

# All Written Submission Supporting Documents

July 9, 2021

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**WS-BOIMMS-1 1211**

**Jared Bothwell**

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**From:** Louisa Dassow [REDACTED]  
**Sent:** Tuesday, 20 April 2021 11:22 am  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary  
**Subject:** Te Pēwhairangi (Bay of Islands) marine mammal sanctuary proposal

Dear DOC,

My name is Louisa Dassow and my feedback for this proposal is simply that Marine Reserves are the best way to start protecting our marine life and I am very very happy with this project.

My recommendation is simply that it should be larger.

We love Marine Reserves. May this be one of many! Love it.

Ngā mihi nui,  
Louisa Dassow  
[REDACTED]

**WS-BOIMMS-1 1214**

**Jared Bothwell**

---

**From:** Annie Hill [REDACTED]  
**Sent:** Thursday, 22 April 2021 9:34 am  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary  
**Subject:** Re: Bay of Islands Marine Reserve  
**Attachments:** image001.png

Kia ora

I should like you to regard my feedback in my email of 15 April accepted as my submission and considered in the statutory consultation process.

Ngā mini

Annie Hill

From my phone

On Thu, 22 Apr 2021, 09:29 Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary, <[boimms@doc.govt.nz](mailto:boimms@doc.govt.nz)> wrote:

Kia ora,

Thanks for previously providing some feedback on the proposal to establish a marine mammal sanctuary in Te Pēwhairangi (Bay of Islands).

Statutory consultation has now begun for the marine mammal sanctuary proposal and we are formally inviting submissions on the proposal. The submission period opened on 20<sup>th</sup> April and is running until 5pm on 18<sup>th</sup> May.

If you would like to have your feedback in the email below considered in the statutory consultation process, please respond to this email confirming that you'd like us to treat your feedback as a formal submission.

Alternatively, please feel free to lodge a submission through one of the methods detailed on our webpage linked below.

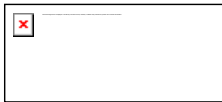
Details of the proposal we are consulting on can be found on our webpage <https://www.doc.govt.nz/boimms>.

If we do not hear back from you before submissions close on 5pm on 18<sup>th</sup> May, your feedback in the email below will not be considered as a submission in the statutory consultation process.

Ngā mihi,

Te Pēwhairangi (Bay of Islands) Marine Mammal Sanctuary Project Team

Department of Conservation - Te Papa Atawhai



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**From:** Annie Hill [REDACTED]  
**Sent:** Thursday, 15 April 2021 3:37 pm  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary <[boimms@doc.govt.nz](mailto:boimms@doc.govt.nz)>  
**Subject:** Bay of Islands Marine Reserve

Kia Ora

Generally, I agree with the proposal for a sanctuary and think that we would all benefit from boats slowing down and making less noise in the Bay. However, whoever has formulated the proposal that sailing boats should "drop their sails" when marine mammals approach is obviously unaware of the realities of a sailing boat. A sailing boat without its sails up, can still drift quickly downwind, but will be out of control. Pulling the sails back up often entails quite a lot of both time and effort, and the necessity possibly to drop them again maybe only a few minutes later, when dolphins decide to come and visit, could mean tiring the crew out to a dangerous extent. A boat under power can alter course to avoid these animals, but a sailing boat is far less manoeuvrable and cannot go directly upwind. Starting the engine - assuming the boat has one - is only going to add to the stress of both parties. Moreover, sailing boats rarely go fast enough to encourage dolphins to bow ride.

I would suggest that a simpler and more effective response would be to enforce a 5 knot speed limit throughout the Bay of Islands. This is also a lot more realistic than suggesting that people try to avoid fast, mobile animals who are determined to approach.

I couldn't manage to access the submission area of your website. Please regard this as my submission.

Regards

Annie Hill

From my phone

Caution - This message and accompanying data may contain information that is confidential or subject to legal privilege. If you are not the intended recipient you are notified that any use, dissemination, distribution or copying of this message or data is prohibited. If you received this email in error, please notify us immediately and erase all copies of the message and attachments. We apologise for the inconvenience. Thank you.

**WS-BOIMMS-1 1217**



To whom it may concern.

In 1999 there were 278 bottlenose dolphins but now there is but a fraction left in the Bay of Islands. There are now only 26 dolphins left! Over the last few years the dolphins' safe place has been destroyed because of the immense boat activity. Also because we are giving them too much love. I think that there should be a big area where boats can't go so then the dolphins can look after their young in peace.

Reason one: distractions from people towards dolphins.

When we are around the dolphins we are not obeying the rules and we are cutting the group off and not giving the mothers and calves enough space to play and feed. When we are around the dolphins the mothers forget about their calves and then come and play with us. This means the calves don't get fed which means they will get hypothermia because they need food to thicken the blubber. Also we are swimming with dolphins which isn't good because then they forget what they are meant to do.

Dolphins aren't safe in the Bay of Islands. There are too many boats close to dolphins and we are going through the dolphins too fast with our motorboats. When we zoom past them with our motor boats we distract them from feeding the young. Don't go near them before lunch time and always look for dorsal fins when going fast in motor boats. The dolphin mortality rate is 75%.

Recommendations from Department of conservation:

The Department of conservation recommends a dolphin sanctuary in the Bay of Islands. I think that because of the rapidly decreasing population of dolphins this is essential.

The department also recommended some rules .

1. No wake within 30 m of dolphin
2. A maximum of 3 boats within a 300 m radius
3. Approach slowly from behind for the side not from front
4. Don't cut them off
5. Don't make sudden moves
6. Don't swim with calves two-thirds the size of their mum
7. Don't make too much noise
8. No boats allowed near a 50 m radius from Whales
9. Stay 200 m away from mothers and calves
10. Scan ahead to see any dorsal fin
11. Don't drive through a dolphin pod
12. Give the pod a wide berth
13. Make the most of Encounters
14. Give all the dolphins NZ Wales lunch break between 11:30 a.m. and 1 p.m.
15. Let Dolphins rest in these places, Waikare inlet, Kerikeri inlet, Te Duna inlet, Deep water cove and Northeast of Waewaetorea Island.

These are the rules that doc are proposing for the Bay of Islands. And I agree with them.

I think that there should be a big area where boats can't go so the dolphins can look after the young.

There needs to be a safe place for dolphins, Give them time to be themselves and give mother's extra space.

WE NEED TO SAVE OUR BOTTLENOSE DOLPHINS WITH THE MARINE SANCTUARY.

Bosco

**WS-BOIMMS-1 122**

To who it may concern:

Dolphin numbers are falling rapidly, with now only 26 today. Over the last 22 years, the Bay of Islands has no longer been a safe place for dolphins to raise their young. The Bay of Islands has been taken over by boats who go out to the Bay of Islands every summer. The department of conservation is proposing a marine sanctuary for the dolphins and I agree with it.

Unfortunately, humans are spending too much time with the dolphins so the dolphins can't eat, care and feed for their young. Humans need to leave the dolphins alone so in the dolphins spare time they can do these things. Summer is when all the boats come to the Bay of Islands and that is when all the calves are born.

Because of humans in the summer of 2019-2020 no new calves were born. There is also a 75% mortality rate for calves. The Bay of Islands is no longer a safe place to raise their young and feed them. Dolphins and humans both like the warm water in the summer, so that is why no calves were born in 2020. Bottlenose dolphins spend 86% of their day eating and feeding.

Bottlenose dolphin numbers are decreasing from 278 in 1999 and now just 26. In 2022 bottlenose dolphins could be locally extinct. Dolphins have a 91% decline in just 21 years. Out of the 26 dolphins in the bay, only 16 constantly visit the Bay of Islands. We need to save the bottlenose dolphins. There needs to be a place in the Bay of Islands where dolphins and calves can be safe.

We don't want the dolphins to be extinct. We need the Bay of Islands to be a safe place for the dolphins to raise their young. We need to respect the dolphins and these rules that the Department of Conservation are placing. We can't swim with calves that are half the size of a fully grown human. You need to be at least 300 meters away from the dolphins if you see them. Also you must not drive through the middle of the pod. These rules will help keep the dolphins safe. If we don't want the dolphins to be extinct, then please follow the rules. Lots of dolphins are hurt from these boats so please, if you're on a boat don't go more than 5 knots when you see dolphins. We are loving our dolphins too much.

In conclusion we need to care and look after these dolphins so they don't go extinct. So please place a marine mammal sanctuary in the Bay of Islands for the dolphins.

From Amalfi

**WS-BOIMMS-1 1220**

#### Bottlenose dolphin in the Bay of Islands

In 1999 there were 278 bottlenose dolphins in the Bay of Islands but now there are roughly 26 bottlenose dolphins today. The problem is that in the summer the dolphins visit but so do lots of people and their boats so dolphins get distracted and don't have time to feed, rest and care for their young. I think you should bring in a law for the dolphins.

How we could help dolphins:

- 1: Give dolphins space
- 2: Stay 300 meters away from pods of dolphins
- 3: Have a maximum of 3 vessels near dolphins
- 4: Leave dolphins in the morning so they can feed, rest and care for their young.

Dolphins have too much contact with people because people chase them and people go too fast around them.

The numbers of calves being born is decreasing with no new calves being born for the first time in the scientific record in 2019/2020. There is also a 75% mortality rate in newborns making it really difficult for numbers to increase.

Therefore my conclusion is they should bring in a law for dolphins. Not just common dolphins, all dolphins.

I would be very sad if these beautiful dolphins were extinct when I'm older because I would love to show my kids these dolphins when I'm older and so will everyone else .

Act now to put in place the proposed marine sanctuary to protect our dolphins for the future.

**WS-BOIMMS-1 1223**

## **Bottlenose dolphins in the Bay of Islands.**

From 278 in 1999 to just 26 today.

I think there should be a law to protect the dolphins.

Dolphins are spending too much time with boats and people. Dolphins need space from humans. Dolphins have no time for their babies because there is humans around. People want to play with them and that is not ok for dolphins. Boats go too close to dolphins. Boats go too fast and hurt the dolphins. People chase them.

The Department of Conservation has recommended that people should follow these rules,

- A maximum of 3 vessels within 300 m of a dolphin.
- no wake allowed within 300 m.
- Approach dolphins Slowly.
- Never drive through dolphins.
- Don't make sudden changes.
- Keep noise to a minimum.
- Scan ahead.
- Slow down
- Give mothers and calves space .

Stay away from these areas

Kerikeri Inlet.

Te puna Inlet.

Waikare inlet.

Deep water cove.

I think that we should have a marine sanctuary for dolphins, because if we don't have one then slowly dolphins will die and become extinct in the Bay of Islands.





**WS-BOIMMS-1 1226**

Did you know that a dolphin can have ten babies and only three live but do you know why? Well because we are going too fast on our boats near the beach; faster than five knots. The time when the dolphins come to our beaches is when everyone goes fishing in summer. In fact in the summer of 2019/2020 no new calves were born and that was a new scientific low record. In 1999 there were 278 bottlenose dolphins today there are only 26. We need to be more aware of and protect the bottlenose dolphins.

I believe that the max of three vessels (jet skis and kayaks) should be allowed within a 300m radius near pods of dolphins. 42 out of 84 worldwide recorded in New Zealand 7.5% decrease in BOI bottlenose dolphins each year. You can find NZ fur seals, long-finned pilot whales, humpback whales and orca/ killer whales in the BOI.

A roopu has formed between DOC and Ngā Hapā kaitiaki o te Pēwhairangi and they are going to have wardens to patrol the bay. Only 16 bottlenose dolphins visit the bay but when they visit it in summer that is the time when boats like to visit too. And because of all that moving around from the boats they don't have anytime to rest, feed their children.

This is why I think we should have a marine reserve in the Bay of Islands and it will help raise the population of bottlenose dolphins and it also keeps them out of trouble. Please pass the law to make a marine sanctuary in the Bay of Islands.

-Mia Wilton

We wrote a letter about bottlenose dolphins to the government so we can try and convince them that there should be a marine reserve in the Bay of Islands for the Bottlenose Dolphins first we had to look at other submissions to the government then we had to take notes on websites about dolphins after that we had to put it on a plan then we wrote it I am very proud of my writing here is my letter.

**WS-BOIMMS-1 1229**

**By 2022 Bottlenose Dolphins Might Go Locally Extinct!!!**

**Did you know that Dolphins In B.O.I are dropping by 91% decline in 21 years. Because in 1999 there was 278 dolphin that visited the bay and now only 16 dolphin visit .As some people might know, the Bay of the Islands isn't a safe place for dolphins and their calves.So in my opinion I agree that the proposal of the marine mammal sanctuary should happen.**

**From over the years there have been some tragedies happening to our bottlenose dolphins that isn't helping the dolphin environment. (Boat strikes,noise population, harassment and separation of mothers from their new calves). Some bottlenose dolphins have died from boat propellers or have been injured because of these reasons.I strongly believe that boats should at least go 10 knots and stay at least 300m from dolphins and their calves.**

**Female dolphins and their calves get disturbed 86% a day by humans and boats, likely getting distracted while sleeping or eating or even from looking after their young ones. Which also means we should give them at least 100m extra space. People should at least give dolphins a 3 - 2 hour free time. So don't approach dolphins between 11:30 - 1:00**

**How can we help?We should respect the local guidelines by scanning for dolphin dorsal fins, slowing down if approaching groups of dolphins, giving dolphins and calves extra space and turning off motors so we don't disturb any activities that are happening. Also let dolphins rest around Waitere Inlet,Kerikeri Inlet,Te Puna Inlet,Deep Water cove and the area northeast of Waewaetorea Island.**

**In conclusion, I strongly believe that if we don't act fast right now our bottlenose dolphins could be extinct by 2022 , In my opinion I agree that the proposal of the marine mammal sanctuary will hopefully help the dolphin environment. Act fast now or their aren't going be any more dolphins in the summers.**

**By:Shaylin Apiata  
From:Bay of island international Academy**



**WS-BOIMMS-1 1232**

To whom it may concern

By 2022 all bottlenose dolphins will be extinct. I agree with the proposal to have a marine mammal sanctuary in the Bay of Islands to save the dolphins.

The boats interact with the dolphins and it interrupts their eating and sleeping routine. Sometimes boats drive straight thru the pod of dolphins which causes the dolphins to be scared or they get hurt by the boats propeller and they could possibly leave the bay. Sometimes the dolphins don't want to raise their babies in the bay because of all the boats that don't keep 300m away from the pod. If the dolphins come near boats you have to turn off the engine and let them go by. If you do not turn off the engine the dolphins can get caught up in the blades. Dolphins come into the bay at summertime but that is when all the boats normally come to the bay for the holidays.

In 1999 there were 278 Bottlenose dolphins, since then the population dropped 91 per cent and now we only have 26 in 2020. Now only 16 visit the bay frequently and that is continuing to decline. Sadly only 3 out of 10 baby dolphins survive their first year which means that the population will not be able to go up.

The Department of Conservation recommends that we can help by scanning ahead for fins so you know where the dolphins are. When you see dolphins we can keep a low speed or completely turn off your boat so you do not hurt them. There is a Max of 3 Boats within 300 m from the dolphins. You should follow the dolphins from behind or the sides if you want to see them. You should not drive through a group of dolphins. Please follow the rules when interacting with dolphins. Give dolphins a break between 11:30 am to 1:00 pm. The proposed sanctuary suggests some rest areas for the dolphins at Kerikeri Inlet, Deep Water Cove, Te Puna Inlet and Waikare inlet. That is what we can do to help these dolphins

Now for all these reasons I agreed with the government proposal for a marine mammal sanctuary so we can protect our bottlenose dolphins in the bay or else they will not be here for long.

kind regards Nate



**WS-BOIMMS-1 1235**

**To whom it may concern**  
**Dolphins Dying in the Bay of Islands**

*Most people know now that there are only 26 bottlenose dolphins that visit the Bay of Islands. Since 1999 the dolphins in the Bay of Islands have decreased by 91%. This is happening because they are spending too much time with humans, I believe that there should be a law put in place to protect the dolphins.*

**What we can do to Protect the Dolphins**

*People should stay 300m away from dolphins, if within range only go 5 knots and only three vessels at a time. Also do not go to these places; Waikare Inlet, Kerikeri Inlet, and Deep Water Cove. These are only a few of the places that the DOC stays not to go to.*

**Give Dolphins a Rest**

*Give dolphins a lunch break of 1 hours 30 minute from 11:30 to 1:00 When dolphins come in the summer people do too. This gives the dolphins no time to rest, eat and care for their young. In 1999 there were 278 but today there are only 26 that visit the Bay of Islands. They spend 86% of their time with humans and their boats.*

**Dolphin Decline**

*In the last 22 years their numbers have declined by 91%, that is a 7.5% decline each year. Also there is a 75% mortality rate in calves. From 278 in 1999 to just 26 recognisable individuals in 2020. Of this 26, only 16 now frequently visit the Bay*

**Conclusion**

*In conclusion I believe that there should be a law in place. There are many other reasons why there should be a law but I think these are the main reasons. If it keeps going like this by 2022 the bottlenose dolphins in the Bay of Islands will be locally extinct.*

*From Julien*

**WS-BOIMMS-1 1238**

## Marine summary for dolphins in the Bay of Islands

278 in 1999 to only 26 to this day.

91% of dolphins have disappeared in the past 21 year.

Having a marine sanctuary is a good idea so that dolphins do not decline even more.

When us people distract dolphins from their calves there's a chance that they are not looked after properly and are likely to die . I suggest that there are safe spots for dolphins that should be located at waikare inlet ,puna inlet and deep water cove.

In summer times everybody loves fishing and swimming but when boat go zooming thru a pod of dolphins there's a chance I that the propeller damage a dolphin, that is why I think we should stay about 100m away from dolphins because boats are distracting the dolphins from there normal activity such as feeding there baby calves and sleeping . I believe we should leave dolphins alone between 11:30 to 1:00 so that the dolphins can be dolphins.

In conclusion i agree we should get a marine sanctuary because it is our job to protect these dolphins from declining even more in the Bay of Island

From Koralee apiata  
Bay of island international

**WS-BOIMMS-1 1241**

To whom it may concern,

Did you know that we are known as the marine mammal capital? You can find species such as New Zealand fur seals to bottlenose dolphins. Sadly we can't say that our bay in Paihia is thriving with bottlenose dolphins. We are losing our dolphins and it makes me sad. I think it's absurd that there is no law to save these dolphins.

Leading from my previous paragraph, the bottlenose dolphins were an unbothered population of 278 in 1999, now in 2021 they are a shocking number of 26! Now only having 9.35% of the population we used to have, only 16 of the 26 still come and visit the Bay of Islands. Scientists have said that there has been a 7.5% decrease in bottlenose dolphins each year and that no new calves were born in the summer of 2019/2020, that's terrible!

From my visits to the bay, I can say that they are getting too much human contact. Everyone likes going out on the water in summertime, sometimes for a swim or for a fish, but even the dolphins like the summer waters in the Bay. When people go out on their boats for a swim they are oblivious to the fact that they might be separating pods of dolphins or hitting them. They also don't know that they occupy 86% of those same dolphins' time that they could be using to sleep, eat or care for their young.

I believe that we should give the dolphins some time to be alone. I think that having a few hours of peace without any boats would be good for them. I think that those 2 or 3 hours should be between 10-12 am. I think the roopu between DOC and Nga Hapu kaitiaki o te Pewhairangi is a good start as well as the wardens going around the bay and monitoring. I also think that there should be a curfew for boats as well. I think having all the boats in at at least 7pm is a good way to give the dolphins rest.

Concluding this submission, I think that it's insane that no laws have been put up until now, when they are on the brink of extinction in our Bays. I think that they deserve to live and that no animal should go extinct in our waters. If I ever have children I would want them to be able to see the dolphins when they go out to the ocean. I would also love to be able to come back to Paihia and know that these dolphins are thriving and enjoying their time in our waters. Now that this submission is ending, I would like to say that I will be glad to see these dolphins back in the Bay!

Molly Para

**WS-BOIMMS-1 1244**

To whom it may concern:

By 2022, dolphins could be locally extinct.

Over the last 20 years, the Bay of Islands has become an unsafe place for the dolphins and their calves. I agree with the proposed marine sanctuary.

The Bay of Islands is a fun location for people, especially during summer, and many people enjoy zooming around on boats. But they probably don't know that dolphins also enjoy Bay of Island summers. In fact, dolphins are usually born from December to February. Dolphins spend 86% of their day surrounded by us and our boats, and that distracts them from eating, sleeping and looking after their new calves. Dolphins need time to be dolphins.

There has been a 75% mortality rate in newborns, the highest seen in the world. Not to mention, over the summer of 2019/2020, no calves were born. Calves are hugely important to the welfare and numbers of the dolphins, and if no calves are being born, the numbers will be decreasing even more rapidly.

In 1999, there were 278 dolphins. Right now, there are 26. And only 16 of those 26 are frequently visiting the Bay of Islands. That's a 91% decline in just under 22 years. All these statistics proven by scientists show we *need* to save these dolphins.

Now you understand why we need to protect our spectacular marine mammals. Imagine telling your grandchildren about how dolphins *used to* live here in the Bay.

The Bay of Islands should be a safe place for dolphins and their calves, and need to be protected. I took this photo earlier this year. I would love to be able to take another photo like this, to be able to say, "This photo is of the dolphins in the Bay of Islands!"

We need to save our dolphins!







**WS-BOIMMS-1 1247**

## To who may concern

Bottlenose dolphin numbers in the Bay of Islands are falling dramatically. From 278 in 1999 to just 26 today. The numbers have fallen so much in just a little bit of time so I think New Zealanders should have a say on a proposed marine mammal sanctuary in the Bay to stop people from hurting these lovely creatures.

We wonder what will the marine mammal sanctuary do about this problem? What needs to happen is no swimming with marine mammals, vessels to maintain a 400m distance from marine mammals and within the Bay of Islands, vessel speed to be restricted to 5 knots within marine mammal sites. If you go around these areas keep your speed at least 3 knots waikare inlet, kerikeri inlet, te puna inlet, Deep water cove, area northeast of waewaetorea these are the designated rest areas for dolphins in the Bay.

There is too much contact with these mammals. The proposal developed jointly with nga Hapu o te pewhairangi and DOC outlines some much needed rules to help protect the marine mammals. Latest research shows a 75% mortality rate for these dolphins. With so many boats on the water as people enjoy the summer, that is also the time when some marine mammals have their babies and it is not safe for them to be around humans. With the distraction of humans on their boats means the babies can't feed from their mothers. The behaviors of these mammals are critical to their survival.

So it is my opinion that we should have a marine mammal sanctuary. We have to stop making contact with them because it is too dangerous for them, for the reason we will need to have rangers out on patrol. So can we please make a marine mammal sanctuary.

From Shaun R

**WS-BOIMMS-1 125**

**From:** [Gary Underwood](#)  
**To:** [Bay of Islands \(Te Pēwhairangi\) Marine Mammal Sanctuary](#)  
**Subject:** BoI Marine sanctuary  
**Date:** Wednesday, 21 April 2021 11:40:16 am

---

Sirs

Some of the proposals are unworkable.

I have only ever been a 5 knot boat. Which attracts the Marine mammals.. They like to play around my boat. You expect me to stop?

The problem has been all the tourist boats hownding them plus the fast boats and their noise.

I don't anchor at Roberton or Entico any more due to the wakes.

Gary Underwood

**WS-BOIMMS-1 1250**

# Why bottlenose dolphins need to be protected?

Did you know in 1999 there were 278 and 26 today. Of these 26 bottlenose dolphins only 16 visit the bay. Scientist's research shows that 91% declined in the Bay of Islands. That's a 7.5% decrease in the Bay of Islands every year. We need to provide safety for the bottlenose dolphins, the population is fading away very quickly. In my opinion we need to save these dolphins before it's too late.

Why is it that bottlenose dolphins have so many injuries? Main injuries are caused by propellers. When locals approach pods of dolphins they mustn't change direction or speed suddenly. If you see a dolphin half the size of a grown human don't go any closer than 300m. Don't swim with bottlenose dolphin calves.

Summer is a big holiday for lots of people and everyone is out on the water swimming at the same time the dolphins are feeding their calves and feeding themselves. Boats and swimmers don't give the dolphins enough time to rest and care for their peers.

To solve this problem we need to follow these rules:

- 3 vessels allowed within 300m of a pod.
- Keep slow around dolphins.
- When your approaching dolphins do it on the side or behind.
- Don't speed or change your direction all of a sudden
- Don't swim with calves
- Be quiet not too loud around dolphins
- No boats allowed 50m of whale or 200m of female whales and calves.

Safe rest areas for these dolphins:

- Waikare Inlet



- Kerikeri Inlet
- Te Puna Inlet
- Area northeast of Waewaetorea Islands
- Deep water cove

I agree with proposed marine sanctuary to not have too much contact with people, They are not safe in Bay Of Islands and how we can keep them safe. We need to save these bottlenose dolphins now before it too late.

**WS-BOIMMS-1 1253**

## Why we need to protect Bottlenose dolphins.

The bottlenose dolphin population is crashing, we need to act fast. In 1999 there were only 278 bottlenose dolphins in the Bay of Islands; now at this moment there are only 27 bottlenose dolphins swimming in the bay.

Bottlenose dolphins spend 86% of their days surrounded by boats, jet skis, kayaks and more. These things can affect the way they eat, sleep, and how they take care of their calves.

These dolphins can get hurt and scared by boats driving by, speeding and changing directions all of a sudden. Calves can get split up from their parents if people cut across the pods.

In summer in the Bay of Islands, it is common for boats to drive through the middle of a dolphin pod at high speed – because either they haven't seen the dolphins or they think they will get out of the way.

But dolphins can get hit by propellers, and some have died from their injuries. In the bay over summer many people want to get close to the dolphins, but getting too close can harm them and their calves. That's why I think that people should stay at least 100 meters away from the dolphins, so they can have some space.

Conservation minister Kiri Allan announced a mammal sanctuary covering most of the Bay of Islands, to provide much needed safety for the bottlenose dolphin population. I suggest that we should have a time-span between 11:00am to 1:00pm to watch the dolphins, then after that time the dolphins will be able to spend the rest of their day with their calves

I agree that we should have a marine sanctuary, because it will protect the bottlenose dolphins and other marine animals in need.

By: Mika silich

From: Bay Of Islands International Academy



**WS-BOIMMS-1 18101**

Did you know in 1999 there were 278 bottlenose dolphins and in 2020 there were 26 bottlenose dolphins and in 2021 there are just 16 bottlenose dolphins that come to the Bay of Islands today?

If we don't look after the bottlenose dolphins they will most likely be extinct by 2022 and the other people can't see the amazing creatures that we have in New Zealand.

Scientific records say that in 2019/2020 no new calves were born for the first time in scientific record. Also, calves have a 75% mortality rate.

We need to leave the dolphins alone so they can feed their calves and so they can sleep and spend time with their babies and grow and thrive.

If you see a pod of dolphins and they are about the size of half a man you have to be 100 meters away from the pod and if you see a pod you have to leave them alone.

Therefore I believe that we desperately need a marine mammal sanctuary and rules to protect the dolphins.

**WS-BOIMMS-1 18104**

There has been a 9 per cent decline in the local Bay of Islands bottlenose dolphin population.

I would support the government proposing a marine mammal sanctuary to save them.

Best of all the Ngā Hāpu o te pēwhairangiis working with the DOC and together they would protect all marine mammals.

(DOLPHINS HAVING TOO MUCH CONTACT FROM PEOPLE)

WARNING! Tourism presents new threats to our marine mammals. Human related threats known to bottlenose dolphins include entanglement in recreational and commercial fishing gear or illegal feeding.

There's been many illnesses passed from dolphins to human visitors, including viral, fungal, and bacterial infections.

(DOLPHINS NOT BEING SAFE)

Eventually there were 16 species of dolphins that are considered to be in danger of extinction according to the endangered species act.

Approximately 14 species are believed to be endangered and 1 is thought to be extinct.

For these years that have passed we should keep our dolphins safe so they can't be killed.

For the reasons for this submission we should get more dolphins in the future.



**WS-BOIMMS-1 18107**

TO WHOM MAY CONCERN

278 is how many dolphins we had in 1999. It is now 2021 and there are only 26 dolphins in the Bay of Islands. I believe that if we keep going on like this our dolphins could go locally extinct. That's why I believe we need to have a marine sanctuary in the Bay of Islands.

Dolphins are surrounded by humans and boats 86% of the day, which distracts them from eating and sleeping. It is no longer safe to raise the young because they are getting distracted too much and can not put enough attention to the younglings.

It is no longer safe for dolphins to swim around too because boats can separate the dolphins from their pods and they can hit the dolphins if the boat's drive too fast. I believe that boats should stay at least 100 meters away from the dolphins because the dolphins need space. If boats want to get close to dolphins they should only be allowed for a certain time then leave them for 2 hours to have their lunch. Those times when they are given space should be 11:00am till 12:00am. The places where there should be a marine reserve should be Kerikeri inlet, Deep water cove and Te Puna inlet.

In conclusion I believe we should have a law that states the dolphins independence and a marine reserve in the Bay of Islands. Because I am pretty sure that I don't want to have to be a parent that tells the story of an extinct animal called the dolphin.

FROM MAX

**WS-BOIMMS-1 1889**

**From:** Rosemary Gardner [REDACTED]  
**Sent:** Friday, 23 April 2021 7:55 am  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary; Steve Southworth; Katrina Frankum; Karen Poole; Karin Hoksbergen; Adele Jones; Adriana Sofia Ruiz Restrepo; Unnati Lal  
**Subject:** Fw: Excellent Proposal to create a Marine Sanctuary and I highly support it!

Bay of Islands Marine Mammal Sanctuary;

Please accept my submission of support for the formation of the Bay of Islands Marine Sanctuary. This is a once in a life time opportunity to preserve and protect all marine mammals and all marine life in an ecologically perfect environment. If we as a community do not respond quickly to eliminating the dangers that are killing our marine mammal populations, we may lose these miraculous animals forever.

In a recent publication from DOC it was stated that there are 26 Bottlenose Dolphins living in the Bay and 12 babies were born the last five years with only two babies surviving. Under the current circumstances, the dolphins are in danger of extinction due to lack of food and too many boats near the dolphins can stop them from resting and feeding. It can be stressful for them especially for mums looking after their young. I have personally seen boats chasing pods of dolphins knowing there were babies in the pod struggling to keep up with their mum. This results in the low survival rate of the young. There is also another danger of over fishing, hooks, lines and nets discarded in the bay and ocean which can cause serious and permanent damage to marine life.

The Bay of Islands could be an excellent breeding ground for all marine life and now is the time to preserve our beautiful ocean environment. Thank-you for your efforts in completing this important work.

Respectfully Submitted,

Dr. Rosemary Gardner

----- Forwarded Message -----

**From:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary <boimms@doc.govt.nz>  
**To:** Rosemary Gardner [REDACTED]  
**Sent:** Thursday, April 22, 2021, 09:26:53 AM GMT+12  
**Subject:** RE: Excellent Proposal to create a Marine Sanctuary and I highly support it!

Kia ora,

Thanks for previously providing some feedback on the proposal to establish a marine mammal sanctuary in Te Pēwhairangi (Bay of Islands).

Statutory consultation has now begun for the marine mammal sanctuary proposal and we are formally inviting submissions on the proposal. The submission period opened on 20<sup>th</sup> April and is running until 5pm on 18<sup>th</sup> May.

If you would like to have your feedback in the email below considered in the statutory consultation process, please respond to this email confirming that you'd like us to treat your feedback as a formal submission.

Alternatively, please feel free to lodge a submission through one of the methods detailed on our webpage linked below.

Details of the proposal we are consulting on can be found on our webpage <https://www.doc.govt.nz/boimms>.

If we do not hear back from you before submissions close on 5pm on 18<sup>th</sup> May, your feedback in the email below will not be considered as a submission in the statutory consultation process.

Ngā mihi,

Te Pēwhairangi (Bay of Islands) Marine Mammal Sanctuary Project Team

Department of Conservation - Te Papa Atawhai

**From:** Rosemary Gardner [REDACTED]  
**Sent:** Friday, 16 April 2021 9:07 am  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary <boimms@doc.govt.nz>  
**Subject:** Excellent Proposal to create a Marine Sanctuary and I highly support it!

Thank-you for your efforts to protect the dolphins as well as all marine animals. Many times I have seen dolphins chased by boats even when it is well known there is a baby within the pod. The Bay of Islands has the potential to be a sanctuary for all marine life.

Respectfully Submitted,

Dr. Rosemary Gardner

Sent from [Mail](#) for Windows 10

Caution - This message and accompanying data may contain information that is confidential or subject to legal privilege. If you are not the intended recipient you are notified that any use, dissemination, distribution or copying of this message or data is prohibited. If you received this email in error, please notify us immediately and erase all copies of the message and attachments. We apologise for the inconvenience. Thank you.

**WS-BOIMMS-1 1892**

Dolphin numbers in the bay of the island are falling dramatically.

From 278 dolphins in 1999 to just 26 today.

Encouraging New Zealanders to have their say on a proposed marine mammals sanctuary.

What will the sanctuary do?

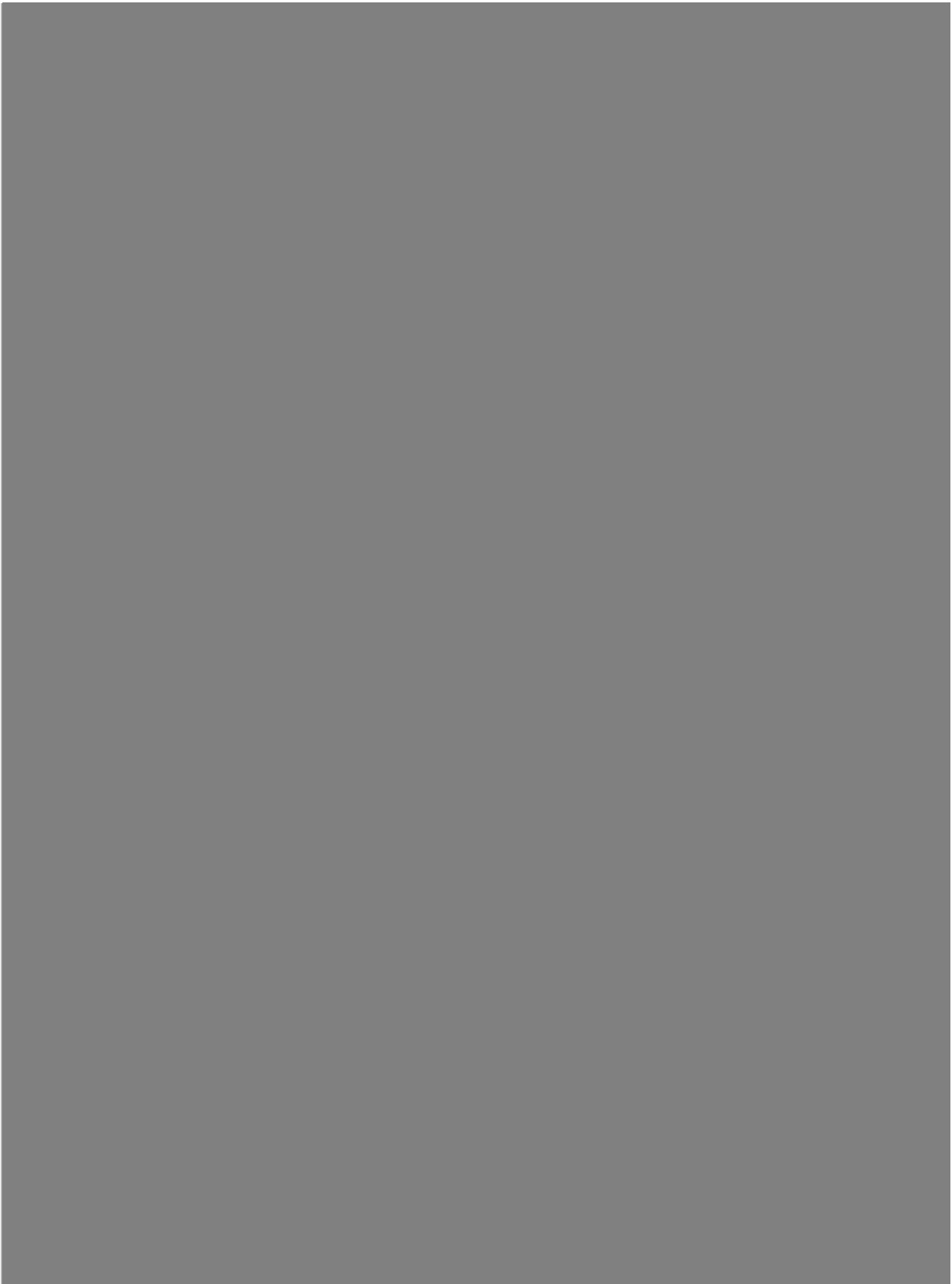
- Do not swim with mammals.
- Vessels to maintain a 400m distance from marine mammals and within the bay of islands.
- Vessels speed to be restricted to 5 knots
- Latest research shows 75% calf mortality rate

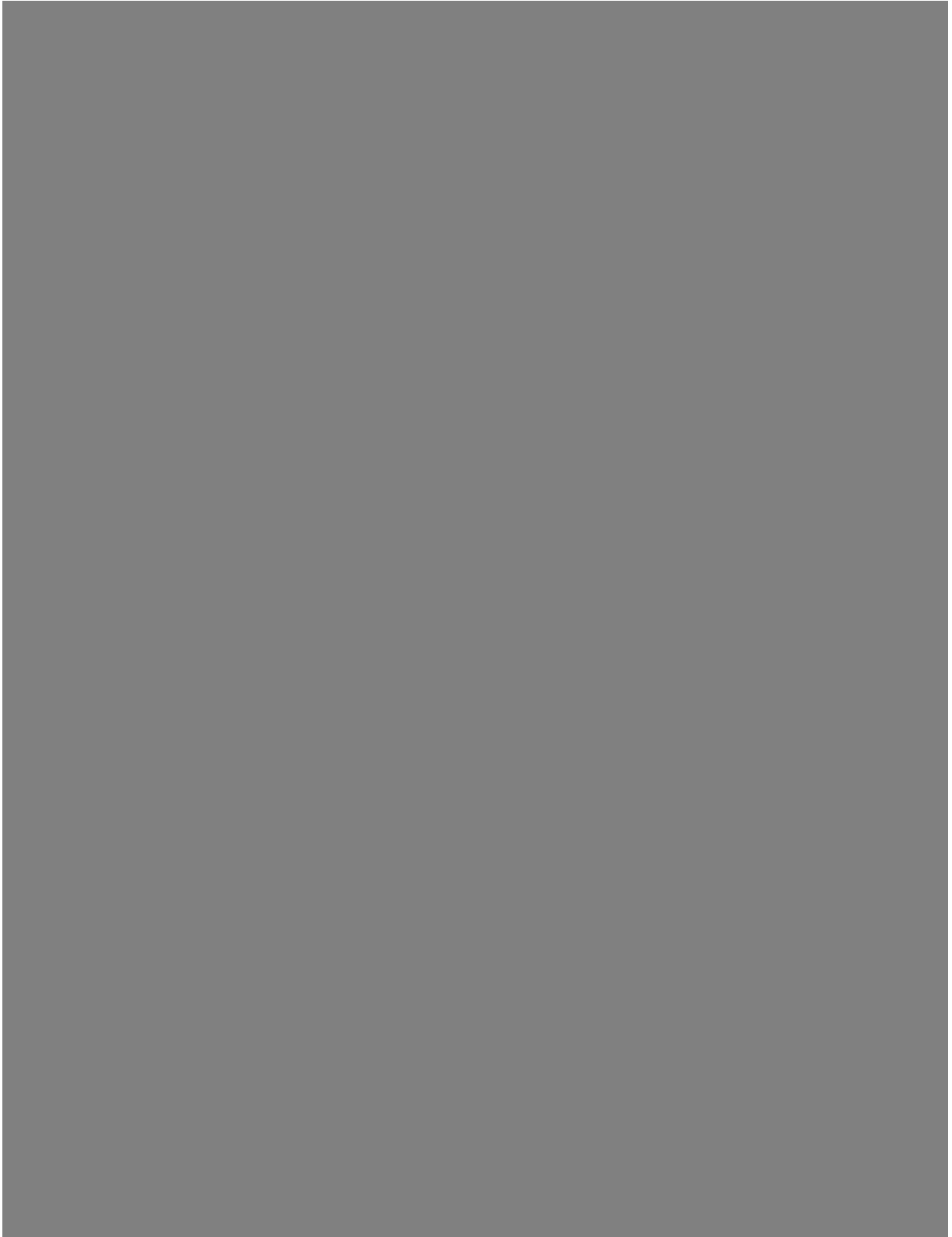
I believe that we should make a marine mammal sanctuary for these dolphins because next thing you know they are all going to be extinct. And it will probably be our last chance to see any bottlenose dolphins around the bay of islands. So I say we should make a marine mammal sanctuary. Please help save these marine mammals and their all we have.

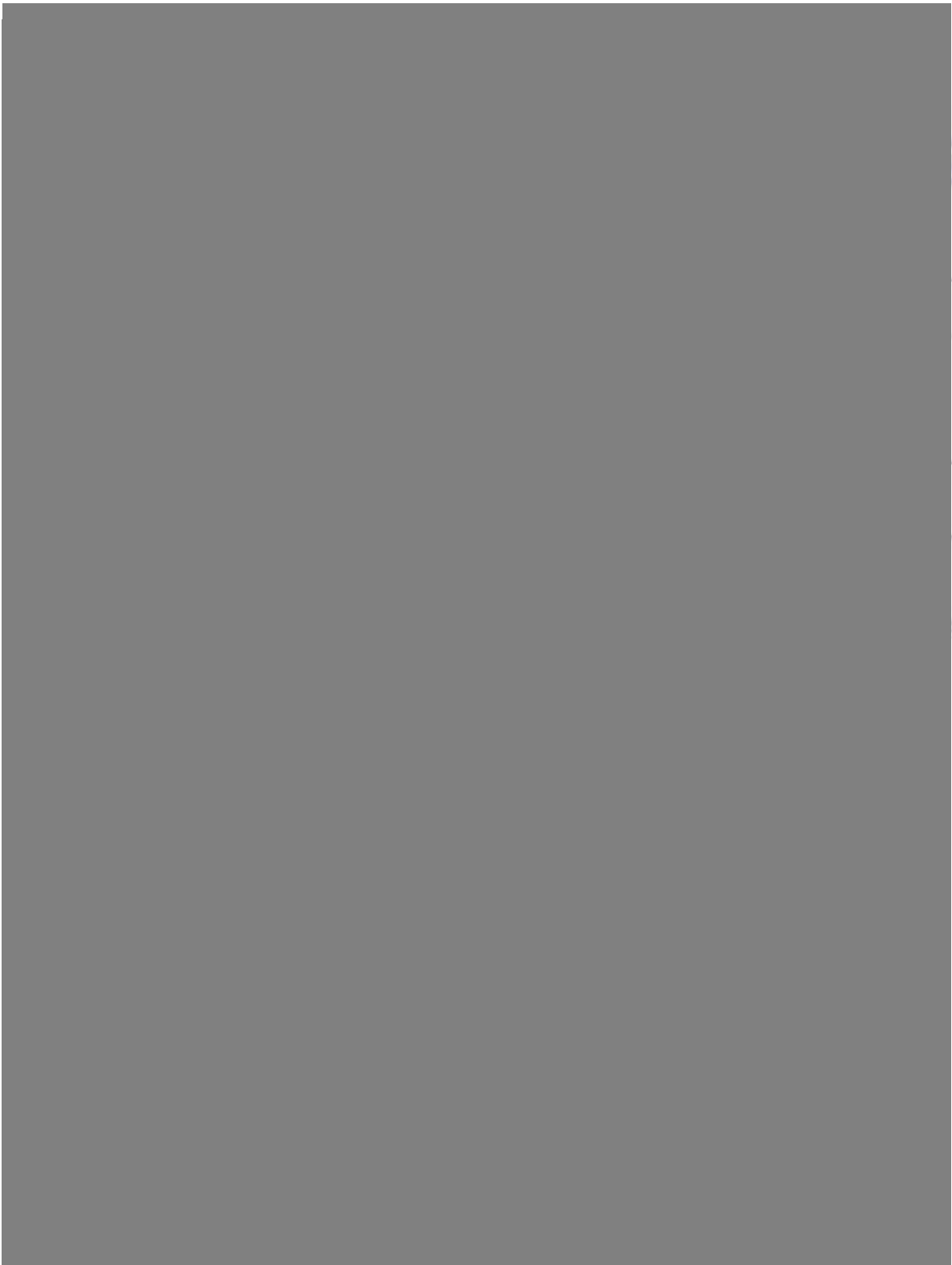
From Stacy George



**WS-BOIMMS-123110**









**WS-BOIMMS-123116**

**Te Pēwhairangi (Bay of Islands) marine mammal sanctuary proposal submission form**



**Your details**

Your name: Felix Case 7  
 Organisation (if applicable): NO  
 Street address: [REDACTED]  
 Suburb: [REDACTED]  
 City: [REDACTED]  
 Region: [REDACTED]  
 Email address: [REDACTED]  
 Phone number: [REDACTED]

Are you whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area?

Yes  No

If you answered yes, please provide details (eg. which hapū and/or iwi do you affiliate to):

**Which group(s) best describes your interest:**

- Northland / Te Pēwhairangi Bay of Islands community member
- Whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area
- Recreational maritime vessel operator
- Commercial maritime vessel operator
- Local business owner
- Local community group
- Member of the New Zealand general public
- Science and research
- Environmental groups
- Other (please specify): \_\_\_\_\_

**Official Information Act 1982**

Please note that any submission you make will become public information and that anyone can ask for copies of all submissions under the Official Information Act 1982.

The Official Information Act states that we must make information available unless there is a good reason for withholding it and provides a list of such reasons in sections 6, 9 and 18. If you think there is a good reason to withhold specific information, please state this in your submission. A good reason may include commercial confidentiality or that it is personal information. Note that any decision that is made by DOC to withhold information can be reviewed by the Ombudsman, who may require the information to be released.

I would like specific information in my submission withheld.

Please state the reasons for wanting specific information in this submission withheld.

### Your submission

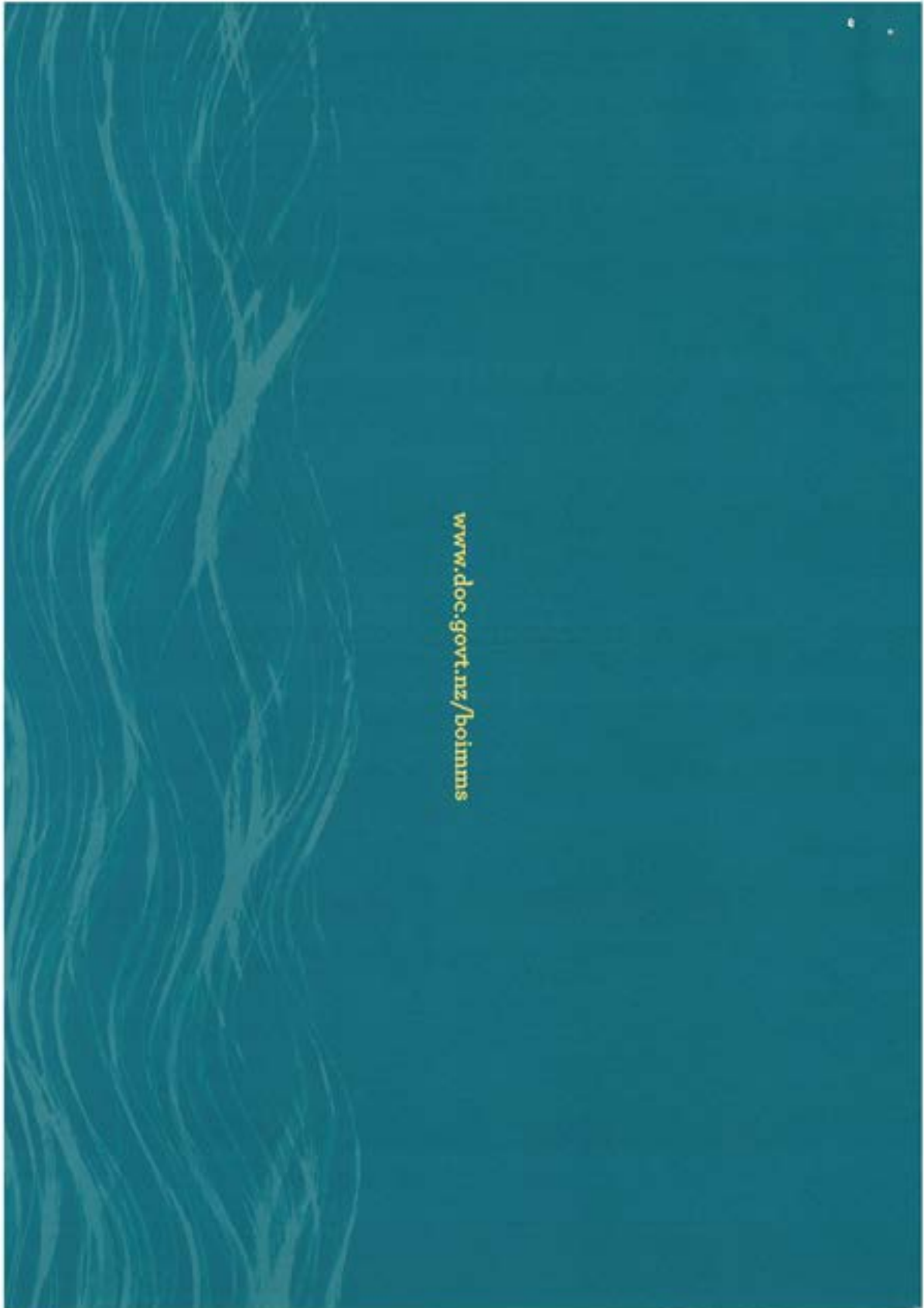
You can provide any feedback on the proposed marine mammal sanctuary you would like. However, answering the following questions may assist in making your submission:

1. Do you support or oppose the proposed marine mammal sanctuary?  
If so, why, or why not?
2. Do you believe the proposal should be changed or amended?  
If so, what changes would you propose, and why?
3. Do you agree with how we have characterised the problem, objectives, and impacts?  
If not, how would you change it?

I support dolphins, ~~and~~ so I support and so  
 but not very interesting and not interesting.  
 I love them they're the best I want to  
 visit this and I'm not. I want to save  
 they're kind of lives.







**WS-BOIMMS-123119**

**Te Pēwhairangi (Bay of Islands) marine mammal sanctuary  
proposal submission form**



**Your details**

Your name: Rory Fisher

Organisation (if applicable):

Street address:

Suburb:

City:

Region:

Email address:

Phone number:

Are you whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area?

Yes  No

**If you answered yes, please provide details (eg, which hapū and/or iwi do you affiliate to):**

**Which group(s) best describes your interest:**

- Northland / Te Pēwhairangi Bay of Islands community member
- Whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area
- Recreational maritime vessel operator
- Commercial maritime vessel operator
- Local business owner
- Local community group
- Member of the New Zealand general public
- Science and research
- Environmental groups
- Other (please specify):

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I would like specific information in my submission withheld.

**Please state the reasons for wanting specific information in this submission withheld.**

**Your submission**

You can provide any feedback on the proposed marine mammal sanctuary you would like. However, answering the following questions may assist in making your submission:

1. Do you support or oppose the proposed marine mammal sanctuary?  
If so, why, or why not?  
I support the proposed marine mammal sanctuary because I can come back in a few years time & see alot of Dolphins.
2. Do you believe the proposal should be changed or amended?  
If so, what changes would you propose, and why?  
I Do not think the proposal should be changed or amended
3. Do you agree with how we have characterized the problem, objectives, and impacts?  
If not, how would you change it?  
Yes

**WS-BOIMMS-123122**

Te Pēwhairangi (Bay of Islands) marine mammal sanctuary  
proposal submission form



**Your details**

Your name: Andrew Fisher

Organisation (if applicable):

Street address:

Suburb:

City:

Region:

Email address:

Phone number:

Are you whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area?

Yes

No

If you answered yes, please provide details (eg, which hapū and/or iwi do you affiliate to):

**Which group(s) best describes your interest:**

Northland / Te Pēwhairangi Bay of Islands community member

Whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area

Recreational maritime vessel operator

Commercial maritime vessel operator

Local business owner

Local community group

Member of the New Zealand general public

Science and research

Environmental groups

Other (please specify): Environmental Business Owner

**Official Information Act 1982**

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I would like specific information in my submission withheld.

Please state the reasons for wanting specific information in this submission withheld.

### Your submission

You can provide any feedback on the proposed marine mammal sanctuary you would like. However, answering the following questions may assist in making your submission:

1. Do you support or oppose the proposed marine mammal sanctuary?  
If so, why, or why not?
2. Do you believe the proposal should be changed or amended?  
If so, what changes would you propose, and why?
3. Do you agree with how we have characterised the problem, objectives, and impacts?  
If not, how would you change it?

① I support the proposed marine mammal sanctuary because we are losing our fellow species and they won't come back. We can still make a difference.

② Let's get this passed the sanctuary going.

③ Yes, we are being short sighted and not seeing a legacy.



**WS-BOIMMS-123125**

**Te Pēwhairangi (Bay of Islands) marine mammal sanctuary  
proposal submission form**



**Your details**

Your name:

Mel Pinfold

Organisation (if applicable):

Street address:

Suburb:

City:

Region:

Email address:

Phone number:

Are you whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area?

Yes

No

If you answered yes, please provide details (eg, which hapū and/or iwi do you affiliate to):

**Which group(s) best describes your interest:**

Northland / Te Pēwhairangi Bay of Islands community member

Whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area

Recreational maritime vessel operator

Commercial maritime vessel operator

Local business owner

Local community group

Member of the New Zealand general public

Science and research

Environmental groups

Other (please specify):

**Official Information Act 1982**

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I would like specific information in my submission withheld.

Please state the reasons for wanting specific information in this submission withheld.

### Your submission

You can provide any feedback on the proposed marine mammal sanctuary you would like. However, answering the following questions may assist in making your submission:

1. Do you support or oppose the proposed marine mammal sanctuary?  
If so, why, or why not?
2. Do you believe the proposal should be changed or amended?  
If so, what changes would you propose, and why?
3. Do you agree with how we have characterised the problem, objectives, and impacts?  
If not, how would you change it?

I support the Marine Mammal Sanctuary as I think it is important to take steps now to ensure ~~the population~~ that the dolphin population has a chance to regenerate in the Bay of Islands.

**WS-BOIMMS-123128**

Te Pēwhairangi (Bay of Islands) marine mammal sanctuary  
proposal submission form



**Your details**

Your name: Cecilia Fisher

Organisation (if applicable): \_\_\_\_\_

Street address: \_\_\_\_\_

Suburb: \_\_\_\_\_

City: \_\_\_\_\_

Region: \_\_\_\_\_

Email address: \_\_\_\_\_

Phone number: \_\_\_\_\_

Are you whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area?

Yes  No

If you answered yes, please provide details (eg, which hapū and/or iwi do you affiliate to): \_\_\_\_\_

**Which group(s) best describes your interest:**

- Northland / Te Pēwhairangi Bay of Islands community member
- Whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area
- Recreational maritime vessel operator
- Commercial maritime vessel operator
- Local business owner
- Local community group
- Member of the New Zealand general public
- Science and research
- Environmental groups
- Other (please specify): \_\_\_\_\_

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I would like specific information in my submission withheld.

Please state the reasons for wanting specific information in this submission withheld.

### Your submission

You can provide any feedback on the proposed marine mammal sanctuary you would like. However, answering the following questions may assist in making your submission:

1. Do you support or oppose the proposed marine mammal sanctuary?  
If so, why, or why not?
2. Do you believe the proposal should be changed or amended?  
If so, what changes would you propose, and why?
3. Do you agree with how we have characterised the problem, objectives, and impacts?  
If not, how would you change it?

I whole heartedly support the proposed marine mammal sanctuary. I have been coming here to visit the dolphins and other wildlife for the past 25 years and now there are hardly any sightings of these wonderful creatures. I would love for other areas of NZ to follow these sanctuaries so that we as a whole can sustain these fascinating mammals.

**WS-BOIMMS-123131**

**Te Pēwhairangi (Bay of Islands) marine mammal sanctuary  
proposal submission form**



**Your details**

Your name: Wendy Fisher (ia)

Organisation (if any):

Street address:

Suburb:

City:

Region:

Email address:

Phone number:

Are you whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area?

Yes

No

**If you answered yes, please provide details (eg. which hapū and/or iwi do you affiliate to):**

**Which group(s) best describes your interest:**

Northland / Te Pēwhairangi Bay of Islands community member

Whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area

Recreational maritime vessel operator

Commercial maritime vessel operator

Local business owner

Local community group

Member of the New Zealand general public

Science and research

Environmental groups

Other (please specify):

**Official Information Act 1982**

Please note that any submission you make will become public information and that anyone can ask for copies of all submissions under the Official Information Act 1982.

The Official Information Act states that we must make information available unless there is a good reason for withholding it and provides a list of such reasons in sections 6, 9 and 18. If you think there is a good reason to withhold specific information, please state this in your submission. A good reason may include commercial confidentiality or that it is personal information. Note that any decision that is made by DOC to withhold information can be reviewed by the Ombudsman, who may require the information to be released.

I would like specific information in my submission withheld.

**Please state the reasons for wanting specific information in this submission withheld.**



### Your submission

You can provide any feedback on the proposed marine mammal sanctuary you would like. However, answering the following questions may assist in making your submission:

1. Do you support or oppose the proposed marine mammal sanctuary?  
If so, why, or why not?
2. Do you believe the proposal should be changed or amended?  
If so, what changes would you propose, and why?
3. Do you agree with how we have characterised the problem, objectives, and impacts?  
If not, how would you change it?

Yes I support the proposal for the marine mammal sanctuary because I would love to see more dolphins in the bay as I haven't seen any yet. One day I would like to bring my family to experience the dolphins and see them enjoying their lives.

Zara 499 90

**WS-BOIMMS-123134**

**Ryan Jagers**

---

**Sent:** Friday, 30 April 2021 11:40 am  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary  
**Subject:** Marine Mammal Sanctuary

**Follow Up Flag:** Follow up  
**Flag Status:** Completed

Kia ora

I'm writing as an individual kayaker to support the Marine Mammal Sanctuary in the Bay of Islands. This year I spent a very enjoyable week kayaking off Urupukapuka island.

The reduction of the dolphin population by 90% since the 90s is shocking. All vessels, especially motorised ones, should keep their distance. As a kayaker, it's always a delight if dolphins choose to approach us but we should never disturb them.

May I suggest this sanctuary is urgently followed by a proposal for a significant Marine Reserve to protect their food sources too.

Ngā mihi | Warm regards

Celia Wade-Brown  
Mangatāreere Valley  
Carterton 5791



**WS-BOIMMS-123137**

**Ryan Jagers**

---

**Sent:** Friday, 30 April 2021 9:34 am  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary  
**Subject:** Marine mammal reserve

**Follow Up Flag:** Follow up  
**Flag Status:** Completed

You can't ask people to stop and let dolphins swim through And 400 meters is absolutely stupid Leave everything as it is

Sent from my iPhone

**WS-BOIMMS-125152**

**From:** Patrick Kaines [REDACTED]  
**Sent:** Tuesday, 4 May 2021 6:55 pm  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary  
**Subject:** MMS proposal submission:

Patrick Kaines, [REDACTED]  
email: [REDACTED]  
phone: [REDACTED]

I cannot support the proposed Marine Mammal Sanctuary. DOC fails to make its case with scientific analysis data. Parts of the safe zone requirements are unworkable, and enforcement of the rules may not always be attainable.

The entire proposal should be withdrawn and further comprehensive analysis into the root cause(s) of declining numbers be evaluated.

I don't think DOC is onto the root causes. Root causes must be identified and corrective measures evaluated before any meaningful improvement will be made. Identifying root causes is often like peeling back layers of an onion.

DOC does not adequately prove vessel activity is the cause for diminishing numbers of dolphins in the Bay. I don't dispute the decline in numbers, but think factors other than vessel activity play a more important aspect. Where is the analysis of the food supply chain, water quality and other environmental factors such as water temperature and noise?

What has changed in the Bay since 1997?

- More commercial viewing vessels, and more vessel traffic overall
- Degradation of fish stocks
- Degradation of water quality
- Increase in aquaculture activity
- Changes in ecosystem of the Bay
- Other

If the food supply chain is broken, then dolphin numbers will decrease as well as their activities. Diminished food supply will mean fewer dolphins in the area. DOC must determine the present and projected food supply chain to estimate the size of a sustainable dolphin population? To support a dolphin population of 100 the Bay would need to regenerate an annual food supply in excess of 700,000 kgs. Can the Bay do that?

Water quality in the Bay has substantially diminished in the past twenty years. One doesn't need to be a scientist to see the color of the water change to know the turbidity has increased. Increased turbidity can affect the food supply chain. The upper reaches of the Bay are extremely turbid, and after rainfalls the water has the appearance of an effluent pond. One never sees dolphins in the upper reaches of the Bay. DOC might work more on cleaning up the rivers emptying into the

Bay. Water in the Bay should be blue or clear, not brown. So twenty years ago there were more dolphins in the Bay and barnacle growth on vessels was negligible. Today the reverse is the case, could there be a connection?

And where is the analysis of factors such as aquaculture, water temperature and noise? Those must be considered.

There are problems with safe zone 2. This is a large area with considerable vessel traffic. The proposal would require all vessels, including sailboats to reduce speed to 5 kts; a considerable inconvenience. As for maintaining a distance of 400 m; from a small vessel close to sea level one would be hard pressed to spot dolphins in the water at 400m, especially for my old eyes. 400m is a long way on the water. Also, if one reads the proposal, swimming from the beaches would be restricted if dolphins came within 400m of swimmers. How's that going to work? And how is DOC going to effectively measure ones distance from dolphins?

Why are some commercial vessels allowed exemptions? Commercial operators are in the Bay nearly every day with an objective of providing their paying passengers a viewing of dolphins. This group does more to distract dolphins than any other. Rules should apply to all vessels. Private vessels seldom intentionally take to the water to view dolphins as opposed to commercial operators. And yes, I agree there are some idiot private vessel operators that harass the dolphins.

I'm a grumpy old man who is on the water in the Bay almost every week. I have no interest in viewing dolphins. I've seen the water quality change. The proposed sanctuary doesn't target the root causes of diminishing numbers. I doubt the proposal will have any significant effect.

Let me just add, I think the submission process is a sham. It's clear that DOC has already decided on the proposal, and submissions are sent DOC. Where's the oversight to evaluate submissions and audit provisions to ensure actions taken have a positive impact?



**WS-BOIMMS-125155: 1**

## Doug's Opua Boat Yard

5 May 2021

Department of Conservation

SUBMISSIONS TO THE: BAY OF ISLANDS:

MARINE MAMMAL SCANTUARY PROPOSAL

1 Richardson Street, Opua, Bay of Islands  
Ph (09) 402 7055, A/h (09) 407 4577  
totarahill@stra.co.nz

My name is Doug Schmuck and I am the owner and proprietor of Doug's Opua Boatyard in the Bay of Islands for the last 27 years. I have also been a mariner most of my life and sailed perhaps many thousands of sea miles both commercially and privately whilst holding a New Zealand Commercial Launch Master ticket.

Because of the implications and various assertions made for this proposal, I have made it a point to attend multiple consultations with stakeholders and mariners from Stewart Island to the BOI. I have also had discussions with Mr Duffey and Ms Peters of DOC/ IWI at the proposal's public forum in Paibia along with numerous requests for information to the Department that have not all been forthcoming and come to the following conclusions because what I requested should have been readily to hand.

In doing this, I have also come to accept that these same issues seem to exist along the entire coastlines of New Zealand and appear to be driven by a lack of knowledge, assumption, and presumed probabilities that do not exist in our marine environments or for any exact regard for the marine mammals we ostensibly are trying to protect.

I therefore retract my 20 March 2021 open letter to the Ministers by this submission, as the proposals outlined in it are too complex and unmanageable when faced with the historic realities of the effects on Dolphin when interacting with humans in the BOI.

Furthermore, it would appear that these issues are also mixed with perceptions of inalienable rights amongst the various parties/stakeholders based on economics or unresolved claims to individual environmental elements that may be directly affecting the intended outcomes for marine mammals and the environments in which they live.

There are also other matters like the wisdoms of imposing these measures in the confines of a harbour that has a wide range of use and seasonal fluctuations of those uses that are not addressed and/or weighed against the assumed probabilities.

However, I do concur with the "Conditions governing commercial operations and behaviour of all persons around any marine mammal"; pursuant to s18 and Schedule 3 of the Marine Mammals Protections Act 1992; but conversely do not support this proposal on the fundamental grounds; that no knowing mariner stalks or otherwise seeks out any marine mammal in a manner that might cause them harm, disruption of their habits, or that is in the pursuit of a dollar interacting with them.

These being the actions of ignorance and/or reckless behaviour or those undertakings of commercial interests surrounding fishing or access operations to marine mammals for those whom are not mariners and/or are in effect landmen with zero knowledge of the impact of their participation in this practice.

This particularly so, when some of the commercial permit holders guarantee and/or have guaranteed the public the chance to interact with Dolphin, let alone other marine mammals, whilst seemingly breaching the regulations or their permit conditions to do so. Clearly a stone hard case surrounding enforcement of the “rules of engagement” that is otherwise driving this plan of action in the BOI specifically for the BOI. This all taking place when we really should be considering greater environmental goals and how to achieve them.

My main concerns in reviewing the details of this proposal being:

- A. The potential implications of a proposed management plan for the BOIMMS that is ultra vires to s3B (2) of the Marine Mammals Protection Act 1978 that may have further implications as SECONDARY LEGISLATION outlined in sections 4-6 of the Bill of Rights Act 1990.
- B. The subsequent breach of s 18 and/or Schedule 3 of the Marine Mammals Protection Regulations 1992 with proposed area specific rules that will be just as unenforceable if not combined with further legislative action to secure meaningful designations and intended restrictions supporting environmental reforms that can be publicly supported as a whole nation wide.
- C. A perception of predetermination for the BOIMMS that would seem likely coupled with conflict of interest in research leading to misrepresentation with all potential “Stakeholders” regarding “POSSIBLE EXTINCTION” of the Dolphin in the BOI without primary evidentiary substance.
- D. A likely combination of all three that has led to not only bad management of available resources, but dereliction of those duties prescribed in the Acts in enforcing of the “Regulations” since 1992 that seems to be at the core of the issues driving this proposal. And thereby delegating those responsibilities of the Department to unqualified persons on political grounds that are in all events, inappropriate, unenforceable, and have no mandate basis in law as proposed.
- E. Failure to fully disclose information in a public process to establish a seventh Marine Mammal Sanctuary in one of the most trafficked boating areas in New Zealand. This where relevant “best scientific research” has not been provided in relation to what is being proposed and/or why these proposed rules should supersede legislation for a population of Bottlenose Dolphin that is not at all proven to be ENDANGERED but solely on the belief of ENDANGERMENT!

I am therefore opposed to the current scale of the proposal for following reasons:

- 1. Lack of scientific research into the specific parameters impacting the environmental effects that might be changing the behaviour and habits of Dolphin in the BOI. This mainly due to insufficient funding or misdirected research.
- 2. Lack of scientific research into the specific parameters impacting the environmental effects that might be changing the behaviour and habits of these

same Dolphin along the inshore waters of the coast outside of the BOI from East Cape to Cape Reinga due to misdirected and/or micro area research.

3. Lack of scientific research into the effects of all classes of small vessels up to (65 feet/100 tons) on Dolphin. Their underwater harmonics and/or sonic noise emissions at speeds up to 10 knots in displacement by sail or power or both as prescribed in s 18 of the act; propeller cavitation by way of type of drive; their speeds of up to 30 knots in an extension of all previous research with regard to shipping noise that wholly appears to be the only parameters to date affecting all of the low frequency communications of marine mammals. This in an attempt to establish blame on recreational vessels without reasonable or "Best" scientific proofs.
4. Lack of scientific evidence that the mortality of infant Dolphin is a direct cause and effect of a sailing vessel of any kind; numbers of sailing vessels in the form of any regatta that in effect, leave no discernable "wake or wakes". In the event of a vessel under power that produces a discernable "Anthropogenic Noise" over and above the ambient noise of the sea beyond a radius of one hundred and fifty meters from its source astern at any speed. This referred to as the "Gap" in scientific research by: (Frontiers in marine science, Oct. 2019; THE EFFECTS OF SHIP NOISE ON MARINE MAMMALS – A REVIEW. From page 1: "There appears a bias to more easily accessible species (i.e. , bottlenose dolphins and humpback whales), whereas there is a paucity of literature addressing vessel noise impacts on river dolphins, even though some of these species experience chronic noise from boats". This specific evidence held by DOC and yet funding in-house what appears to be redundant and/or repetitive research leading to already established conclusions.
5. Lack of scientific evidence in the sociological, physiological, or physiognomy research that will in any way promote a form of "rehab" program and/or expunge the behaviour of "Bow Ridding" in Dolphin learned and exercised over millennia world wide and in the BOI when the greatest number of small vessels/craft including shipping are present in the months of December to the end of March and otherwise not remotely to that effect April to December.
6. Lack of specific evidence that DOC has been able and/or even willing to enforce the prescriptions of enforcement pursuant in the Acts regarding commercial permits and/or licenses to marine mammal watching tourist operations. This being the case, when research has shown direct impacts on habits and/or abandonment of areas by Dolphin that have coexisted with human activity of many kinds after the abolishment of sealing and whaling, and prior to the issue of those same permits that have now become clearly problematic and environmentally unsustainable over that time. This, then, the only clear evidentiary factor in the BOI setting aside the reasons for infant Dolphin mortality that remains unexplained.
7. Lack of recognition of years empirical maritime knowledge of the waters of the BOI along with research evidence world wide that appears to be ignored in the process of this proposal by unqualified persons over those whom have used and navigated these same waters with marine mammals since long before

the formation of the Department of Conservation and any of the research practices undertaken by DOC sporadically leading to this proposal.

8.



9.



10.



{ With the above said, I can however, support the establishment of a Marine Mammal Sanctuary inclusive of Dolphin, extending from Tapeka Pt in a Northeast line to "Red Head" outside of Okahu Island hence to Piercy Rock of (Motukokako Island) hence to Cape Brett; inclusive of areas as indicated for special circumstances where the current "Regulations" are strictly enforced by DOC rangers. This excluding any harbour administrations by a Regional Authority with an overall set of rules that govern any harbour applying to all vessels/craft up to and including any class of ship].

This would entail the following due to the lack of a robust long term plan for the BOI:

I The immediate and complete abolition of all permits for commercial interactions with Dolphin/Marine Mammals within the harbour limits of the BOI year around.

II. Once all of the 10 parameters of information are canvassed above, "conditions of compliance" within the Acts are enforced in all coastal waters for all vessels/craft including the BOI with specific regard to the summer periods between December and April each season.

III. A completely independent evaluation of the information for the purpose of public notification of a wider proposal that can increase the probabilities of enhancement of the marine environments in the BOI and along coastal waters from Tauranga to Doubtless Bay.

IV. Public Notification and the subsequent evaluation of all submissions to the above heard by an independent body of three commissioners representing all three of the Parliamentary Ministrations that have the oversight for coastal waters. This for the purpose of establishing a Marine Mammal management plan for the entire northeast coast and the establishment of a Marine Reserve overlaid upon the BOIMMS. This in

securing a sustainable plan for future generations of both mammals and humans in a protected marine environment that is our Bay of Islands as well as the coast.

V. That if we are going to make any future assumptions surrounding Dolphin about their behaviour or habits, let us take into account that they are one of the truly more intelligent terrestrial beings in the wild. This in relation to their evolutionary counterparts on land like the African Elephant and Great Ape; very much "ENDANGERED SPECIES"; that all have some characteristics as we Homo sapiens, but none if any of the social hang ups and/or sensitivities brought on within the last few minutes of the evolutionary clock when compared to the mass of ages of the Marine/land Mammal.

They are therefore likely intuitive, adaptable, playful, loving, social, and caring whilst territorial, combative, and aggressive when needs be. But they are not human and are not saddled with the human traits of social and individual self-destruction by way of formed addictions that override their primal needs for survival. This is particularly so when none of the global evidentiary proofs on environmental impacts on them has remotely been canvassed in the lead up to this proposal. This for/is a species that is NOT BECOMING EXTINCT and/or ENDANGERED because of their choice to abandon the BOI or to or not to interact with humans including boats and ships.

The bottom line of this proposal is therefore a case against small vessels/craft that intersect with Dolphin through engendered evidence is not entirely made out; is secondary legislation by its intent; and acknowledged by DOC as a partial solution. Whereas commercial permits allowing intercourse for extended periods with marine mammals is clearly problematic, can lead to further abandonment of specific areas, and for what scientific research there is; has been proven to be so for many years!

With respect, it is an absolute nonsense to assume: That if the commercial permit holders are allowed to remain out in the BOI; other vessels/craft and Dolphin will not gravitate to those vessels and/or that because they are mostly in communication amongst themselves on the position of groups of Dolphin or other mammals, a protracted unnatural presence to the detriment of Dolphin will not continue; this clearly with regulations and permit conditions completely aside.

In the end, The Department of Conservation has had almost thirty years to exercise their judicial tools and responsibilities to implement permanent plans in matters protecting marine habitats. And during that time in the BOI, there has been a long continuous effort to preserve the inner island areas for just such a purpose. These all invariably opposed by the very factions DOC is now proposing to delegate its legal authority to as co-management partners in a scheme that completely avoids the core issues causing the decline in, and/or abandonment of the BOI by, Bottlenose Dolphin.

It is therefore inconceivable that with the weight of evidence that is to hand against the continuation of the permits in the BOI, as much as it was to abolish sealing and whaling in the last century, the Minister/Ministers will not take the bold view ahead in achieving workable and enforceable plans pursuant to the legislation that is already in place. This for those purposes the Department has heretofore avoided for many years for whatever reasons; by now introducing what appears to be secondary legislation.

CC: The Director General of Conservation

ATTACHMENTS TO THIS SUBMISSION

1. THE EFFECTS OF SHIP NOISE ON MARINE MAMMALS – A REVIEW, (FRONTIERS IN MARINE SCIENCE, 11 OCT 2019).
2. BOTTLENOSE DOLPHIN – WIKIPEDIA, (10 APRIL 2021).
3. AFRICAN ELEPHANT – WIKIPEDIA, (10 APRIL 2021).
4. CHIMPANZEE – WIKIPEDIA, (10 APRIL 2021).
5. BILL OF RIGHTS ACT 1990 – PART II, (SECTIONS 4-6).
6. A PROPOSAL TO ESTABLISH THE BOIMMS – {FOREWORD WHAKATAKKI KORERO, PAGE 2 “LOCAL EXTINCTION”}!
7. REQUESTS FOR INFORMATION TO DOC – (“A-F”).
8. The “BOLD VIEW CONCEPT PLAN”, an outline for the future of national marine compliance REGULATIONS as enacted.



## The Effects of Ship Noise on Marine Mammals—A Review

Christine Erbe<sup>1\*</sup>, Sarah A. Marley<sup>2</sup>, Renée P. Schoeman<sup>3</sup>, Joshua N. Smith<sup>4</sup>, Leah E. Trigg<sup>5</sup> and Clare Beth Embling<sup>6</sup>

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The number of marine watercraft is on the rise—from private boats in coastal areas to commercial ships crossing oceans. A concomitant increase in underwater noise has been reported in several regions around the globe. Given the important role sound plays in the life functions of marine mammals, research on the potential effects of vessel noise has grown—in particular since the year 2000. We provide an overview of this literature, showing that studies have been patchy in terms of their coverage of species, habitats, vessel types, and types of impact investigated. The documented effects include behavioral and acoustic responses, auditory masking, and stress. We identify knowledge gaps: There appears a bias to more easily accessible species (i.e., bottlenose dolphins and humpback whales), whereas there is a paucity of literature addressing vessel noise impacts on river dolphins, even though some of these species experience chronic noise from boats. Similarly, little is known about the potential effects of ship noise on pelagic and deep-diving marine mammals, even though ship noise is focused in a downward direction, reaching great depth at little acoustic loss and potentially coupling into sound propagation channels in which sound may transmit over long ranges. We explain the fundamental concepts involved in the generation and propagation of vessel noise and point out common problems with both physics and biology: Recordings of ship noise might be affected by unidentified artifacts, and noise exposure can be both under- and over-estimated by tens of decibel if the local sound propagation conditions are not considered. The lack of anthropogenic (e.g., different vessel types), environmental (e.g., different sea states or presence/absence of prey), and biological (e.g., different demographics) controls is a common problem, as is a lack of understanding what constitutes the 'normal' range of behaviors. Last but not least, the biological significance of observed responses is mostly unknown. Moving forward, standards on study design, data analysis, and reporting are badly needed so that results are comparable (across space and time) and so that data can be synthesized to address the grand unknowns: the role of context and the consequences of chronic exposures.

**Keywords:** auditory masking, chronic noise exposure, marine watercraft, ship noise emission, commercial shipping, marine mammal, behavioral response



## INTRODUCTION

Marine traffic in the world's oceans is increasing. This includes watercraft ranging from small boats to large ships. Commercial ships are increasing in number as well as size, linked to overall economic growth (United Nations Conference on Trade and Development [UNCTAD], 2018). Between World War II and 2008, the global number of ships rose by a factor 3.5 and the total gross tonnage by a factor 10 (Frisk, 2012). Based on satellite altimetry, global ship density increased by a factor 4 between 1992 and 2012, with the greatest increase in the Indian Ocean (Fournadre, 2014). Ship noise is rising concomitantly. In fact, ships have become the most ubiquitous and pervasive source of anthropogenic noise in the oceans. Ship traffic is responsible for the steady rise in ambient noise at low frequencies (10–100 Hz) in many ocean regions—a rate that has been reported to be as high as 3 dB/decade (Andrew et al., 2002, 2011; Chapman and Price, 2011; Miksis-Olds et al., 2013; Miksis-Olds and Nichols, 2016).

Concern about the potential effects of ship noise on marine mammals is not recent, but instead has been raised for decades (e.g., Payne and Webb, 1971; Myrberg, 1978; Geraci and St Aubin, 1980). As ship noise peaks in the low frequencies, early studies primarily focused on low-frequency specialist species such as mysticetes (i.e., baleen whales) (e.g., Eberhardt and Evans, 1962; Cummings and Thompson, 1971). Mysticetes produce and use sound at the frequencies emitted by large ships, and they are considered to be more sensitive at these low frequencies than are other marine mammals (e.g., Parks et al., 2007b; Cranford and Krysl, 2015). However, ships also emit significant energy at higher frequencies (tens of kHz) (e.g., Arveson and Vendittis, 2000; Hermaansen et al., 2014; Veirs et al., 2016), and so odontocetes (i.e., toothed whales, dolphins, and porpoises), which specialize in high-frequency sound usage, can also be affected (e.g., Marley et al., 2017b). Not only commercial ship traffic but also numbers of small boats have been increasing around the world. For example, the number of registered recreational vessels in the United States increased by 1% per annum between 1980 and 2017 (U.S. Department of Homeland Security, 2018). In the state of Florida, there is approximately one registered recreational boat per 17 people (Sidman and Fik, 2005). Similarly, parts of Australia saw increases of 3% per annum between 1999 and 2009 (New Government Maritime, 2010). In Sydney Harbour, 70% of overall vessel traffic is comprised of recreational boats (Widmer and Underwood, 2004). Noise from small boats peaks at higher frequencies (e.g., Erbe, 2013; Erbe et al., 2016b) at which coastal odontocetes are more sensitive (e.g., Houser and Finerman, 2006).

The noise field around a boat or ship is not isotropic (i.e., it is not the same in all directions; e.g., Arveson and Vendittis, 2000). It depends on source frequency and the environment in which the vessel travels, and it changes with vessel speed, load, size, and other factors (e.g., Ross, 1976; Urlick, 1983). Consequently, it is not straightforward to translate acoustic recordings made in one environment to others. Obtaining quality recordings of watercraft noise is a science of its own, with numerous flaws that are commonly unrecognized in the literature.

Similarly, determining the responses of marine mammals to watercraft noise has numerous challenges, including constraints

in experimental design; variability in species-, population-, and individual-specific characteristics and responses; and context-specific factors that may need to be considered. For example, many studies suffer bias from observer presence in that the majority of marine mammal studies are, by necessity, vessel-based. This introduces a potential source of bias from the presence of the research vessel, as well as the noise it creates. Furthermore, many studies struggle to differentiate between the effects of vessel presence and vessel noise, resulting in confounding explanatory variables. Even if researchers can be confident in noise as the source of disturbance, measurements are often inconsistent between studies, thus complicating comparisons. Animal behavioral responses can also take many forms. Due to the challenges associated with studying these fast-moving, far-ranging, often-submerged animals, the majority of marine mammal behavioral response studies in the wild concentrate on visible changes to physical behavior at the sea surface, such as changes in occurrence or cessation of certain activities. Far fewer consider a combination of behavioral changes, including acoustical behaviors. The resulting knowledge gaps, biases, and uncertainties may be minimized by standardization and interdisciplinary cooperation.

In fact, the effects of watercraft noise on marine mammals is an interdisciplinary field: Sound generation, propagation, measurement, and modeling are physics problems, yet monitoring animals, determining impacts, and understanding biological significance are biological problems. Misinformation and miscommunication have led to numerous issues with underwater acoustic quantities, units, recording and reporting, as well as experimental design, statistical analysis, and interpretation. This review provides an overview of the field of watercraft noise impacts on marine mammals, explains the fundamental physical and biological concepts, highlights common issues and problems, identifies data gaps, and discusses research needs.

## GENERATION AND PROPAGATION OF WATERCRAFT NOISE

There is a large variety of motorized boats and ships, such as recreational boats, passenger and car ferries, high-speed hovercraft, cruise ships, tug boats, dredges, dry and liquid cargo vessels, fishing vessels, oil and gas production platforms, research vessels, naval ships, submarines, etc. All of these produce noise. Source levels<sup>1</sup> of 130–160 dB re 1  $\mu$ Pa m have been reported for small watercraft such as jetskis and rigid-hulled inflatable boats

<sup>1</sup>In the case of ship noise, source levels (SL) are typically given as a root-mean-square (rms) sound pressure level (SPL). The sound pressure is recorded at some distance (i.e., in the far-field) from the vessel, and the root-mean-square is computed (i.e., literally squaring the pressure samples, summing, dividing by their number, and taking the square-root). Applying “20 log<sub>10()</sub>” converts the rms sound pressure to a level quantity (i.e., SPL) in the far-field. Propagation loss is typically modeled and a propagation loss term is added, yielding a (monopole) SL referenced to a distance of 1 m from the source. SPL and SL are thus expressed in dB relative to 1  $\mu$ Pa and 1  $\mu$ Pa m, respectively. Note that the notation of “@ 1 m” is common in the literature but deprecated by the ISO (International Organization for Standardization, 2016, 2017).

(Erbe, 2013; Erbe et al., 2016b). Large and powerful watercraft such as ferries, container ships, and icebreakers have source levels of 200 dB re 1  $\mu\text{Pa}$  m and more (e.g., Erbe and Farmer, 2000; Simard et al., 2016; Gassmann et al., 2017). Source levels may vary by 20–40 dB within a ship class due to variability in design, maintenance, and operational parameters such as speed (Simard et al., 2016; Joy et al., 2019).

The strongest noise source is typically the propeller when it cavitates (Ross, 1976). Propeller cavitation involves the formation of bubble clouds behind the propeller. Bubbles of all sizes are created, then grow, vibrate and collapse, producing an overall broadband noise spectrum that ranges from a few Hz to over 100 kHz (Ross, 1976). Traveling at low speed and/or great depth (hence pressure; e.g., submarines) can reduce and avoid propeller cavitation noise. Cavitation noise increases with vessel speed, size, and load (e.g., Ross, 1976; Urick, 1983; Scrimger and Heitmeyer, 1991; Hamson, 1997; Trevorrow et al., 2008; Simard et al., 2016). Cavitation noise is typically amplitude-modulated by the propeller blade rate (i.e., the number of propeller blades times the number of rotations per second; Ross, 1976). 'Propeller singing' refers to narrow-band noise that is a result of vibrating propeller blades. The engine and any machinery onboard a ship also produce noise, and this may couple well into the water through the ship's hull (Urick, 1983). The engine generates narrow-band noise consisting of the engine firing-rate plus overtones (Arveson and Vendittis, 2000). Furthermore, hydrodynamic flow past the hull can lead to vibration of appendages or cavities generating additional narrow-band noise (Urick, 1983). Overall, the noise spectrum emitted by a ship may have multiple sources that contribute noise from different locations about the ship, at different frequencies and into different directions—leading to a complicated and dynamic noise field.

The noise field varies with frequency and angle about a vessel (Arveson and Vendittis, 2000; Trevorrow et al., 2008; Gassmann et al., 2017). Given that boats and ships operate at the water surface and the propeller sits, at maximum, a few meters below the surface, emitted noise reflects at the water surface leading to a strongly downward-directed noise emission pattern (e.g., Gassmann et al., 2017). In physical terms, the source of the watercraft noise and its image source (in air) create a dipole radiation pattern. This means that watercraft noise radiates very well to great depth in the ocean. Radiation in the horizontal plane, near the sea surface, is greatly reduced because of destructive interference of the image source with the real source (i.e., the Lloyd's mirror effect; note that the interference pattern is frequency-dependent). In addition, the hull may shield sound propagation from the propeller in the forward direction. These acoustic radiation phenomena might explain why marine mammals that spend a lot of time at the water surface are prone to vessel strike (e.g., right whales and sirenians) and why bow-riding marine mammals (Würsig, 2018) are not disturbed by the vessel's noise (Gerstein et al., 2005).

As a vessel travels through different environments, from coastal to offshore waters, its noise field changes. In shallow water, the propagating noise repeatedly interacts with the water surface and seafloor, where it is reflected, scattered, and partly

absorbed (e.g., Cole and Podszwa, 1967). The directionality of the noise field is highly variable. In deep water, the directionality is dipolar (i.e., strongly downward) and interactions with, and hence acoustic energy losses at, the seafloor and sea surface are reduced. The noise from watercraft traveling in deep water easily couples into the deep sound channel (i.e., the so-called Sound Fixing And Ranging (SOFAR) channel; e.g., Williams and Horne, 1967; Shockley et al., 1982), where it can traverse entire oceans with very little acoustic energy loss. The noise from watercraft traveling over sloping bathymetry (such as the continental slope) can enter the SOFAR channel with just one seafloor reflection (Figure 1). Animals in coastal versus offshore waters or at low versus great depth may experience quite different noise fields—even at the same range from the same vessel.

## IMPACTS OF WATERCRAFT NOISE ON MARINE MAMMALS

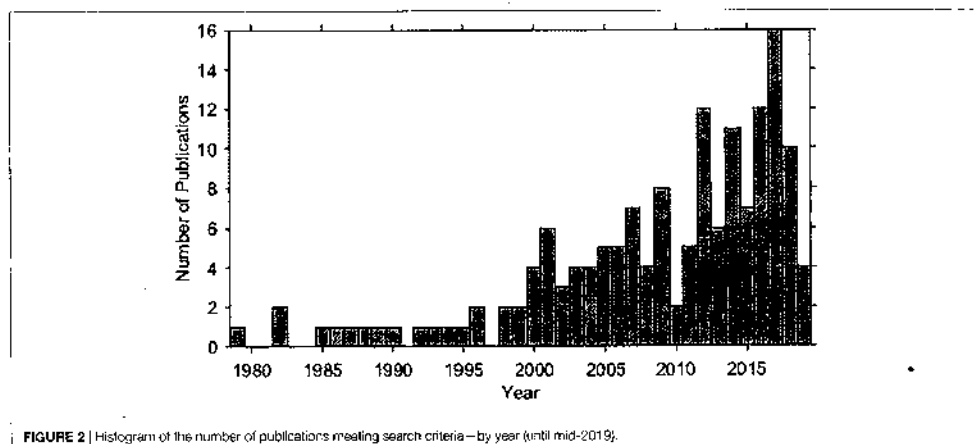
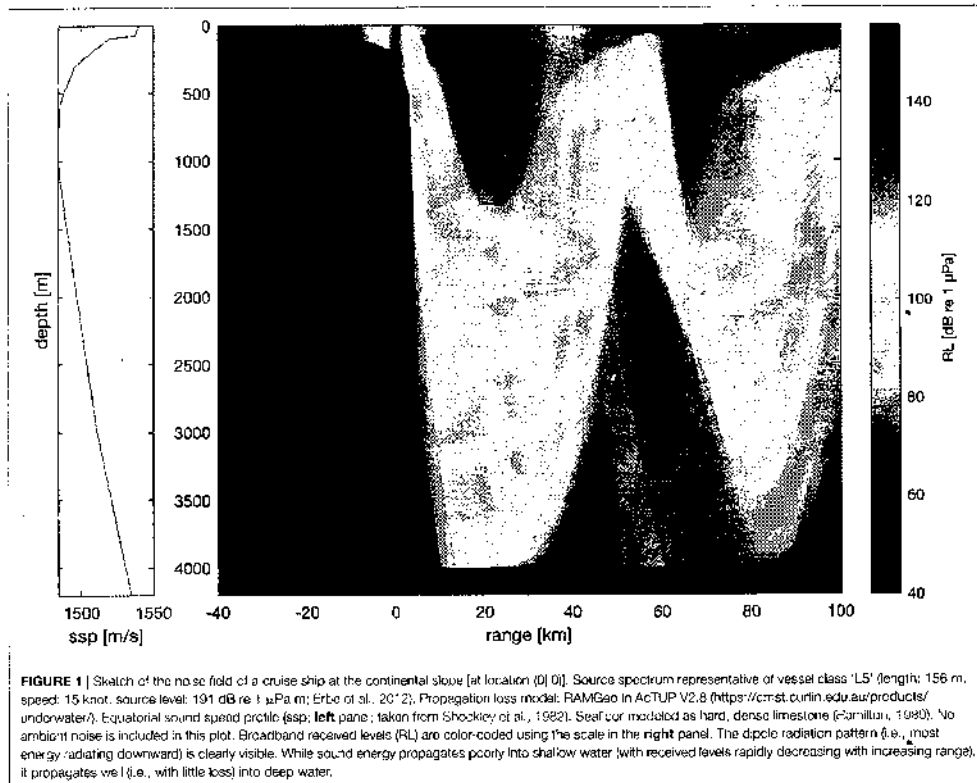
The effects of underwater noise from anthropogenic activities on marine mammals have been summarized in several works and include the following: behavioral responses, acoustic interference (i.e., masking), temporary or permanent shifts in hearing threshold (TTS, PTS), and stress (e.g., Richardson et al., 1995; Nowacek et al., 2007; Erbe et al., 2018). Acute effects on individual animals are more easily observed, more frequently published, and hence better understood than long-term effects on populations from chronic exposures. Watercrafts are the primary source of chronic noise exposures on marine mammals.

We set out to review the effects of watercraft noise on marine mammals by compiling the literature from a Web of Science search<sup>2</sup>, augmented by our personal libraries. The following criteria had to be met for articles to be included in the review. Studies:

- must have dealt with marine vessels;
- must have dealt with marine mammals in water (hence excluding hauled-out pinnipeds);
- may have focused on one or the other;
- must have measured, observed, modeled, or estimated responses (i.e., articles that addressed the potential effects of vessel noise only in the Discussion were excluded); and
- did not need to have measured or modeled source levels or received levels of noise.

A total of 154 articles were included in this review. A rapid growth in the number of publications has occurred since the year 2000 (Figure 2). Forty-seven marine mammal species have been studied. The most studied species are the bottlenose dolphin (*Tursiops truncatus*), humpback whale (*Megaptera novaeangliae*), and then beluga whale (*Delphinapterus leucas*) (Figure 3). Figure 4 maps the different study sites by species.

<sup>2</sup>Web of Science search information: Search string: TS = (ship\$ OR boat\$ OR vessel\$) AND TS = noise AND TS = (marine mammal\$ OR whale\$ OR porpoise\$ OR dolphin\$ OR seal\$ OR sea lion\$ OR sealion\$ OR dugong\$ OR manatee\$). Years searched: 1972–2019. Number of returned articles: 504.



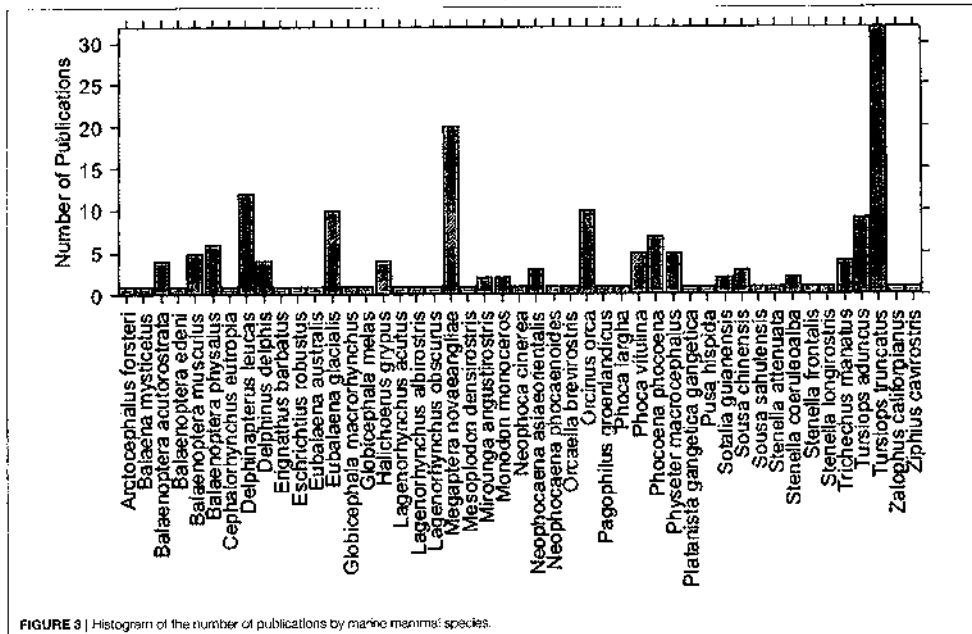


FIGURE 3 | Histogram of the number of publications by marine mammal species.

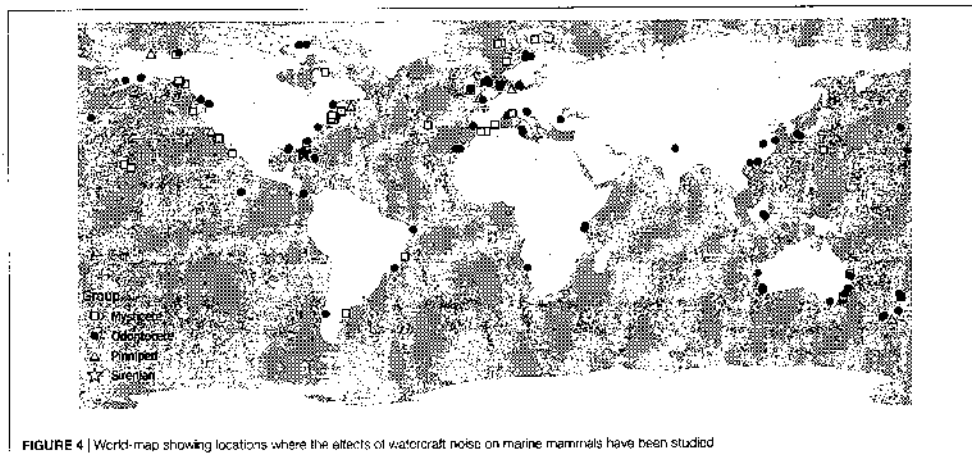


FIGURE 4 | World-map showing locations where the effects of watercraft noise on marine mammals have been studied.

The reported effects of boat or ship noise on marine mammals include changes in both physical and acoustic behavior, masking of communication and echolocation sounds, and stress.

Supplementary Table S1 lists the articles we reviewed and provides information on the following: the types of vessels and marine mammal species studied, the study location, objectives,

design, and methodology; and the animal responses observed or modeled. Several interesting patterns are revealed, which are presented in the following sections, along with discussions of the key findings for particular species groups. Additionally, a number of common issues and problems are identified, which highlight research needs.

## Mysticetes

In the early 1980s, concern about the effects of shipping and hydrocarbon development in the Arctic led to several multi-year studies on underwater noise effects on bowhead whales (*Balaena mysticetus*; e.g., Richardson et al., 1982; Greene, 1985; Richardson et al., 1985; Johnson et al., 1986). In these studies, experimental approaches of bowhead whales by small vessels at high speed showed that whales generally moved away, thereby interrupting foraging, socializing, and playing behavior, while spending less time at the surface. The early 1980s also saw the first and only playback experiment on the response to vessel noise by gray whales (*Eschrichtius robustus*) in their breeding and nursery habitat off Mexico (Dahlheim, 1987; Dahlheim and Castellote, 2016). Gray whales have a limited repertoire of low-frequency (40–4000 Hz) vocalizations, overlapping with watercraft noise (Dahlheim et al., 1984; Moore and Ljungblad, 1984; Dahlheim and Castellote, 2016; Burnham et al., 2018). In the presence of ships and boats, gray whales increased their vocalization rate, and at times of increased outboard engine noise, received levels from gray whales were higher (interpreted as an increase in source levels; Dahlheim, 1987; Dahlheim and Castellote, 2016).

An increase in studies on the potential effects of vessel noise on a wider range of mysticete species has occurred in recent years. The most extensively studied species is the humpback whale. Humpback whales in Glacier Bay National Park, AK, United States of America, are prone to high noise exposures from tourism vessels and have been shown to increase the amplitude of their vocalizations by 0.8 dB for every 1.0 dB increase in ambient noise, while vocalizing less frequently (Frankel and Gabriele, 2017; Fournet et al., 2018). Similarly, singing individuals near Chichijima Island ceased their song after a passenger-cargo vessel passed within 1400 m (Tsujii et al., 2018). Humpback whales off the Australian east coast exhibited great variation in behavioral responses to seismic survey vessels with the airguns turned off. While no behavioral change was seen in some trials, others revealed a decrease in dive duration, travel speed, and the number of breaches (Dunlop et al., 2015, 2016, 2017a,b, 2018). Most humpback whales did not respond to sonar vessels with the sonar turned off (Sivle et al., 2016; Wensveen et al., 2017). Tsujii et al. (2018) found that humpback whales moved away from large vessels, while others noted changes in respiratory behavior (Baker and Herriman, 1989; Frankel and Clark, 2002) and a cessation of foraging activities (Blair et al., 2016). The large number of studies on humpback whales and the resulting variety of documented responses demonstrate that context affects behavior.

Conversely, North Atlantic right whales (*Eubalaena glacialis*) show no behavioral response to ship noise at all, or at least not to received levels of 132–142 dB re 1  $\mu$ Pa rms from large ships passing within 1 nm distance, nor to received levels of 129–139 dB re 1  $\mu$ Pa rms (main energy between 50 and 500 Hz) from ship noise playback (Nowacek D.P. et al., 2004). A lack of behavioral response of right whales to ship noise is particularly concerning due to the high levels of ship strike in this species (Lai et al., 2001), affecting their conservation status (Kraus et al., 2005). Nevertheless, analyses of North Atlantic right whale fecal samples suggested that noise from large commercial vessels might increase stress levels (Rolland et al., 2012). In

addition, studies suggest that right whales have vocally adapted to environments with increased low-frequency noise through a shift in vocalization frequency and duration (Parks et al., 2007a, 2009, 2011), which may have been a response to compensate for a loss in communication range (Clark et al., 2009). Tennessen and Parks (2016) modeled the communication space of mother-calf pair up-calls in the vicinity of container vessels and found that an up-call would only be detected when the receiving whale was 25 km from the moving vessel and within 320 m of the transmitting whale. Another important social call for right whales, the gunshot, was also found susceptible to masking by vessel noise (Cunningham and Mountain, 2014).

A decrease in communication range as a result of increased levels of ship noise has also been modeled for Bryde's (*Balaenoptera edeni*), fin (*Balaenoptera physalus*), humpback, and minke whales (*Balaenoptera acutorostrata*) (Clark et al., 2009; Cholewiak et al., 2018; Gabriele et al., 2018; Putland et al., 2018). The Lombard effect comprises changes in the spectral features of vocalizations (i.e., in frequency and level) and in vocalization rates, in order to compensate for masking (Lombard, 1911). In addition to the examples from gray, humpback, and right whales above, fin whales lowered the bandwidth, peak frequency, and center frequency of their vocalizations under increased levels of background noise from large vessels (Castellote et al., 2012).

Less attention has been paid to the effects of noise generated by smaller vessels. Dunlop (2016b) predicted an increase in humpback whale social call source levels and the proportion of surface-generated sounds under increased vessel noise, as observed in response to increased wind noise. However, no behavioral changes were observed at received levels of 91–124 dB re 1  $\mu$ Pa rms from a recreational fishing vessel. Au and Green (2000) studied the response of humpback whales to four different whale-watching vessels, each with their own acoustic signature, approaching to 91 m distance. Individual whales responded strongest (i.e., abrupt changes in direction and longer dive durations) to the vessel with the highest received level (127 dB re 1  $\mu$ Pa, 1/3 octave band level at 315 Hz). Several other studies report on the behavioral responses of mysticete whales to smaller vessels in the absence of noise measurements. These studies indicate avoidance of vessels at close range (Palka and Hammond, 2001; Starvation et al., 2010). Changes in behavioral state and respiratory behavior were also observed (Jalouda et al., 2003; Morete et al., 2007), with mother-calf pairs eliciting stronger responses than adults (Morete et al., 2007).

## Odontocetes

Much of the significant early work on the potential effects of watercraft noise on odontocetes was—similar to studies on mysticetes—a result of concern about Arctic industrial development (hydrocarbons, mining, and shipping) in the early 1980s (e.g., LGL Ltd., 1986; Finley et al., 1990; Richardson et al., 1990). The focal species were beluga whales and narwhals (*Monodon monoceros*). In response to icebreakers, beluga whales lost pod integrity, commenced rapid movement, asynchronous and shallow dives, and changed their vocal behavior (i.e., vocalization types) at received levels of 94–105 dB re 1  $\mu$ Pa rms (20–1000 Hz), while narwhals changed their locomotion (i.e., exhibited more directed and slower movement, became

motionless, and sank) and fell silent at received levels of about 124 dB re 1  $\mu$ Pa rms (20–1000 Hz) (LGI Ltd., 1986; Cosens and Dueck, 1988; Finley et al., 1990). Since the 1990s, beluga whale responses to boats and ships have been studied more extensively in the St. Lawrence Estuary, Canada. Here, beluga whales have shown increasing avoidance (i.e., increased dive duration and swim speed) with the number of boats, as well as other changes in both physical and acoustic behavior (Blane and Jaakson, 1994; Lesage et al., 1999). The Lombard effect has been demonstrated as an increase in source level, vocalization rate, and frequency (i.e., shift to higher frequencies; Lesage et al., 1999; Scheifele et al., 2005).

In the case of beaked whales, much effort has been spent on understanding the potential effects of ship-based sonar transmissions given coincident strandings and naval exercises (e.g., DeRuiter et al., 2013; Goldbogen et al., 2013; Sivle et al., 2015; Kvadsheim et al., 2017). The effects of ship noise without sonars have been investigated less. Using passive acoustic monitoring and acoustic tags, ship noise at received levels of approximately 135 dB re 1  $\mu$ Pa rms (0.1–45 kHz) affected beaked whale foraging by reducing both the horizontal area in which animals foraged and the number of successful prey captures (as indicated by the number of feeding buzzes recorded), with foraging efficiency reduced by > 50% (Aguilar Soto et al., 2006; Pirotta et al., 2012). Similarly, fewer clicks were recorded of sperm whales (*Physeter macrocephalus*) during vessel passes (Azzara et al., 2013), and decreases in surface time, respiration interval, and the number of ventilations were reported in the presence of whale-watching boats (Gordon et al., 1992). A different study found no decrease of sperm whale acoustic detections in ship noise (André et al., 2017). Rather, an increase in sperm whale acoustic and visual detections was found near longline fishing vessels, and propeller cavitation noise (to be exact, changes in that noise corresponding to typical operational changes in longline fishing vessel speeds) was identified as the ‘dinner bell’ attracting sperm whales to depredate (Thoude et al., 2007). Such diverse responses (avoidance, no response, and attraction) highlight the importance of context in assessments of underwater noise.

Killer whales (*Orcinus orca*) in British Columbia and Washington State have recently received much attention with regards to impacts from ships, given the steady decline in their population size. Changes in behavior (i.e., less foraging and increased surface-active behavior), respiration, and swim speed and direction occurred at received levels above 130 dB re 1  $\mu$ Pa rms (0.01–50 kHz), and the Lombard effect (i.e., increased source level and vocalization duration) has been reported in ship noise levels above 98 dB re 1  $\mu$ Pa rms (1–40 kHz) (Foote et al., 2004; Holt et al., 2009, 2011; Lusseau et al., 2009; Noren et al., 2009; Williams et al., 2002, 2014). This geographic area has seen a lot of ship noise recording, quantification, and impact modeling studies (e.g., Erbe, 2002; Erbe et al., 2012, 2014; Williams et al., 2015; Gaminelli et al., 2018; Joy et al., 2019).

A great deal of research has also focused upon smaller dolphins. Occupying habitats from freshwater rivers to coastal estuaries and the open ocean, dolphins often experience high habitat overlap with human activities. In particular, the potential

impacts from dolphin-watching tourism vessels have been investigated (e.g., Scarpaci et al., 2000; Lusseau, 2003a, 2005, 2006; Constantine et al., 2004; Lusseau and Higham, 2004; Bejder et al., 2006; Stensland and Berggren, 2007; Arcangeli and Crosti, 2009; Christiansen et al., 2010; Steckenreuter et al., 2012; Guerra et al., 2014; May-Collado and Quinones-Lebron, 2014; Symons et al., 2014; Heller et al., 2016; Pérez-Jorge et al., 2016). Dolphins were displaced or changed their site occupancy in response to vessel traffic (Lusseau, 2005; Bejder et al., 2006; Rako et al., 2013; Pirotta et al., 2015b; Pérez-Jorge et al., 2016). They altered their movement patterns within an area in response to vessel traffic, with animals changing their direction of travel, beginning to travel erratically, or significantly increasing traveling speeds when approached by vessels (Au and Perryman, 1982; Nowacek et al., 2001; Mattson et al., 2005; Lemon et al., 2006; Lusseau, 2006; Christiansen et al., 2010; Marley et al., 2017b). Watercrafts can cause a shift in dolphin behavioral budgets, generally increasing time spent traveling whilst decreasing time spent resting and socializing (Lusseau, 2003a; Constantine et al., 2004; Stensland and Berggren, 2007; Arcangeli and Crosti, 2009; Steckenreuter et al., 2012; Marley et al., 2017b). Other changes in behavior can include alterations to dive patterns, displays of breathing synchrony, and changes in inter-animal distances (Janik and Thompson, 1996; Nowacek et al., 2001; Hastie et al., 2003; Krieb and Rahawi, 2004; Stensland and Berggren, 2007). Furthermore, dolphins have been observed to alter their whistle characteristics, such as their frequency range, in elevated noise conditions or in the presence of vessels (Morisako et al., 2005; May-Collado and Wartzok, 2008; Guerra et al., 2014; May-Collado and Quinones-Lebron, 2014; Papale et al., 2015; Heiler et al., 2016; Rako Gospić and Picciulin, 2016; Marley et al., 2017b). Changes to whistle duration have also been reported (May-Collado and Wartzok, 2008; Guerra et al., 2014; May-Collado and Quinones-Lebron, 2014), as have increases in whistle production rates (Scarpaci et al., 2000; Van Parijs and Corkeron, 2001; Buckstaff, 2004; Guerra et al., 2014; Martins et al., 2018).

However, delphinid studies are heavily biased toward particular species, with some receiving considerably more research attention than others. The bottlenose dolphin (*Tursiops* spp.) has been the focus of the most research effort of all the odontocetes. Bottlenose dolphins have a cosmopolitan distribution, ranging from northern Scotland to southern New Zealand and occupying both coastal and pelagic habitats. As a result, they are available to marine mammalogists around the world, and so dominate the literature. Bottlenose dolphins are also the most common cetacean kept in captivity, which has facilitated a range of physiological studies regarding the impacts of noise that have not been possible for other species; e.g., studies on how behavioral and acoustical changes affect energetics. Dolphin metabolic rates increase during periods of vocal effort and sound production, with energy requirements varying according to the type of sound produced (Noren et al., 2013; Holt et al., 2015, 2016). This combined with increased energy expenditure due to more time spent traveling, moving at speed, avoiding vessels, or leaving impacted areas, results in disturbance having potential cumulative energetic consequences.

Conversely, little is known about the responses of dolphin species that inhabit relatively constrained systems that are also some of the world's busiest waterways. The river systems utilized by these species are known to have high levels of vessel traffic and, in some cases, there is evidence of river dolphins being the target of tourism activities (e.g., boto, *Inia geoffrensis*, in Brazil; de Sá Alves et al., 2012). Ganges river dolphins (*Platanista gangetica gangetica*) showed mixed responses to approaching vessels, including changing direction to orient away from the boat, prolonging dive times, and displaying attraction toward the boat, as well as no obvious effect (Basur et al., 2013). Such variability, again, shows the importance of context in behavioral responses. Finally, there is a clear paucity of publications addressing the responses of river dolphins (families *Iniidae*, *Platanistidae*, *Pontoporiidae*, and *Lipotiidae*) to vessel traffic or noise.

Similarly, of the porpoise species, only harbor porpoises (*Phocoena phocoena*) and finless porpoises (Indo-Pacific, *Neophocaena phocaenoides*; Yangtze, *N. asiatorientalis asiatorientalis*) have been studied with regards to the impact of watercraft. Harbor porpoises moved away from vessels (Palka and Hammond, 2001), showed higher levels of porpoising in the presence of boats (Dyndo et al., 2015), changed behavioral states (Akkaya Bas et al., 2017), reduced foraging behavior (Wisniewska et al., 2018), and experienced decreased communication ranges (Hermannsen et al., 2014). Acoustic tags (DTAGs) placed on harbor porpoises in Danish waters showed that animals encountered vessel noise 17–89% of the time, and exhibited vigorous fluking, bottom diving, interrupted foraging, and cessation of echolocation during some high vessel noise events (received level > 96 dB re 1  $\mu$ Pa at 16 kHz) 1/3 octave band; Wisniewska et al., 2018). Meanwhile the Yangtze finless porpoise has been shown to forage in busy (port) areas exhibiting high vessel traffic, with no detected impact on echolocation behavior (Dong et al., 2012; Wang et al., 2014). Wang et al. (2015) proposed that the high prey densities in the ports in comparison to surrounding areas mean porpoises need to forage there regardless of boat traffic. The closely related Indo-Pacific finless porpoise appears not to exhibit the same pattern, with echolocation behavior showing a negative correlation with ship traffic (Akamatsu et al., 2008). Porpoises may be more vulnerable to this type of disturbance due to their small size and low fat reserves, such that any disturbance that reduces foraging opportunities may result in negative fitness consequences (Nøbe-Nielsen et al., 2014; Wisniewska et al., 2016).

### Sirenians

Knowledge about the potential effects of watercraft noise on sirenians grew from curiosity of why these animals did not avoid approaching boats and whether they perhaps could not hear them. Fatal collision with watercraft is a serious problem that has been recognized since the 1970s (Ackerman et al., 1992; O'Shea, 1995; Marsh et al., 2001; Rycyk et al., 2018). The majority of these fatalities are a result of blunt force trauma rather than propeller cuts (Lightsey et al., 2006). Vessel strike is the main source of mortality for some populations (e.g., 25% of all Florida manatee, *Trichechus manatus latirostris*, deaths; Calleson and Kipp-Frohlich, 2007). Consequently, an understanding of the

hearing capabilities of sirenians has been of interest to determine the capabilities of sirenians to detect watercraft noise. There are no data for dugong (*Dugong dugon*); however, manatee hearing underwater is sensitive at 1–30 kHz (Klisch et al., 1990; Popov and Supin, 1990; Gerstein et al., 1999; Gaspard et al., 2012). This overlaps with the spectrum of noise from boats, raising the question of why manatees do not manage to avoid a vessel strike. The current hypothesis is that, as they spend a great deal of time very close to the sea surface, received noise levels from watercraft are low due to the Lloyd's mirror effect and less sound radiation toward the bow. This, combined with manatees' relatively low movement speed, leaves manatees vulnerable to vessel strikes (e.g., Gerstein et al., 1999).

Conversely, some behavioral studies have concluded that manatees (*Trichechus* spp.) are able to detect and respond to approaching boats, often changing their orientation (heading or roll), depth, diving behavior, behavioral state, and swimming speed (Nowacek S.M. et al., 2004; Miksis-Olds et al., 2007b; Rycyk et al., 2018). Such responses to vessels were more pronounced for vessels in close proximity and traveling at speed (Nowacek S.M. et al., 2004). Dugongs were also affected by close boat approaches and less likely to continue feeding when vessels traveled within 50 m (Hodgson and Marsh, 2007). Manatees foraged in habitat with lower ambient noise (that included vessel noise below 1 kHz), particularly at times with less boat density (Miksis-Olds et al., 2007a). Playback experiments simulating different boats at different speeds approaching to within 10 m supported earlier behavioral response studies that manatees swam to deeper waters in the presence of boat noise (Miksis-Olds et al., 2007b).

### Pinnipeds

Pinnipeds are amphibious and haul out on land or ice to breed, pup, molt, and rest. Consequently, much of the research examining vessel traffic has focused on the easily observable reactions of hauled-out pinnipeds to approaching boats and ships. This includes the haul-out behavior of harbor seals (*Phoca vitulina*) (Andersen et al., 2012; Blundell and Pendleton, 2015), Australian fur seals (*Arctocephalus pusillus doriferus*) (Stafford-Bell et al., 2012), Saimaa ringed seals (*Phoca hispida saimensis*) (Niemi et al., 2013), Australian sea lions (*Neophoca cinerea*) (Osterrieder et al., 2017), and walrus (*Odobenus rosmarus*) (Wren et al., 2018). A small number of studies also extend observations to the water surrounding haul-out sites (Osterrieder et al., 2017). Common reactions of pinnipeds to approaching vessels include flushing off haul-out sites into the sea (Jansen et al., 2010; Andersen et al., 2012; Blundell and Pendleton, 2015), increased alertness (Henry and Hannill, 2001), and head raising (Niemi et al., 2013). However, these studies focused on the reactions of pinnipeds to the presence of a vessel rather than perceived levels of vessel noise. Studies that incorporate in-air noise generation, transmission, and reception are very rare (Tripovich et al., 2012). In-air watercraft noise and the perception of sound in air are notably different from their underwater equivalents (Kastak and Schusterman, 1998). Therefore, the remainder of this section and **Supplementary Table S1** focus on studies investigating the impacts of underwater watercraft noise on pinnipeds.

Underwater noise from watercraft has the potential to mask or alter the communication of pinnipeds. Bagočius (2014) showed that gray seal (*Halichoerus grypus*) vocalizations recorded underwater in captivity overlapped with the noise spectrum of a vehicle/passenger ship. Terhune et al. (1979) reported a decrease in the loudness of underwater harp seal (*Pagophilus groenlandicus*) vocalizations after the presence of a vessel was recorded acoustically near whelping sites in the Gulf of St. Lawrence. This may have reflected a change in seal vocalizations or the movement of seals away from the recording area (Terhune et al., 1979).

Studies on the behavioral responses of pinnipeds to shipping noise have been undertaken at a range of spatial scales. A national-scale assessment of seals and shipping in the United Kingdom showed high rates of co-occurrence between gray seals or harbor seals and shipping traffic within 50 km of the coastline near haul-out sites (Jones et al., 2017). At regional and local scales, it was estimated, using sound propagation models, that harbor seals in the Moray Firth were exposed to 24-h cumulative SEL<sup>3</sup> between 170 dB re 1  $\mu\text{Pa}^2\text{s}$  (95% CI 168–172) and 189 dB re 1  $\mu\text{Pa}^2\text{s}$  (95% CI 173–206) from shipping (Jones et al., 2017). When considering the upper limits of the 95% confidence intervals, these predicted values exceeded the estimated thresholds for the onset of TTS (Southall et al., 2007, 2019). Locally in Broadhaven Bay, Ireland, gray seals potentially varied habitat use in response to vessels as indicated by a negative correlation between the numbers of gray seals and construction vessels (Anderwald et al., 2013). A recent study using acoustic tags (DTAGs) that record sound and behavior concurrently showed that harbor and gray seals were exposed to vessel noise 2.2–20.5% of their time at sea (Mikkelsen et al., 2019). In response to vessel noise, a tagged seal changed its diving behavior, switching quickly from a dive ascent to descent (Mikkelsen et al., 2019). This observation agrees with descriptions of changes in diving reported during the development of early acoustic recording tags on juvenile northern elephant seals (*Mirounga angustirostris*) (Fletcher et al., 1996; Burgess et al., 1998). Studies using acoustic recording tags on pinnipeds demonstrate the potential opportunities, and the need, to further explore the impact of shipping noise on the at-sea behavior of pinnipeds.

## APPROACHES TO STUDY DESIGN

In order to compare studies, identify focus areas and research gaps, and point out common issues and problems, we defined a 'study' as a unique combination of publication reference and species. For example, if a publication dealt with two species, then this was counted as two studies. However, if a publication investigated the same species at two different sites, then this was counted as one study.

With this definition, an approximately equal number of studies dealt with large ships as with small boats (ratio: 1.05:1).

<sup>3</sup>The sound exposure level (SEL) is a measure of the total noise energy over time. It is computed as the time-integral of the squared pressure, before applying 10 log<sub>10</sub>(.), and it is expressed in dB relative to 1  $\mu\text{Pa}^2\text{s}$  (International Organization for Standardization, 2017).

Animal responses to these vessels were observed in the wild in 82% of studies, while 4% of studies were done in captivity and 14% of studies used models instead of live animals. The majority of studies on live animals dealt with real vessels *in situ*, while 5% were playback studies of pre-recorded sound.

In terms of measuring animal responses, 34% of studies undertook vessel-based observations, 19% land-based observations, and 8% aerial observations. Passive Acoustic Monitoring (PAM) was employed in 33% of studies, and tags were used in 13% of studies. Some studies used more than one method of observation. Studies were designed as controlled exposure experiments (14%) or before-during-after observations (29%), while 21% were opportunistic in nature.

Out of all studies, 28% determined the received noise level at the study animals, 13% measured the received level, 12% used a sound propagation model to determine the received level, and 3% applied a geometric propagation loss. In addition to determining the received level, 15% of studies also considered frequency-dependent hearing sensitivity of the animals (e.g., audiograms or critical bands). A total of 41% of studies neither estimated the received level nor the range of the vessel to the animals.

In terms of context, 58% of studies considered vessel-related factors such as vessel numbers, types, speeds, distances, directions of approach, etc. Environmental factors such as location, habitat type, bathymetry, tide, sea state, temperature, prey presence, and ambient noise (in addition to vessel noise) were considered by 42% of studies. Biological factors such as group demographics, behavioral state, speed of movement etc., were considered by 46% of studies. Only 17% of studies did not consider any contextual variables. However, the majority used only very few and basic contextual variables such as range to the vessel, ambient noise, and current behavioral state.

## COMMON ISSUES AND PROBLEMS

### With Physics: Estimation of Exposure, Recording, and Playback of Vessel Noise

Studies on the effects of watercraft noise on marine mammals would ideally be able to determine the sound levels received by the animals and the total sound exposure (i.e., the integral of the squared sound pressure over time; International Organization for Standardization, 2017). Few studies employed acoustic recording tags on the animals, which store a record of received levels over time right at the animal. The majority of studies that determined received levels did so by modeling and estimation. In this case, watercrafts are recorded at some site, source levels are estimated, and these estimates are then applied to mostly different situations (i.e., locations, environments, and times of year) for the computation of received levels. There are common problems with all of these steps.

Measuring ship noise is not as simple as lowering a hydrophone over the side of a boat. Over-the-side deployments as well as hydrophones suspended straight from surface buoys may record noise from wave action against the boat or buoy, and show artifacts from the hydrophone moving through the water with the waves, affecting acoustic recordings at frequencies from



a few Hz to a few kHz (e.g., Strasberg, 1979; Cato, 2008; Erbe et al., 2016c). Common in moored deployments, flow noise is an artifact of recording resulting from hydrodynamic flow past the hydrophone, which causes non-acoustic pressure fluctuations at approximately 0.005–1 kHz range (e.g., Buck and Greene, 1980; Erbe et al., 2015). Strong currents might set mooring ropes and legs into vibration and resonance, causing mooring noise at a few hundred Hz to a few kHz (e.g., Köper et al., 2016). Metal chains and shackles in moorings cause clanking noise in the same frequency range (~100 Hz to a few kHz; e.g., Marley et al., 2017a). Many such artifacts can be minimized with hydrophones deployed on the seafloor (e.g., McCauley et al., 2017), though soft seafloor material such as sand moving over the hydrophone may contaminate acoustic recordings up to a few kHz (e.g., Erbe, 2009). Alternatives are arrangements that drift freely with the currents. The recorder is suspended from a buoy via a suspension system, which may comprise a drogue and a bungee that decouple the hydrophone from surface wave action. Similarly, a catenary (or distributed buoyancy) arrangement will decouple the hydrophone and spatially remove it from potential noise generated at the surface buoy (Figure 5). Building noise-free moorings is an art, and different designs may be required for different situations.

An international standard has recently been developed for the measurement of ship noise in deep water (i.e., water depth more than 150 m or  $1.5 \times$  ship length, whichever is greater) (International Organization for Standardization, 2016). The ship travels along a pre-defined course, and recordings are taken from both port and starboard aspects. While the standard does not specify a certain speed, it would be good to obtain measurements at multiple speeds representing typical operational speeds. Recording is done in the geometric far field (i.e., closest point of approach 100 m or  $1 \times$  ship length, whichever is greater) with a vertical array, having three hydrophones at specified inclination angles from the ship. The 'radiated noise level' (RNL, referenced to 1 m) is computed by applying a geometric (spherical) spreading loss term ( $20 \log_{10}(\text{range})$ ) over the slant range for each hydrophone and then averaging over all hydrophones. This averaging smooths over the Lloyd's mirror interference pattern. The RNL is useful for noise emission studies, but may lead to large errors when used to estimate received levels at animals in other environments. This is because the environment in which the ship was recorded affects RNL. The recent release of Part 2 of this standard (International Organization for Standardization, 2019) provides formulae to estimate equivalent monopole source levels that correct for surface effects.

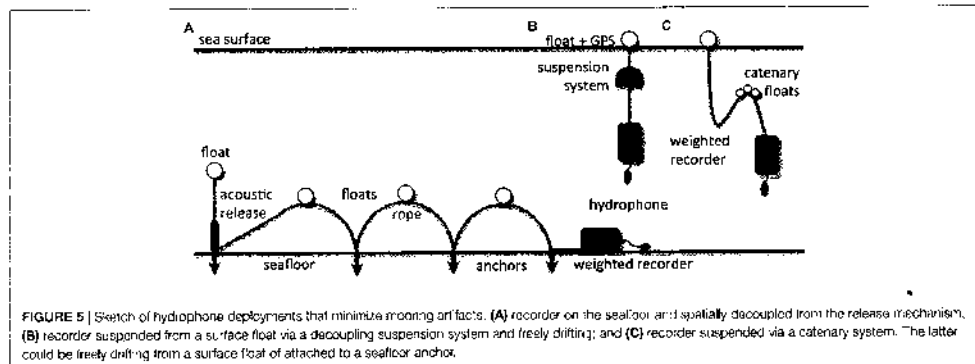
In order to compute environment-corrected monopole source levels, sound propagation models need to be applied that translate levels recorded at long range to levels normalized to 1 m range. There are a number of sound propagation models to choose from—depending on the environment (e.g., Fiter, 2003; Jensen et al., 2011). The resulting source levels can then be inputted into sound propagation models for other environments in order to estimate received levels at the animals (e.g., Erbe et al., 2013; Williams et al., 2014). If a spherical spreading loss term is applied rather than a sound propagation model, then source levels are

commonly under-estimated if the recording hydrophone was at shallow inclinations from the ship. Conversely, if monopole source levels are taken from the literature and a spherical loss is applied, then received levels may be over-estimated, when the receiving animal is at shallow inclinations from the ship. These are likely common problems in the literature. For example, the RNLs (re 1 m) of cargo vessels reported by McKenna et al. (2012) and Veirs et al. (2016) were up to 15 and 25 dB less than the source levels (re 1 m) of Simard et al. (2016), respectively, likely due to an underestimation of propagation loss. This is because of the dipole radiation pattern of a ship and its image source, yielding a propagation loss well above the wrongly, yet commonly applied  $20 \log_{10}(\text{range})$  at shallow inclination angles (e.g., Ainslie et al., 2014). Using sound propagation models, Chen et al. (2017) showed that gray seals experienced step changes of up to 20 dB in the received ship noise levels as they dove throughout the water column in the Celtic Sea. This was because of environmental features such as thermoclines, which a geometric propagation loss model cannot account for.

Finally, once recordings of watercraft have been obtained, they are sometimes played back to animals in different environments for response studies. The recorded sound was affected (in frequency and level) by the environment in which the recordings were made and by the recording system. It will likely be broadcast in yet another, different environment, resulting in further affected received spectrum levels. In addition, the speaker used for playback will have a frequency response, which can distort the signal. Ideally, the speaker's frequency response is measured, and the playback signal is digitally filtered with the inverse of the frequency response before the playback study. Furthermore, the underwater speaker used will have a rather different sound radiation (i.e., directivity) pattern from the recorded vessel. Finally, it is impossible to simulate an approaching vessel with a single, moored speaker, because not only the received level changes as a vessel approaches, but also its spectrum and directionality.

### With Biology: Experimental Design, Disturbance Differentiation, and Biological Significance

One of the most fundamental aspects of experimental design is ensuring that fair comparisons are made. In many response studies, this requires having some idea of 'normal' animal behavior in the form of a control group, with which treatment groups can then be compared for deviations that could imply disturbance (Johnson and Besselsen, 2002). However, here field-based marine mammal studies typically hit a problem: Despite the advancements of acoustic and visual monitoring techniques over recent decades, many fundamental questions regarding marine mammal behavior remain unanswered. As a result, the scientific community are still trying to determine the realms of normal behavior, hindered by continual new discoveries describing range expansions, diving abilities, hearing capabilities, and so on (e.g., Schorr et al., 2014; Cranford and Krysl, 2015; Accardo et al., 2018). Furthermore, all animals are individuals and the response of any given individual may change based on its current



**FIGURE 5 |** Sketch of hydrophone deployments that minimize mooring artifacts. **(A)** recorder on the seafloor and spatially decoupled from the release mechanism; **(B)** recorder suspended from a surface float via a decoupling suspension system and freely drifting; and **(C)** recorder suspended via a catenary system. The latter could be freely drifting from a surface float or attached to a seafloor anchor.

requirements and motivational states (e.g., health, reproductive status, age, energetic requirements; Pirodda et al., 2015a). Overall, this means that within the same species, individuals may respond differently in different environments and at different times, depending upon their previous experience with man-made noise and the importance of the habitat they are occupying for their current life-function requirements. Additionally, as previously discussed, animal behavioral responses can take many forms. This can make it difficult to conclusively identify when disturbance has occurred.

Similarly, a lack of control contexts can further confound results. There are few environments globally which have not experienced anthropogenic stressors (Halpern et al., 2015). Thus, there are few 'naïve' populations of marine mammals to serve as baselines in behavioral response studies. This raises the question of habituation (e.g., Cox et al., 2001). Do we see no behavioral response to noise because the population is already used to the presence of such sounds? If so, did behavioral responses ever occur or have animals developed strategies to deal with these noisy environments? And, if such strategies exist, do they evoke an energetic or reproductive cost to the animals involved?

It is possible to account for anthropogenic, biological, and environmental contexts by including a suite of additional variables. In fact, the majority of studies we reviewed tried to account for at least one form of context. Some contextual factors, however, have not been addressed in impact assessments of underwater noise, such as the role of nearby conspecifics (Dunlop, 2016a) or nearby animals of other species (e.g., Koper and Plon, 2016). Contextual data of any type may not always be available or obtainable at a sufficient spatial or temporal resolution to coincide with quick behavioral events (Mammocchi et al., 2017). And so, this leads to the issue of sample size. Statistical models with too many variables and insufficient sample size will fail to converge. Consequently, there are minimum sample sizes required for different statistical tests and levels of precision (e.g., Hampton et al., 2019). Unfortunately, the optimum sample size generally cannot be calculated until after the study has been completed. Methods for estimating

it beforehand require some knowledge about variation within the study population (Dell et al., 2002); but, such variation remains poorly understood for the majority of marine mammal species. While increasing the sample size is statistically preferable, the majority of marine mammal studies suffer sample-size restrictions due to logistics and economics.

Once the best possible experimental design has been implemented, there is the problem of disturbance differentiation. Firstly, impact assessment studies are often confounded by the fact that the majority of marine mammal studies are boat-based. This introduces a potential source of observer bias from the presence of the research vessel and the noise it creates. Such bias is unavoidable in many situations, although increasingly researchers are attempting to include this in their analyses (e.g., Lusseau, 2003b). In coastal settings, land-based observations are more readily implementable and may help reduce (or totally exclude) any influence from observer presence. However, this does not assist in resolving the question of whether animals respond to the physical presence of a vessel or if responses are due to the noise that vessel creates, or to any other factor in the environment.

And so, despite the best intentions, many response studies may be restricted to relatively simple analyses, such as the use of basic comparative statistics (such as *t*-tests, ANOVAs, and non-parametric equivalents) to look at one particular behavioral response with and without the presence of ships. This is not to say that such studies are of no value—every result adds another piece to the overall puzzle. But they by no means capture the full context of the situation. Now that long-term datasets are in existence, researchers are increasingly able to apply more complex analytical techniques, consider individual motivations in the study species, and even make predictions using agent- or context-based modeling (e.g., Ellison et al., 2012; Nabe-Nielsen et al., 2014; Pirodda et al., 2014).

Once analytical techniques have been applied, the final question is whether any observed response actually matters in terms of biological significance. Behavioral changes associated with anthropogenic activities are often assumed to equate to a

biologically significant effect (New et al., 2013; Curé et al., 2016). Individuals exposed to novel forms or chronic levels of disturbance may be displaced from critical habitat, disrupted from key activities, and thus suffer lower individual fitness, reproductive success, or overall survival (New et al., 2013). However, this may not be the case for infrequent disturbance resulting in instantaneous or short-term responses. For example, although animals may initially leave a site when exposed to anthropogenic activities, this may not equate to their utilizing lower-quality habitats or experiencing long-term, broad-scale displacement (Thompson et al., 2013). Recently, several studies have attempted to investigate biological significance using advanced mathematical models that allow for complexity of animal behavior, motivational state, social structure, and exposure to anthropogenic activities (e.g., New et al., 2013). Unfortunately, ground-truthing the outcomes is logistically challenging, requiring long-term studies at the individual- and population-level. Therefore, most behavioral studies are still restricted to establishing links between short-term measures and long-term population consequences (New et al., 2014).

## RESEARCH NEEDS

As can be seen from **Supplementary Table S1**, research on the potential impacts of watercraft on marine mammals has been patchy—in terms of its coverage of species, geographic areas, vessel type, and type of impact. As a result, there are a number of knowledge gaps resulting in several obvious research needs.

### Species Coverage

The Society for Marine Mammalogy currently recognizes 126 extant species of cetaceans, pinnipeds and sirenians. While 47 of these species have been studied regarding the impacts of vessel noise, the vast majority have received no attention or at maximum, one publication. More than half (64%) of the mysticete species have at least been the topic of a publication once, as have about half (46%) of the delphinid (Family *Delphinidae*) and half (43%) of the porpoise (Family *Phocoenidae*) species. However, of all the river dolphins (Families *Iniidae*, *Platanistidae*, *Pontoporiidae*, and *Lipotidae*—noting that the latter was declared possibly extinct in 2006), only one publication was found. All of the 22 species of beaked whales (Family *Ziphiidae*) are deep-diving pelagic species and rather cryptic, and so only two have been studied with regard to noise impacts. In terms of sirenians, only the Florida manatee appears in the literature on vessel noise impacts. Out of the pinnipeds, four of 18 phocids (true seals) and one otariid (i.e., eared seals) have been included in publications on responses to vessel noise at sea. Note that we did not review publications on the potential effects of approaching vessels on hauled-out pinnipeds, as underwater noise would not have been the cause.

The most-commonly studied species identified in this review were bottlenose dolphins and humpback whales. Ease of access might have played a role, as these species are widespread and at times exceptionally coastal. Thus their popularity as a target species for vessel noise impact studies does not necessarily reflect

their being a research priority, although many populations do inarguably experience high levels of vessel traffic and noise. In comparison, given that river dolphins experience a multitude of anthropogenic stressors, including often-chronic noise from boats, it is perhaps surprising that these species have not had greater research focus. Rivers are among the most threatened ecosystems in the world (Tockner et al., 2010); but these systems represent problematic study sites for cetacean research. For example, the Indus River dolphin (*Platanista gangetica minor*) historically occurred in approximately 3,400 km of the Indus River and its tributaries; surveying this extensive, narrow and convoluted system is logistically challenging (Braulik, 2006; Jensen et al., 2013). Finding river dolphins and tracking them during response studies is difficult. The literature thus far has consequently focused on abundance estimates and status assessments, as well as documenting and mitigating immediately lethal threats (e.g., bycatch; Smith and Smith, 1998), as opposed to potentially less-obvious threats such as disturbance from vessels and noise. Similarly, the potential impacts on cryptic species like deep-diving, pelagic beaked whales are perhaps not always apparent or easy to study. But impacts could be biologically significant, given the sheer volume and density of ocean traffic, coupled with a vertically downward focused sound radiation pattern and a deep-ocean sound propagation environment that enables very long propagation distances.

Non-cetacean species received considerably less research attention. Sirenians are predominantly found in coastal areas, whereas pinnipeds are tied to land; both these characteristics mean these animals inevitably have high habitat overlap with human activities. Yet the impacts of those activities in terms of their physical presence and associated noise remain poorly understood.

### Geographic Area

Another group of species that has been under-represented are those utilizing Antarctic waters. Annually migrating mysticetes critically depend on the Antarctic Ocean in the austral summer for feeding, as they do not feed while on their tropical breeding grounds in the austral winter. Some of the phocid species are truly Antarctic in the sense that they are present there all year round. Antarctica is predominantly governed by high-income countries, and thus might be expected to receive higher levels of research attention. Ship noise, in particular, is rapidly increasing off Antarctica due to booming tourism and heightened fisheries effort (Erbe et al., 2014). While Arctic marine mammals were first studied several decades ago, at a time when industrial development (i.e., mostly offshore oil and gas) was expected to grow rapidly, no such impetus has yielded a research increase in Antarctica. In fact, not a single publication has addressed the potential effects of watercraft noise on marine mammals in Antarctic waters, perhaps because of an absence of oil and gas exploration (as prohibited under the Antarctic Treaty) and the associated funding that accompanies such work. However, the expanding tourism and fishing industries may offer opportunities for future research work.

Not all areas have such opportunities. Marine mammal conservation at a global scale is challenged by a lack of basic

information on species presence, but this is particularly true in the developing world (Braulik et al., 2018). For instance, as noted above, river ecosystems have received relatively little research attention. However, in addition to being logistically challenging study areas, those utilized by river dolphins are all located in developing countries, and so local researchers also experience considerable socio-economic challenges when conducting even baseline research. Overall, the majority of publications identified in this review originated from developed countries. Although this likely in part reflects funding or resource availability, it could also reflect publishing practices. For example, in this review only English-publishing journals were included. Furthermore, whilst studies may have taken place on the impacts of noise on marine mammals in developing countries, this research may not have reached the international, peer-reviewed publication stage. It is likely that this information is available, but difficult to access or not publically available (e.g., internal reports, environmental impact assessments, or local conservation and management plans). Therefore, there is a need not only for greater research in particular geographic areas, but also for sharing of research outcomes with a global audience.

### Vessel Type

Vessels ranging from small, rigid-hulled inflatable whale-watching boats to large, powerful icebreakers have been investigated with regards to their potential impacts on certain species of marine mammal. Some combinations of vessel type and marine mammal species are more common than others in the literature. For example, the effects of cetacean-watching tourism vessels have most commonly been studied on bottlenose dolphins, then killer whales, humpback whales, and beluga whales. As tourism vessels are directly targeting marine mammals, it is reasonable to be concerned about the impacts these may have on the animals of interest. This is particularly true in areas where multiple trips occur each day or multiple tourism vessels are in operation, as this could lead to cumulative exposure and impacts. Additionally, cetacean-tourism vessels can also act as platforms of opportunity, allowing researchers the chance to study these animals from the tourism vessel itself rather than a dedicated research vessel. However, whilst there are many studies investigating the impacts of cetacean tourism, few specifically consider noise from tourism vessels.

In comparison, small recreational watercraft, such as jetskis, have received relatively little attention. Recreational watercraft may also have cumulative impacts on marine mammals, with an individual animal potentially encountering a multitude of vessels each day. Personal watercraft are considerably more challenging to document than tour vessels, but, given the continual increase in personal watercraft ownership, these vessels are of increasing concern with regards to noise impacts on marine mammals.

### Type of Impact

The types of noise impacts that have been studied are as patchy as the coverage of species, areas, and vessels. Risk assessments are often based on the assumption that affected animals will leave the area. However, as summarized above, there is overwhelming evidence that marine mammals can display a wide range of behavioral responses, ranging from the obvious

(e.g., area avoidance) to the subtle (e.g., shifts in acoustic behavior or raised cortisol levels). Measuring these responses comes with a number of logistical challenges; consequently, many studies have historically focused on the former, easier-to-identify response types. Recent technological developments have facilitated a rise in the number of studies targeting subtler types of impact, which will undoubtedly continue over coming years. However, there is still a need for integrative studies that simultaneously consider multiple response types in order to capture the variation associated with different species, populations, cohorts, and individuals.

One obvious pattern is that the effects of noise on the vocalizations of dolphins have been studied more than on those of other marine mammals. Perhaps this is due to the ease at which coastal dolphins can be recorded these days and due to the stereotypical nature of their vocalizations. This does not imply that acoustic communication is more important (and hence of more concern) in dolphins than other species. In fact, a range of responses can be evidence of disturbance, and more studies simultaneously looking at both physical and acoustical behavior are needed.

A significant gap in our knowledge is our lack of understanding of the potential long-term and population-level impacts and the corresponding biological significance. It could be argued that if a response does not equate to having biological significance, then it is of least concern; such conclusions would have obvious regulatory and management implications, but require considerable ground-truthing. This emphasizes the need for long-term, broad-scale studies targeting a range of response types to examine their consequences at the individual and population level. Physical and vocal behavioral changes impact an individual's energetic costs (Noren et al., 2013; Holt et al., 2015, 2016; Williams et al., 2017), but knowledge on how these costs affect other biologically important functions (e.g., growth and reproduction) is currently absent. Even if population consequences could be ascertained, the question remains how these consequences affect the structure, function, and stability of the ecosystem of which the population is a part (Wong and Candolin, 2015). Recent research has focused on developing a framework for assessing the population consequences of disturbance (PCoD) using sparsely available data, supplementing it with expert elicitation to link changes in individual behavior or physiology, to vital rates, and incorporating these into stochastic population models (King et al., 2015; Harwood et al., 2016). This methodology has the benefit of being able to model population consequences on the best available data, identifying gaps in understanding to focus research efforts, and being able to be updated as more data becomes available.

## DISCUSSION

The potential for watercraft noise to impact marine mammals is considerable. Some interactions have received particular attention, such as small boats affecting coastal dolphins; cetacean-watching boats affecting the specific populations of whales, dolphins, and porpoises that they target; large commercial ships affecting threatened species such as gray and southern

resident killer whales; and icebreakers affecting Arctic mysticetes and odontocetes. Reasons for these specific combinations of vessel type and species include spatio-temporal overlap in presence, identified research needs (such as an expected rise in industrialization of the Arctic due to climate change), conservation urgency (as in the case of the southern resident killer whale), and ease of access (such as coastal and tourism-targeted species).

Other patterns, in addition to specific species-vessel combinations, emerge. For example, research looking at the effects of small vessels is primarily related to vessel behavior without mentioning noise produced by these vessels. This is in contrast to larger vessels, where the noise factor is more often taken into account. Overall, our understanding of the potential effects of watercraft noise on marine mammals exhibits a number of 'holes.'

In this article, we have summarized the information available in the literature, highlighted some of the data gaps, and identified common problems. Standards are needed for both physical and biological aspects of study design, data collection (including recording of vessel noise and animal responses), data analysis, modeling, and reporting to avoid common mistakes and make results comparable and synthesizable (Erbe et al., 2016a). Given the interdisciplinary nature of the field of noise impacts on marine fauna, multi-disciplinary teams are needed to ensure consistent quality of outcomes.

While this article focused on the impacts of ship noise on marine mammals, ship noise also impacts other marine fauna such as fish (e.g., Slabbekoorn et al., 2010; Simpson et al., 2016) and crustaceans (e.g., Wale et al., 2013). The potential bioacoustic impacts on these species have been of concern for as long as those on marine mammals (Myrberg, 1978). However, despite the longevity of these concerns, there remains an information paucity for many species, populations, and cohorts in terms of the impacts of noise, responses invoked, and biological significance of disturbance. As well as being a concern in its own right, this topic also has biological significance for marine mammals in terms of impacts on their prey species.

Overall, ship traffic is expected to keep increasing by approximately 4% per year over the coming five years, with different rates predicted for different ship types (United Nations Conference on Trade and Development [UNCTAD], 2018). Ship noise is a loss in energy, and vibrating propellers, appendages, and cavities are a structural risk; therefore, there is a natural incentive for the shipping industry to maintain its vessels and thus reduce noise (Leaper and Renilson, 2012; Leaper et al., 2014). Reducing ship noise for environmental reasons has also been on the agenda of the International Maritime Organization (IMO) publishing guidelines on quieting technologies and methods for newly built,

as well as existing, vessels (International Maritime Organization [IMO], 2014). Particularly quiet vessels have been designed for defense and research applications, demonstrating that significant reductions in a ship's noise footprint are achievable (Mitsou, 1995; Fischer and Brown, 2005; Bahrtarian and Fischer, 2006; De Robertis et al., 2013; Palomo et al., 2014). The conundrum remains though, whether quieter vessels pose a higher risk of collision with marine mammals.

## CONCLUSION

The impacts of ship noise on marine mammals continue to be of great concern. Despite this and increasing research attention over recent years, a number of common problems exist in terms of both the physics and biology of this inter-disciplinary issue. Consequently, a number of knowledge gaps remain. However, growing awareness, improving technology, increasing availability of multi-variate data streams, and analytical advancements have started to provide much-needed context for impact assessments. The continuing growth of long-term data sets is enabling much needed assessments of chronic exposures at the individual and population level of marine mammals. As a scientific community, we should endeavor to address the gaps highlighted in this review to strategically target under-represented species, geographic areas, vessel types, and types of impact.

## AUTHOR CONTRIBUTIONS

CE conceived, designed, and led the study, collected and analyzed the data, prepared the figures and table, authored and reviewed the drafts of the manuscript, and approved the final manuscript. SM and RS contributed to the design of the study, collected the data, prepared the figures, authored and reviewed the drafts of the manuscript, and approved the final manuscript. JS, JT, and CE collected the data, authored and reviewed the drafts of the manuscript, and approved the final manuscript.

## SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fmars.2019.00606/full#supplementary-material>

**TABLE S1 |** Publications on the effects of ship noise on marine mammals: Flororanco, vessel type, species, study location, latitude, longitude, study objectives, study design, range to vessel, types of responses, received level, anthropogenic covariates, environmental covariates, biological covariates, and sample size.

Ackerman, B. B., Wright, S. D., Bonds, R. K., Odell, D. K., and Panowitz, D. J. (1992). "Trends and patterns in manatee mortality in Florida, 1974-1991," in *Interim report of the technical workshop on manatee population biology (Manatee Population Research Report No. 10)*, eds T. J. O'Shea, B. B. Ackerman, and H. F. Percival (Gainesville, FL: Florida Cooperative Fish and Wildlife Research Unit).

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## Bottlenose dolphin

**Bottlenose dolphins**, the genus *Tursiops*, are the most common members of the family Delphinidae, the family of oceanic dolphin.<sup>[a]</sup> Molecular studies show the genus contains three species: the common bottlenose dolphin (*Tursiops truncatus*), the Indo-Pacific bottlenose dolphin (*Tursiops aduncus*),<sup>[2]</sup> and the Burmuan dolphin (*Tursiops australis*). Bottlenose dolphins inhabit warm and temperate seas worldwide, being found everywhere except for the Arctic and Antarctic Circle regions. Their name derives from the Latin *tursio* (dolphin) and *truncatus* for their characteristic truncated teeth.<sup>[4]</sup>

Numerous investigations of bottlenose dolphin intelligence have been conducted, examining mimicry, use of artificial language, object categorization, and self-recognition. They can use tools (sponging; using marine sponges to forage for food sources they normally could not access)<sup>[5]</sup> and transmit cultural knowledge from generation to generation, and their considerable intelligence has driven interaction with humans. Bottlenose dolphins gained popularity from aquarium shows and television programs such as *Flipper*. They have also been trained by militaries to locate sea mines or detect and mark enemy divers. In some areas, they cooperate with local fishermen by driving fish into their nets and eating the fish that escape. Some encounters with humans are harmful to the dolphins: people hunt them for food, and dolphins are killed inadvertently as a bycatch of tuna fishing and by getting caught in crab traps.

Bottlenose dolphins have the third largest encephalization levels of any mammal on Earth (humans have the largest), sharing close ratios with those of humans and other great apes, which more than likely contributes to their high intelligence and emotional intelligence.<sup>[6]</sup>


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**Bottlenose dolphin**

Temporal range: Miocene – Recent  
3.6–0 Ma

PreЄ O Q S D C P T J K PaЄ



Bottlenose dolphin breaching in the wake of a boat



Size compared to an average human

**Scientific classification** ✎

Kingdom: Animalia

Phylum: Chordata

Class: Mammalia

Order: Artiodactyla

Infraorder: Cetacea

Family: Delphinidae


Genus: *Tursiops*  
Gervais, 1855

**Type species**

*Tursiops truncatus*  
Montagu, 1821

**Species**

- *Tursiops truncatus*
- *Tursiops aduncus*
- *Tursiops australis*



Common bottlenose dolphin range (in blue)

### Taxonomy

Scientists were long aware that the *Tursiops* dolphins might consist of more than one species, as there is extensive variation in color and morphology along its range. In the past, most studies used morphology to evaluate differences between and within species, but in the late 20th century, combining morphological and molecular genetics allowed much greater insight into this previously intractable problem.<sup>[7]</sup> Since the late 1990s and early 2000s, most researchers acknowledged the existence of two species:<sup>[8]</sup> the common bottlenose dolphin (*T. truncatus*), found in coastal and oceanic habitats of most tropical to temperate oceans, and the Indo-Pacific bottlenose dolphin (*T. aduncus*), that lives in coastal waters around India, northern Australia, South China, the Red Sea, and the eastern coast of Africa. In 2011, a third distinct species was described, the Burmuan dolphin (*T. australis*), found in the Port Phillip and Gippsland Lakes areas of Victoria, Australia, after research showed it was distinct from *T. truncatus* and *T. aduncus*, both in morphology<sup>[9]</sup> and genetics.<sup>[10]</sup> Also, evidence has been accumulating to validate the existence of a separate species, Llabille's bottlenose dolphin, *T. gephyreus*,<sup>[11][12][13]</sup> that occurs in coastal waters of Argentina, Uruguay and southern Brazil.

The Society for Marine Mammalogy's Committee on Taxonomy,<sup>[31]</sup> presently recognizes only two species, *T. truncatus* and *T. aduncus*, and two subspecies: the Black Sea bottlenose dolphin (*T. t. ponticus*), that lives in the Black Sea, and Lahille's bottlenose dolphin (*T. t. gephyreus*). Other sources also accept the Pacific bottlenose dolphin (*T. t. gilii* or *T. gilii*),<sup>[32]</sup> that inhabits the Pacific, and has a black line from the eye to the forehead.<sup>[32]</sup> The IUCN, on their Red List of endangered species, also recognises only two species of bottlenose dolphins.<sup>[33]</sup>

Much of the discussion and doubts about its taxonomy is related to the existence of two ecotypes of bottlenose dolphins in many part of its distribution. The two ecotypes of the common bottlenose dolphin within the western North Atlantic<sup>[34]</sup> are represented by the shallower water or coastal ecotype and the more offshore ecotype.<sup>[35]</sup> Their ranges overlap, but they have been shown to be genetically distinct.<sup>[36]</sup> They are not currently described, however, as separate species or subspecies. In general, genetic variation between populations is significant, even among nearby populations.<sup>[37]</sup> As a result of this genetic variation, other distinct species currently considered to be populations of common bottlenose dolphin are possible.<sup>[38]</sup>

Some recent genetic evidence suggests the Indo-Pacific bottlenose dolphin belongs in the genus *Stenella*, since it is more like the Atlantic spotted dolphin (*Stenella frontalis*) than the common bottlenose dolphin.<sup>[39]</sup>

#### Hybrids

Bottlenose dolphins have been known to hybridize with other dolphin species. Hybrids with Risso's dolphin occur both in the wild and in captivity.<sup>[40][41]</sup> The best known hybrid is the wolpin, a false killer whale-bottlenose dolphin hybrid. The wolpin is fertile, and two currently live at the Sea Life Park in Hawaii. The first was born in 1985 to a female bottlenose. Wolpins also exist in the wild.<sup>[42]</sup> In captivity, a bottlenose dolphin and a rough-toothed dolphin hybridized.<sup>[43]</sup> A common dolphin-bottlenose dolphin hybrid born in captivity lives at SeaWorld California.<sup>[44][45]</sup> Other hybrids live in captivity around the world and in the wild, such as a bottlenose dolphin-Atlantic spotted dolphin hybrid.<sup>[46]</sup>

#### Fossil species

Bottlenose dolphins appeared during the Miocene.<sup>[47]</sup> Known fossil species include *Tursiops osennae* (late Miocene to early Pliocene)<sup>[48]</sup> from the Piacenzian coastal mudstone, and *Tursiops miocenus* (Miocene) from the Burdigalian marine sandstone,<sup>[49]</sup> all in Italy.

### Description

The bottlenose dolphin weighs an average of 300 kg (660 pounds). It can reach a length of just over 4 meters (13 feet). Its color varies considerably, is usually dark gray on the back and lighter gray on the flanks, but it can be bluish-grey, brownish-grey, or even nearly black, and is often darker on the back from the rostrum to behind the dorsal fin. This is called countershading and is a form of camouflage. Older dolphins sometimes have a few spots.

Bottlenose dolphins can live for more than 40 years. Females typically live 5–10 years longer than males, with some females exceeding 60 years.<sup>[41][50][51]</sup> This extreme age is rare and less than 2% of all Bottlenose dolphins will live longer than 60 years.<sup>[52]</sup> Bottlenose dolphins can jump at a height of 6 metres (20 feet) up in the air.<sup>[53]</sup>

### Anatomy

Their elongated upper and lower jaws form what is called a rostrum, or snout, which gives the animal its common name.<sup>[54]</sup> The real, functional nose is the blowhole on top of its head; the nasal septum is visible when the blowhole is open.<sup>[55]</sup>

Bottlenose dolphins have 18 to 28 conical teeth on each side of each jaw.<sup>[52][56]</sup>

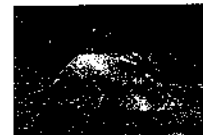
The flukes (lobes of the tail) and dorsal fin are formed of dense connective tissue and do not contain bone or muscle. The dorsal fin usually shows phenotypic variations that help discriminate among populations.<sup>[57]</sup> The animal propels itself by moving the flukes up and down. The pectoral flippers (at the sides of the body) are for steering; they contain bones homologous to the forelimbs of land mammals. A bottlenose dolphin discovered in Japan has two additional pectoral fins, or "hind legs", at the tail, about the size of a human's pair of hands. Scientists believe a mutation caused the ancient trait to reassert itself as a form of atavism.<sup>[58]</sup>

### Physiology and senses

In colder waters, they have more body fat and blood, and are more suited to deeper diving. Typically, 18%–20% of their bodyweight is blubber.<sup>[60]</sup> Most research in this area has been restricted to the North Atlantic Ocean.<sup>[41]</sup> Bottlenose dolphins typically swim at 5 to 11 km/h (1.4 to 3.1 m/s), but are capable of bursts of up to 29 to 35 km/h (8.1 to 9.7 m/s). The higher speeds can only be sustained for a short time.<sup>[42][53]</sup>

#### Senses

The dolphin's search for food is aided by a form of sonar known as echolocation: it locates objects by producing sounds and listening for the echoes. A broadband burst pulse of clicking sounds is emitted in a focused beam in front of the dolphin. When the clicking sounds hit an object in the water, like a fish or rock, they bounce off and come back to the dolphin as echoes. Echolocation tells the dolphins the shape, size, speed, distance, and location of the object.<sup>[61]</sup> To hear the returning echo, they have two small ear openings behind the eyes, but most sound waves are transmitted to the inner ear through the lower jaw. As the object of interest is approached, the echo becomes booming, and the dolphins adjust by decreasing the intensity of the emitted sounds. (This contrasts with bats and sonar, which reduce the sensitivity of the sound receptor.) The interclick interval also decreases as the animal nears the target. Evidently, the dolphin waits for each click's echo before clicking again. Echolocation details, such as signal strength, spectral qualities, and discrimination, are well understood by researchers.<sup>[44]</sup> Bottlenose dolphins are also able to extract shape information, suggesting they are able to form an "echoic image" or sound picture of their targets.<sup>[45]</sup>



Indo-Pacific bottlenose dolphin (*T. aduncus*)



Wolpin (Kawili'Kai) at the Sea Life Park in Hawaii



The fossil species *Tursiops osennae*



Bottlenose dolphin head, showing rostrum and blowhole



Dolphin and a bottler at Daikyo Park

Dolphins have sharp eyesight. The eyes are located at the sides of the head and have a **tapetum lucidum**, or reflecting membrane, at the back of the retina, which aids vision in dim light. Their horseshoe-shaped, double-slit pupils enable dolphins to have good vision both in air and underwater, despite the different indices of refraction of these media.<sup>[46]</sup> When under water, the eyeball's lens serves to focus light, whereas in the in-air environment, the typically bright light serves to contract the specialized pupil, resulting in sharpness from a smaller aperture (similar to a **pinhole camera**).<sup>[47]</sup>

By contrast, a bottlenose's sense of smell is poor,<sup>[48]</sup> because its blowhole, the analog to the nose, is closed when underwater and it opens only for breathing. It has no olfactory nerves or olfactory lobe in the brain.<sup>[49]</sup> Bottlenose dolphins are able to detect salty, sweet, bitter (**quinine sulphate**), and sour (citric acid) tastes, but this has not been well-studied.<sup>[49]</sup> Anecdotally, some individuals in captivity have been noted to have preferences for food fish types, although it is not clear if taste mediates this preference.<sup>[48]</sup>

### Communication

Bottlenose dolphins communicate through burst-pulsed sounds, whistles, and body language (<http://cetns.ucsd.edu/voicesinthesea.org/species/dolphins/bottlenose.html>). Examples of body language include leaping out of the water, snapping jaws, slapping the tail on the surface and butting heads.<sup>[49]</sup> Sounds and gestures help keep track of other dolphins in the group, and alert other dolphins to danger and nearby food. Lacking **vocal cords**, they produce sounds using six air sacs near their blow hole. Each animal has a uniquely identifying, frequency-modulated narrow-band signature vocalization (**signature whistle**).<sup>[50]</sup>

Researchers from the Bottlenose Dolphin Research Institute (BDRI (<http://www.thebdri.com/>)), based in Sardinia (Italy) have now shown whistles and burst-pulsed sounds are vital to the animals' social life and mirror their behaviors.<sup>[51]</sup>

The tonal whistle sounds (the most melodious ones) allow dolphins to stay in contact with each other (above all, mothers and offspring), and to coordinate hunting strategies.<sup>[52]</sup> The burst-pulsed sounds (which are more complex and varied than the whistles) are used "to avoid physical aggression in situations of high excitement", such as when they are competing for the same piece of food, for example. The dolphins emit these strident sounds when in the presence of other individuals moving towards the same prey. The "least dominant" one soon moves away to avoid confrontation.<sup>[53]</sup>

Other communication uses about 30 distinguishable sounds, and although famously proposed by **John Lilly** in the 1950s, no "dolphin language" has been found. However, **Herman**, Richards, and Wolz demonstrated comprehension of an artificial language by two bottlenose dolphins (named **Akeakamai** and **Phoenix**) in the period of skepticism toward animal language following **Herbert Terrace's** critique.<sup>[54]</sup>

### Intelligence

#### Cognition

Cognitive abilities that have been investigated include **concept formation**, sensory skills, and mental representations. Such research has been ongoing since the 1970s. This includes: acoustic and behavioral mimicry,<sup>[54][55]</sup> comprehension of novel sequences in an artificial language,<sup>[56][57]</sup> **memory**,<sup>[58]</sup> monitoring of self behavior,<sup>[52]</sup> discrimination and matching,<sup>[59][60]</sup> comprehension of symbols for various body parts,<sup>[61]</sup> comprehension of pointing gestures and gaze (as made by dolphins or humans),<sup>[62][63]</sup> **mirror self-recognition**,<sup>[64][65]</sup> and numerical values.<sup>[66]</sup>



Bottlenose dolphin responding to human hand gestures

#### Tool use and culture

At least some wild bottlenose dolphins use tools. In **Shark Bay**, dolphins place a marine sponge on their rostrum, presumably to protect it when searching for food on the sandy sea bottom.<sup>[67]</sup> This has only been observed in this bay (first in 1997), and is predominantly practiced by females. A 2005 study showed mothers most likely teach the behavior to their offspring, evincing culture (behavior learned from other species members).<sup>[68][69]</sup>

Mud plume feeding is a feeding technique performed by a small community of bottlenose dolphins over shallow seagrass beds (less than 1 m) in the **Florida Keys** in the United States. The behavior involves creation of a U-shaped plume of mud in the water column and then rushing through the plume to capture fish.<sup>[70]</sup>

Along the beaches and tidal marshes of South Carolina and Georgia in the United States, bottlenose dolphins cooperatively herd prey fish onto steep and sandy banks in a practice known as "strand feeding". Groups of between two and six dolphins are regularly observed creating a bow wave to force the fish out of the water. The dolphins follow the fish, stranding themselves briefly, to eat their prey before twisting their bodies back and forth in order to slide back into the water.<sup>[71]</sup> While initially documented in South Carolina and Georgia, strand feeding has also been observed in Louisiana, Texas, Baja California, Ecuador, and Australia.<sup>[72]</sup>

Some Mauritanian dolphins cooperate with human fishermen. The dolphins drive a school of fish towards the shore, where humans await with nets. In the confusion of casting nets, the dolphins catch a large number of fish as well. Intraspecies cooperative foraging has also been observed. These behaviors may also be transmitted via teaching. Controversially, Rendell and Whitehead have proposed a structure for the study of cetacean culture.<sup>[73][74]</sup> Similar cases have been observed in Laguna, Santa Catarina in Brazil since during 19th century as well.<sup>[75][76]</sup>

Near Adelaide, in South Australia, three bottlenose dolphins 'tail-walk', whereby they elevate the upper part of their bodies vertically out of the water, and propel themselves along the surface with powerful tail movements. Tail-walking mostly arises via human training in dolphinariums. In the 1980s, a female from the local population was kept at a local dolphinarium for three weeks, and the scientist suggests she copied the tail-walking behavior from other dolphins. Two other wild adult female dolphins have now copied it from her.<sup>[77]</sup>

A study conducted by the University of Chicago showed that bottlenose dolphins can remember whistles of other dolphins they'd lived with after 20 years of separation. Each dolphin has a unique whistle that functions like a name, allowing the marine mammals to keep close social bonds. The new research shows that dolphins have the longest memory yet known in any species other than humans.<sup>[78]</sup>

The bottlenose dolphins of John's Pass in Boca Ciega Bay, St. Petersburg FL, exhibit a rare form of self-decoration and social object use called grass-wearing. Self-decoration by wearing grass appears to be an attention-getting device rather than purely play and varies from a single blade to large clusters of grass. John's Pass dolphins self-decorate with grass primarily when they form new social groups or engage in procreative activities. Grass-wearing behavior among these dolphins is a local behavioral tradition that could constitute a cultural difference from other communities.<sup>[79]</sup>

#### Cortical neurons

Some researchers hypothesize that the number of nerve cells (neurons) in the cortex of the brain predicts intelligence in mammals.<sup>[89]</sup> A 2019 study estimated the number of neurons in the cerebral cortex of three common bottlenose dolphins and found numbers ranging from 11.7 to 15.2 billion neurons.<sup>[90]</sup> The human average being approximately 16 billion, this is likely within the range found in the human population.<sup>[91]</sup> This would suggest considerable overlap between the two species.

## Life history

### Respiration and sleep

The bottlenose dolphin has a single blowhole located on the dorsal surface of the head consisting of a hole and a muscular flap. The flap is closed during muscle relaxation and opens during contraction.<sup>[92]</sup> Dolphins are voluntary breathers, who must deliberately surface and open their blowholes to get air. They can store almost twice as much oxygen in proportion to their body weight as a human can: the dolphin can store 36 milliliters (ml) of oxygen per kg of body weight, compared with 20 ml per kg for humans. This is an adaptation to diving.<sup>[93]</sup> The bottlenose dolphin typically rises to the surface to breathe through its blowhole two to three times per minute,<sup>[92]</sup> although it can remain submerged for up to 20 minutes.<sup>[94]</sup>

Dolphins can breathe while "half-asleep". During the sleeping cycle, one brain hemisphere remains active, while the other hemisphere shuts down. The active hemisphere handles surfacing and breathing behavior.<sup>[95]</sup> The daily sleeping cycle lasts for about 8 hours, in increments of minutes to hours. During the sleeping cycle, they remain near the surface, swimming slowly or "logging", and occasionally closing one eye.<sup>[96]</sup>

### Reproduction

Both sexes have genital slits on the underside of their bodies. The male can retract and conceal his penis through his slit.<sup>[97][98]</sup> The female's slit houses her vagina and anus. Females have two mammary slits, each housing one nipple, one on each side of the genital slit.<sup>[99]</sup> The ability to stow their reproductive organs (especially in males) allows for maximum hydrodynamics. The breeding season produces significant physiological changes in males. At that time, the testes enlarge, enabling them to hold more sperm. Large amounts of sperm allow a male to wash away the previous suitor's sperm, while leaving some of his own for fertilization. Also, sperm concentration markedly increases. Having less sperm for out-of-season social mating means it wastes less. This suggests sperm production is energetically expensive. Males have large testes in relation to their body size.<sup>[99]</sup>

During the breeding season, males compete for access to females. Such competition can take the form of fighting other males or of herding females to prevent access by other males.<sup>[99][100]</sup> In Shark Bay, male bottlenose dolphins have been observed working in pairs or larger groups to follow and/or restrict the movement of a female for weeks at a time, waiting for her to become sexually receptive.<sup>[99][100]</sup> These coalitions, also known as male reproductive alliances, will fight with other coalitions for control of females.<sup>[101]</sup> Humans and dolphins are the only species that share this type of "gang formation" habit as a form of cooperation.<sup>[94]</sup>

Mating occurs belly to belly.<sup>[97]</sup> Dolphins have been observed engaging in intercourse when the females are not in their estrous cycles and cannot produce young, suggesting they may mate for pleasure.<sup>[98][102]</sup> The gestation period averages 12 months.<sup>[92]</sup> Births can occur at any time of year, although peaks occur in warmer months.<sup>[97]</sup> The young are born in shallow water, sometimes assisted by a (possibly male) "midwife", and usually only a single calf is born.<sup>[97]</sup> Twins are possible, but rare. Newborn bottlenose dolphins are 0.8 to 1.4 m (2.6 to 4.6 ft) long and weigh 9 to 30 kg (20 to 66 lb), with Indo-Pacific bottlenose dolphin infants being generally smaller than common bottlenose dolphin infants.<sup>[103]</sup> To accelerate nursing, the mother can eject milk from her mammary glands. The calf suckles for 18 months to up to 8 years,<sup>[97]</sup> and continues to closely associate with its mother for several years after weaning.<sup>[104]</sup> Females sexually mature at ages 5–13, males at ages 9–14.<sup>[105]</sup> Females reproduce every two to six years.<sup>[97]</sup> Georgetown University professor Janet Mann argues the strong personal behavior among male calves is about bond formation and benefits the species in an evolutionary context. She cites studies showing these dolphins as adults are inseparable, and that early bonds aid protection, as well as in locating females.<sup>[97]</sup>

Female bottlenose dolphins have to expend additional energy in carrying out parental care, e.g. infant carrying behavior. Dolphins don't physically hold their infants but line up in an echelon position with infants swimming beside them. This position creates a change of water flow pattern from the infant which minimizes separation between the mother and infant, but also increases the mother's surface area and creates a drag for the swimmer. This also leaves less energy to use in swimming speed, foraging, and predator evasion.<sup>[106]</sup>

### Social interaction



An adult female bottlenose dolphin with the young. Marine Earth Sciences

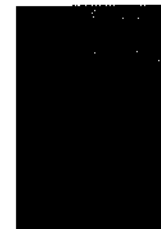
Adult males live mostly alone or in groups of two to three, and join pods for short periods of time. Adult females and young dolphins normally live in groups of up to 15 animals.<sup>[107]</sup> However, they live in fission-fusion societies of varying group size, within which individuals change associations, often on a daily or hourly basis.<sup>[108][109]</sup> Group compositions are usually determined by sex, age, reproductive condition, familial relations and affiliation histories. In a dolphin community near Sarasota, Florida, the most common group types are adult females with their recent offspring, older subadults of both sexes, and adult males either alone or in bonded pairs.<sup>[103]</sup> Smaller groups can join to form larger groups of 100 or more, and occasionally exceed 1,000.<sup>[109]</sup> The social strategies of marine mammals such as bottlenose dolphins "provide interesting parallels" with the social strategies of elephants and chimpanzees.<sup>[108][109]</sup>

Bottlenose dolphins studied by Bottlenose Dolphin Research Institute researchers off the island of Sardinia show random social behavior while feeding, and their social behavior does not depend on feeding activity.<sup>[109]</sup> In Sardinia, the presence of a floating marine fin-fish farm has been linked to a change in bottlenose dolphin distribution as a result of high fish density around the floating cages in the farming area.<sup>[109]</sup>

## Ecology

### Feeding

Fish is one of the main items in the dolphin diet. They also eat shrimps, squid, mollusks, and cuttlefish, and only swallow the soft parts. They eat 22 pounds of fish a day. When they encounter a shoal of fish, they work as a team to herd them towards the shore to maximize the harvest.<sup>[107]</sup> They also hunt alone, often targeting bottom-dwelling species. The bottlenose dolphin sometimes bites a fish with its fluke, sometimes knocking it out of the water, using



Mother and juvenile bottlenose dolphins head to the surface



a strategy called "fish whacking".<sup>[33][32]</sup> "Strand feeding" is an inherited feeding technique used by bottlenose dolphins near and around coastal regions of Georgia and South Carolina. When a pod finds a school of fish, they will circle the school and trap the fish in a mini whirlpool. Then, the dolphins will charge at the school and push their bodies up onto a mud-flat, forcing the fish on the mud-flat, as well. The dolphins then crawl around on their sides, consuming the fish they washed up on shore. This happens only during low tides.<sup>[30]</sup>

One type of feeding behavior seen in bottlenose dolphins is **mud ring feeding**.<sup>[33]</sup>

Bottlenose dolphins conflict with small-scale coastal commercial fisheries in some Mediterranean areas. Common bottlenose dolphins are probably attracted to fishing nets because they offer a concentrated food source.<sup>[33]</sup>

#### Relations with other species



A bottlenose dolphin attacks and kills a harbor porpoise at Chatham Point, Scotland.

Dolphins can exhibit altruistic behaviour toward other sea creatures. On Mahia Beach, New Zealand, on March 10, 2008,<sup>[11]</sup> two pygmy sperm whales, a female and calf, stranded on the beach. Rescuers attempted to refloat them four times. Shortly, a playful bottlenose dolphin known to local residents as Moko arrived and, after apparently vocalizing at the whales, led them 200 m (660 ft) along a sandbar to the open sea, saving them from imminent euthanasia.<sup>[12]</sup> In 2019 a female was observed caring for a juvenile melon-headed whale, the first reported instance of a bottlenose dolphin adopting a non-conspecific infant.<sup>[13]</sup>

The bottlenose dolphin can behave aggressively. Males fight for rank and access to females. During mating season, males compete vigorously with each other through displays of toughness and size, with a series of acts, such as head-butting. They display aggression towards sharks and smaller dolphin species. At least one population, off Scotland, has practiced **infanticide**, and also has attacked and killed **harbour porpoises**. University of Aberdeen researchers say the dolphins do not eat their victims, but are simply competing for food.<sup>[14]</sup> However, Dr. Read of Duke University, a

porpoise expert researching similar cases of porpoise killings that had occurred in Virginia in 1996 and 1997, holds a different view. He states dolphins and porpoises feed on different types of fish, thus food competition is an unlikely cause of the killings.<sup>[15]</sup> Similar behaviour has been observed in Ireland.<sup>[16]</sup> In the first half of July 2014, four attacks with three porpoise fatalities were observed and caught on video by the **Cardigan Bay Marine Wildlife Centre** in the Cardigan Bay, Wales.<sup>[17]</sup>

The bottlenose dolphin sometimes forms mixed species groups with other species from the dolphin family, particularly larger species, such as the short-finned pilot whale, the false killer whale and Risso's dolphin.<sup>[9][10][12]</sup> They also interact with smaller species, such as the Atlantic spotted dolphin and the rough-toothed dolphin.<sup>[9][10]</sup> While interactions with smaller species are sometimes affiliative, they can also be hostile.<sup>[12]</sup>

#### Predators

Some large shark species, such as the tiger shark, the dusky shark, the great white shark and the bull shark, prey on the bottlenose dolphin, especially calves.<sup>[9][10][12][13][14]</sup> The bottlenose dolphin is capable of defending itself by charging the predator; dolphin "mobbing" behavior of sharks can occasionally prove fatal for the shark.<sup>[12]</sup> Targeting a single adult dolphin can be dangerous for a shark of similar size. Killer whale populations in New Zealand and Peru have been observed preying on bottlenose dolphins, but this seems rare,<sup>[12]</sup> and other orcas may swim with dolphins. Swimming in pods allows dolphins to better defend themselves against predators. Bottlenose dolphins either use complex evasive strategies to outswim their predators, or mobbing techniques to batter the predator to death or force it to flee.<sup>[12]</sup>

### Relation to humans

#### Interaction

The species sometimes shows curiosity towards humans in or near water. Occasionally, they rescue injured divers by raising them to the surface. They also do this to help injured members of their own species.<sup>[12]</sup> In November 2004, a dramatic report of dolphin intervention came from New Zealand. Four lifeguards, swimming 100 m (330 ft) off the coast near Whangarei, were approached by a shark (reportedly a great white shark). Bottlenose dolphins herded the swimmers together and surrounded them for 40 minutes, preventing the shark from attacking, as they slowly swam to shore.<sup>[18]</sup>

In coastal regions, dolphins run the risk of colliding with boats. Researchers of the Bottlenose Dolphin Research Institute first quantified data about solitary bottlenose dolphin diving behavior in the presence and absence of boats.<sup>[19]</sup> Dolphins responded more to tourist than fishing vessels. Driving behavior, speed, engine type and separation distance all affect dolphin safety.

However, dolphins in these areas can also coexist with humans. For example, in the town of Laguna in south Brazil, a pod of bottlenose dolphins resides in the estuary, and some of its members cooperate with humans. These cooperating dolphins are individually recognized by the local fishermen, who name them. The fishermen typically stand up to their knees in the shallow waters or sit in canoes, waiting for the dolphins. Now and then, one or more dolphins appear, driving the fish towards the line of fishermen. One dolphin then displays a unique body movement outside the water, which serves as a signal to the fishermen to cast their nets (the entire sequence is shown here,<sup>[20]</sup> and a detailed description of the signal's characteristics is available here<sup>[21]</sup>). In this unique form of cooperation, the dolphins gain because the fish are disoriented and because the fish cannot escape to shallow water where the larger dolphins cannot swim. Likewise, studies show that fishermen casting their nets following the unique signal catch more fish than when fishing alone, without the help of the dolphins.<sup>[22]</sup> The dolphins were not trained for this behavior; the collaboration began before 1847. Similar cooperative fisheries also exist in Mauritania, Africa.<sup>[19]</sup>

Commercial 'dolphin encounter' enterprises and tours operate in many countries. The documentary film *The Cove* documents how dolphins are captured and sold to some of these enterprises (particularly in Asia) while the remaining pod is slaughtered. In addition to such endeavors, the individuals swim with and surface near surfers at the beach.<sup>[23]</sup> Bottlenose dolphins perform in many aquaria, generating controversy. **Animal welfare** activists and certain scientists have claimed that the dolphins do not have adequate space or receive adequate care or stimulation.<sup>[24]</sup> However, others, notably SeaWorld, counter by claiming that the dolphins are properly cared for, have much environmental stimulation and enjoy interacting with humans.<sup>[25][26]</sup>

Eight bottlenose dolphins that lived at the **Marine Life Aquarium** in Gulfport, Mississippi were swept away from their aquarium pool during Hurricane Katrina. They were later found in the Gulf of Mexico and returned to captivity.<sup>[24]</sup>

The military of the United States and Russia train bottlenose dolphins as military dolphins for wartime tasks, such as locating sea mines and detecting enemy divers.<sup>[27][28]</sup> The U.S.'s program is the **U.S. Navy Marine Mammal Program**, located in San Diego.<sup>[22]</sup>



At Nippon's Aquarium, Japan

## Bottlenose dolphin - Wikipedia

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Tião was a well-known solitary male Bottlenose Dolphin that was first spotted in the town of São Sebastião in Brazil around 1994 and frequently allowed humans to interact with him. The dolphin became infamous for killing a swimmer and injuring many others, which later earned him the nickname "Killer Dolphin".

## Cultural influence

The popular television show *Flipper*, created by Ivan Tors, portrayed a bottlenose dolphin<sup>[39]</sup> in a friendly relationship with two boys, Sandy and Bud. A seagling Lassie, Flipper understood English and was a hero: "Go tell Dad we're in trouble, Flipper! Hurry!" The show's theme song contains the lyric "no one you see / is smarter than he". The television show was based on a 1963 film, with a sequel, *Flipper's New Adventure* (1964), and was remade as a feature film in 1996, starring *Hijah Wood* and *Paul Hogan*, as well as a second TV series running from 1995 to 2000, starring *Jessica Alba*.<sup>[39]</sup>

Other television appearances by bottlenose dolphins include *Wonder Woman*, *Highway to Heaven*, *Dolphin Cove*, *seaQuest OSV*, and *The Penguins of Madagascar*, in which a dolphin, Doctor Blowhole, is a villain. In the HBO movie *Zeus and Roxanne*, a female bottlenose dolphin befriends a male dog, and in *Secrets of the Bermuda Triangle* (1996 Ian Toynton movie), a girl named Annie (played by *Lisa Jakub*) swims with dolphins. Human and dolphin interaction segments shot on location in the Florida Keys with *Dolphin Research Center* as seen on a Halloween episode of *The Simpsons*, *Treehouse of Horror XI*.<sup>[40]</sup>

*Dolphin Tale*, directed by Charles Martin Smith, starring *Nathan Gamble*, *Ashley Judd*, *Harry Connick Jr.*, *Morgan Freeman*, *Cozi Zuehdorff* and *Kris Kristofferson*, is based on the real-life story of the dolphin *Winter*, who was rescued from a crab trap in December 2005 and lost her tail, but has learned to swim with a prosthetic one.<sup>[41]</sup> *Dolphin Tale 2*, a sequel to the 2011 film, featured another dolphin named *Hope* and an appearance by *Bethany Hamilton*. The sequel was released on September 12, 2014.<sup>[42]</sup>

Bottlenose dolphins have appeared in novels. In *The Hitchhiker's Guide to the Galaxy* and one of its sequels, *So Long, and Thanks For All the Fish*, the dolphins try to warn humans of Earth's impending destruction, but their behavior was misinterpreted as playful acrobatics. Bottlenose dolphins are central to *David Brin's* series of *Uplift Universe* novels, particularly *Starline Rising*, where they are one of the four Earth species (along with chimpanzees, gorillas, and dogs) to have been 'uplifted' to sentience. Bottlenose dolphins are primary characters in *Anne McCaffrey's Dragonriders of Pern* series, especially *The Dolphins of Pern*. Bottlenose dolphins have been mentioned in various *Star Trek* novels and other materials as serving as navigation specialists onboard various *Federation* starships.

Bottlenose dolphins have featured in video games, including in the title role of the science fiction video game series *Ecco the Dolphin*. Delphineus, a bottlenose dolphin, appears in the PC adventure game *EcoQuest: The Search for Cetus*. Delphineus helps the player character (a human boy called Adam) find the "sea king" Cetus (a sperm whale). Delphineus also helps Adam clean up the marine environment where he lives.

T.D., the Miami Dolphins' mascot, uses the bottlenose dolphin as its mascot and team logo.<sup>[43]</sup>

Factual descriptions of the dolphins date back into antiquity – the writings of *Aristotle*, *Oppian* and *Pliny the Elder* all mention the species.<sup>[2][44]</sup>

## Threats

Millions of dolphins drown in fishing nets. Tuna fishing crews have been the most responsible for the largest number of deaths. In 1972, the U.S. government passed a law limiting the number of dolphins that could be killed yearly by tuna fishing crews. Dolphins in the United Kingdom have also been found to contain high levels of pollutants in their tissues. Heavy metals including mercury, PCB's and DDT are of great concern. These pollutants can cause harm in dolphins growth development, reproduction, and immunity. Since the mid-1990s, hundreds of dolphins have been trained to perform in shows presented by aquariums, zoos, and amusement parks. Scientists conduct various types of research to understand the dolphin's communication system.

The man-made chemical perfluorooctanesulfonic acid (PFOS) may be compromising the immune system of bottlenose dolphins.<sup>[45]</sup> PFOS affects the immune system of male mice at a concentration of 91.5 ppb.<sup>[46]</sup> while PFOS has been reported in bottlenose dolphins in excess of 1 ppm.<sup>[47]</sup> High levels of metal contaminants have been measured in tissues in many areas of the globe. A recent study found high levels of cadmium and mercury in bottlenose dolphins from South Australia,<sup>[48]</sup> levels which were later found to be associated with kidney malformations, indicating possible health effects of high heavy metal concentrations in dolphins.<sup>[49]</sup>

## Conservation

Bottlenose dolphins are not endangered. Their future is stable because of their abundance and adaptability. However, specific populations are threatened due to various environmental changes. The population in the Moray Firth in Scotland is estimated to consist of around 190 individuals, and are under threat from harassment, traumatic injury, water pollution and reduction in food availability.<sup>[50]</sup> Likewise, an isolated population in Doubtful Sound, New Zealand, is in decline due to calf loss coincident to an increase in warm freshwater discharge into the fiord.<sup>[51]</sup> Less local climate change, such as increasing water temperature may also play a role but has never been shown to be the case.<sup>[52]</sup> One of the largest coastal populations of bottlenose dolphins in Shark Bay, Western Australia was forecast to be stable with little variation in mortality over time (*Manlik et al. 2016*).<sup>[53]</sup>

In US waters, hunting and harassing of marine mammals is forbidden in almost all circumstances, from the passing of the *Marine Mammal Protection Act of 1972*.<sup>[54]</sup>

## See also

- Unihemispheric slow-wave sleep
- Audiograms in mammals
- Cetacean intelligence
- Dolphinarium
- Common bottlenose dolphin

## Footnotes

[https://en.wikipedia.org/wiki/Bottlenose\\_dolphin](https://en.wikipedia.org/wiki/Bottlenose_dolphin)

10/04/2021



K. Dog, trained by the US Navy to find mines and bombs, leaps underwater, leaping out of the water.



Bottlenose dolphin at Hurders Island National Park.

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### External links

- Voices in the Sea Sounds and Videos of the Bottlenose Dolphin (<http://oatus.ucsd.edu/voicesinthesea.org/species/dolphins/bottlenose.html>)
- Tropical Dolphin Research Foundation (<http://tropicaldolphin.org/index.html>)

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## African elephant

The **African elephant** (*Loxodonta*) is a genus comprising two living elephant species, the African bush elephant (*L. africana*) and the smaller African forest elephant (*L. cyclotis*). Both are social herbivores with grey skin, but differ in the size and color of their tusks and in the shape and size of their ears and skulls.

Both species are considered at heavy risk of extinction on the IUCN Red List; as of 2021, the bush elephant is considered **endangered** and the forest elephant is considered **critically endangered**. They are threatened by **habitat loss** and fragmentation, and **poaching** for the illegal **ivory trade** is a threat in several range countries as well.

*Loxodonta* is one of two extant genera of the family Elephantidae. The name refers to the lozenge-shaped enamel of their molar teeth. Fossil remains of *Loxodonta* species have been excavated in Africa, dating to the Middle Pliocene.

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### Taxonomy

The first scientific description of the African elephant was written in 1797 by Johann Friedrich Blumenbach, who proposed the scientific name *Elephas africanus*.<sup>[3]</sup> *Loxodonte* was proposed as generic name for the African elephant by Frédéric Cuvier in 1825. This name refers to the lozenge-shaped enamel of the molar teeth, which differs significantly from the rounded shape of the Asian elephant's molar enamel.<sup>[4]</sup> An anonymous author used the Latinized spelling *Loxodonta* in 1827.<sup>[5]</sup> Anonymous was recognized as authority by the International Code of Zoological Nomenclature in 1999.<sup>[1]</sup>

*Elephas (Loxodonta) cyclotis* was proposed by Paul Matschie in 1900, who described three African elephant zoological specimens from Cameroon whose skulls differed in shape from elephant skulls collected elsewhere in Africa.<sup>[6]</sup> In 1936, Glover Morrill Allen considered this elephant to be a distinct species and called it 'forest elephant',<sup>[7]</sup> later authors considered it to be a subspecies.<sup>[8][9][2]</sup> Morphological and genetic analyses provided evidence for species-level differences between the African bush elephant and the African forest elephant.<sup>[10][11][12][13]</sup>

In 1907, Richard Lydekker proposed six African elephant subspecies based on the different sizes and shapes of their ears.<sup>[14]</sup> They are all considered synonymous with the African bush elephant.<sup>[9]</sup>


#### Extinct African elephants

Between the late 18th and 20th centuries, the following extinct African elephants were described on the basis of fossil remains:


[https://en.wikipedia.org/wiki/African\\_elephant](https://en.wikipedia.org/wiki/African_elephant)

10/04/2021

**African elephant**  
**Temporal range:** Middle Pliocene–Present



African bush elephant bull in Kruger National Park



African forest elephant cow with calf in Nouabalé-Ndoki National Park

**Scientific classification**

Kingdom: **Animalia**  
 Phylum: **Chordata**  
 Class: **Mammalia**  
 Order: **Proboscidea**  
 Family: **Elephantidae**  
 Subfamily: **Elephantinae**  
 Genus: ***Loxodonta***  
Anonymous, 1827<sup>[1]</sup>

**Species**

- *L. africana*
- *L. cyclotis*
- † *L. adaurora*
  - † *L. a. adaurora*
  - † *L. a. kararae*
- † *L. atlantica*
  - † *L. a. angammensis*
  - † *L. a. atlantica*
- † *L. exoptata*
- † *L. cookei*

- North African elephant (*Loxodonta africana pharaoensis*) proposed by Paulus Edward Pieris Deraniyagata in 1948 was a specimen from Fayum in Egypt.<sup>[16]</sup>
- *Loxodonta atlantica* was proposed as *Elephas atlanticus* by Auguste Pomel in 1879 based on a skull and bones found in Ternifine, Algeria.<sup>[17]</sup>
- *Loxodonta exoptata* proposed by Wilhelm Otto Dietrich in 1941 was based on teeth found in Laetoli, Tanzania.<sup>[18]</sup>
- *Loxodonta edaurora* proposed by Vincent Maglio in 1970 was a complete skeleton found in Kanapoi, Kenya.<sup>[19]</sup>

### Phylogeny

Analysis of nuclear DNA sequences indicates that the genetic divergence between African bush and forest elephants dates 2.6 – 5.6 million years ago. The divergence between the Asian elephant and the woolly mammoths is estimated 2.5 – 5.4 million years ago, which strongly supports their status as distinct species. The African forest elephant was found to have a high degree of genetic diversity, perhaps reflecting periodic fragmentation of their habitat during the climatic changes in the Pleistocene.<sup>[13]</sup>

Gene flow between the two African elephant species was examined at 21 locations. The analysis revealed that several African bush elephants carried mitochondrial DNA of African forest elephants, indicating they hybridised in the savanna-forest transition zone in ancient times.<sup>[20]</sup>

Sequence analysis of DNA from fossils of the extinct Eurasian *Palaeoloxodon arcticus* shows it to be much closer related to the African forest elephant than to the African bush elephant. The validity of *Loxodonta* has therefore been questioned.<sup>[21]</sup>

## Description

### Skin, ears, and trunk

African elephants have grey folded skin up to 30 mm (1.2 in) thick that is covered with sparse bristled dark-brown to black hair. Short tactile hair grows on the trunk, which has two finger-like processes at the tip, whereas Asian elephants only have one.<sup>[8]</sup> Their large ears help to reduce body heat; flapping them creates air currents and exposes the ears' inner sides where large blood vessels increase heat loss during hot weather. The trunk is a prehensile elongation of its upper lip and nose. This highly sensitive organ is innervated primarily by the trigeminal nerve, and thought to be manipulated by about 40,000–60,000 muscles. Because of this muscular structure, the trunk is so strong that elephants can use it for lifting about 3% of their own body weight. They use it for smelling, touching, feeding, drinking, dusting, producing sounds, loading, defending and attacking.<sup>[22]</sup> Elephants sometimes swim underwater and use their trunks as snorkels.<sup>[23][24]</sup>

### Tusks and molars

Both male and female African elephants have tusks that grow from deciduous teeth called tushes, which are replaced by tusks when calves are about one year old. Tusks are composed of dentin, which forms small diamond-shaped structures in the tusk's center that become larger at its periphery.<sup>[25]</sup> Tusks are used for digging for roots and stripping the bark from trees for food, for fighting each other during mating season, and for defending themselves against predators. The tusks weigh from 23 to 45 kg (51–99 lb) and can be from 1.5 to 2.4 m (5–8 ft) long. They are curved forward and continue to grow throughout the elephant's lifetime.<sup>[25]</sup>

The dental formula of elephants is  $\frac{1.0.3.3}{0.0.3.3} \times 2 = 26$ .<sup>[22]</sup> Elephants have four molars; each weighs about 5 kg (11 lb) and measures about 30 cm (12 in) long. As the front pair wears down and drops out in pieces, the back pair moves forward, and two new molars emerge in the back of the mouth. Elephants replace their teeth four to six times in their lifetimes. Around 40 to 60 years of age, the elephant loses the last of its molars and will likely die of starvation, a common cause of death. African elephants have 24 teeth in total, six on each quadrant of the jaw. The enamel plates of the molars are fewer in number than in Asian elephants.<sup>[26]</sup>

### Size

The African bush elephant is the largest terrestrial animal. Cows are 2.2–2.6 m (7.2–8.5 ft) tall at the shoulder and weigh 2,160–3,232 kg (4,762–7,125 lb), while bulls are 3.2–4 m (10–13 ft) tall and weigh 4,700–6,048 kg (10,362–13,334 lb).<sup>[8]</sup> Its back is concave-shaped, while the back of the African forest elephant is nearly straight.<sup>[6]</sup> The largest recorded individual stood 3.96 metres (13.0 ft) at the shoulder, and is estimated to have weighed 10,400 kg (22,900 lb).<sup>[27][28]</sup> The tallest recorded individual stood 4.21 m (13.8 ft) at the shoulder and weighed 8,000 kg (18,000 lb).<sup>[29]</sup>



Distribution of living *Loxodonta* (2007)



Comparison of bush (left) and forest (right) elephant skulls in frontal view. Note the shorter and wider head of *L. cyclotis*, with a concave instead of convex forehead



A female African bush elephant skeleton on display at the Museum of Osteology, Oklahoma City



Short tactile hair growing on the trunk



A male African bush elephant skull on display at the Museum of Osteology

The African forest elephant is smaller with male shoulder heights of up to 2.5 metres (8.2 ft).<sup>[30]</sup> It is the third largest terrestrial animal. Their thickset bodies rest on stocky legs.<sup>[34]</sup>

### Development

Elephants have the longest gestation period of any mammal, with each elephant species having a gestation period of roughly 22 months. However, there's slight variations between the African elephant(640-673 days), and the Asian elephant(623-729)(nbc.gov).<sup>[32]</sup> As the largest land mammal on Earth, calves are born at about 200 pounds.<sup>[33]</sup> The elephant is a complex organism, with the trunk alone having roughly 100,000 muscles, making development stages very drawn out.

For the development of the calf in the womb, it takes about 62 days for the embryo to be detectable,<sup>[34]</sup> with a heartbeat detected by 71 days. The placenta is detected by an endometrial reaction on day 80, and the basic shape of the calf(head, rump, and trunk) are detected by day 95(embryology.med.unsw.edu). By day 95, the umbilical cord is also visible. At around day 100, the head makes up half of the length of the calf, and the toes can be discerned on all four limbs. Later on, by day 120, the trunk of an African calf has the two lip-like protrusions seen in adults.

### Distribution and habitat

African elephants are distributed in Sub-Saharan Africa, where they inhabit Sahelian scrubland and arid regions, tropical rainforests, mopane and miombo woodlands. African forest elephants occur only in Central Africa.<sup>[35]</sup>



Female bush elephants in Tanzania

### Behavior and ecology

#### Family

Both African elephant species live in family units comprising several adult cows, their daughters and their subadult sons. Each family unit is led by an older cow known as the **matriarch**.<sup>[36][37]</sup> African forest elephant groups are less cohesive than African bush elephant groups, probably because of the lack of predators.<sup>[32]</sup>

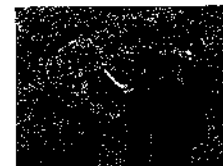
When separate family units bond, they form kinship or bond groups. After **puberty**, male elephants tend to form close alliances with other males. While females are the most active members of African elephant groups, both male and female elephants are capable of distinguishing between hundreds of different low frequency infrasonic calls to communicate with and identify each other.<sup>[38][39]</sup>



Family responds to bee warning rumble

Elephants use some **vocalisations** that are beyond the hearing range of human,<sup>[40]</sup> to communicate across large distances. Elephant mating rituals include the gentle entwining of trunks.<sup>[41]</sup>

The bulls were believed to be solitary animals, becoming independent once reaching maturity. New research suggests that bulls maintain ecological knowledge for the herd, facilitating survival when searching for food and water, which also benefits the young bulls who associate with them. Bulls only return to the herd to breed or to socialize, they do not provide prenatal care to their offspring but rather play a fatherly role to younger bulls to show dominance.<sup>[42]</sup>



Bull elephants in mock aggression

#### Feeding

While feeding, the African elephant uses its trunk to pluck leaves and its tusk to tear at branches, which can cause enormous damage to foliage.<sup>[39]</sup> Fermentation of the food takes place in the hindgut, thus enabling large food intakes.<sup>[43]</sup> The large size and hindgut of the African elephant also allows for digestion of various plant parts, including fibrous stems, bark and roots.<sup>[44]</sup>

#### Intelligence

African elephants are highly intelligent.<sup>[45]</sup> They have a very large and highly convoluted neocortex, a trait they share with humans, apes and some dolphin species. They are amongst the world's most intelligent species. With a mass of just over 5 kg (11 lb), the elephant brain is larger than that of any other terrestrial animal. The elephant's brain is similar to a human brain in terms of structure and complexity; the elephant's cortex has as many neurons as that of a human brain,<sup>[46]</sup> suggesting convergent evolution.<sup>[42]</sup>



Scratching on a tree helps to remove layers of dead skin and parasites

Elephants exhibit a wide variety of behaviors, including those associated with grief, learning, mimicry, art, play, a sense of humor, altruism, use of tools, compassion, cooperation,<sup>[48]</sup> self-awareness, memory and possibly language.<sup>[49]</sup> All point to a highly intelligent species that is thought to be equal with cetacea,<sup>[50][51][52]</sup> and primates.<sup>[50][53]</sup>

#### Reproduction

African elephants are at their most fertile between the ages of 25 and 45. Calves are born after a gestation period of up to nearly two years.<sup>[34]</sup> The calves are cared for by their mother and other young females in the group, known as **allomothering**.<sup>[36]</sup>

African elephants show **sexual dimorphism** in weight and shoulder height by age 20, due to the rapid early growth of males. By age 25, males are double the weight of females; however, both sexes continue to grow throughout their lives.

Female African elephants are able to start reproducing at around 10 to 12 years of age,<sup>[68]</sup> and are in estrus for about 2 to 7 days. They do not mate at a specific time; however, they are less likely to reproduce in times of drought than when water is plentiful. The gestation period of an elephant is 22 months and fertile females usually give birth every 3–6 years, so if they live to around 50 years of age, they may produce 7 offspring. Females are a scarce and mobile resource for the males so there is intense competition to gain access to estrous females.

Post sexual maturity, males begin to experience **musth**, a physical and behavioral condition that is characterized by elevated testosterone, aggression and more sexual activity.<sup>[68][69]</sup> Musth also serves a purpose of calling attention to the females that they are of good quality, and it cannot be mimicked as certain calls or noises may be. Males sire few offspring in periods when they are not in musth. During the middle of estrus, female elephants look for males in musth to guard them. The females will yell, in a loud, low way to attract males from far away. Male elephants can also smell the hormones of a female ready for breeding. This leads males to compete with each other to mate, which results in the females mating with older, healthier males.<sup>[62]</sup> Females choose to a point who they mate with, since they are the ones who try to get males to compete to guard them. However, females are not guarded in the early and late stages of estrus, which may permit mating by younger males not in musth.

Males over the age of 25 compete strongly for females in estrus, and are more successful the larger and more aggressive they are.<sup>[68]</sup> Bigger males tend to sire bigger offspring.<sup>[68]</sup> Wild males begin breeding in their thirties when they are at a size and weight that is competitive with other adult males. Male reproductive success is maximal in mid-adulthood and then begins to decline. However, this can depend on the ranking of the male within their group, as higher-ranking males maintain a higher rate of reproduction.<sup>[68]</sup> Most observed matings are by males in musth over 35 years of age. Twenty-two long observations showed that age and musth are extremely important factors; "... older males had markedly elevated paternity success compared with younger males, suggesting the possibility of sexual selection for longevity in this species." (Hollister-Smith, et al. 287).

Males usually stay with a female and her herd for about a month before moving on in search of another mate. Less than a third of the population of female elephants will be in estrus at any given time and gestation period of an elephant is long, so it makes more evolutionary sense for a male to search for as many females as possible rather than stay with one group.

## Threats

Based on vegetation types that provide suitable habitat for African elephants, it was estimated that in the early 19th century a maximum of 26,913,000 African elephants might have been present from the Sahel in the north to the Highveld in the south. Decrease of suitable habitat was the major cause for the decline of elephant populations until the 1950s. Hunting African elephants for the **ivory trade** accelerated the decline from the 1970s onwards. The carrying capacity of remaining suitable habitats was estimated at 8,985,000 elephants at most by 1987.<sup>[60]</sup> In the 1970s and 1980s, the price for ivory rose, and poaching for ivory increased in particular in Central African range countries where access to elephant habitats was facilitated by logging and petroleum mining industries.<sup>[52]</sup> Between 1976 and 1980, about 830 t (820 long tons; 910 short tons) raw ivory was exported from Africa to Hong Kong and Japan, equivalent to tusks of about 222,000 African elephants.<sup>[62]</sup>

The first continental elephant census was carried out in 1976. At the time, 1.34 million elephants were estimated to range over 7,300,000 km<sup>2</sup> (2,800,000 sq mi).<sup>[62]</sup> In the 1980s, it was difficult to carry out systematic surveys in several East African range countries due to civil wars.<sup>[55]</sup> In 1987, it was estimated that the African elephant population had declined to 760,000 individuals. In 1989, only 608,000 African elephants were estimated to have survived.<sup>[62]</sup> In 1989, the Kenyan Wildlife Service burned a stockpile of tusks in protest against the ivory trade.<sup>[64]</sup> The population in the **Tanzanian Selous Game Reserve**, once the largest of any reserve in the world, dropped from 109,000 in 1976 to 13,000 in 2013.<sup>[64]</sup>

When the international ivory trade reopened in 2006, the demand and price for ivory increased in Asia. In Chad's **Zakouma National Park**, more than 3,200 elephants were killed between 2005 and 2010. The park did not have sufficient guards to combat poaching, and their weapons were outdated. Well organized networks facilitated smuggling the ivory through Sudan.<sup>[66]</sup> The government of Tanzania estimated that more than 85,000 elephants were lost to poaching in Tanzania between 2009 and 2014, representing a 60% loss.<sup>[67]</sup> By 2014 it was estimated that only 50,000 elephants remained in Central Africa. The last major populations are present in Gabon and the Republic of Congo.<sup>[65]</sup> In 2012, *The New York Times* reported a large upsurge in ivory poaching, with about 70% of the product flowing to China.<sup>[68]</sup>

Conflicts between elephants and a growing human population are a major issue in elephant conservation.<sup>[58]</sup> Human encroachment into natural areas where bush elephants occur or their increasing presence in adjacent areas has spurred research into methods of safely driving groups of elephants away from humans. Playback of the recorded sounds of angry **honey bees** has been found to be remarkably effective at prompting elephants to flee an area.<sup>[69]</sup>

According to the **World Wide Fund for Nature**, in 2014 the total population of African elephants was estimated to be around 700,000, and the Asian elephant population was estimated to be around 32,000. The population of African elephants in Southern Africa is large and expanding, with more than 300,000 within the region; Botswana has 200,000 and Zimbabwe 80,000. Large populations of elephants are confined to well-protected areas. However, conservative estimates were that 23,000 African elephants were killed by poachers in 2013<sup>[65]</sup> and less than 20% of the African elephant range was under formal protection.<sup>[70]</sup> The International Union for Conservation of Nature released a report in September 2016 that estimates Africa's elephant population at 415,000. They reported that in the past decade, this is a decline of 111,000 elephants. This is reported as the worst decline in the past 25 years.<sup>[72]</sup>



Men with African elephant tusks in Dar es Salaam, c. 1900

China was the biggest market for poached ivory but announced that it would phase out the legal domestic manufacture and sale of ivory products in May 2015, and in September of that year, China and the U.S.A. "said they would enact a nearly complete ban on the import and export of ivory."<sup>[77]</sup> In response Chinese consumers moved to purchasing their ivory through markets in Laos, leading conservation groups to request pressure be put on Laos to end the trade.<sup>[78]</sup>

## Conservation

In 1986, the African Elephant Database was initiated with the aim to monitor the status of African elephant populations. This database includes results from aerial surveys, dung counts, interviews with local people and data on poaching.<sup>[74]</sup>

In 1989, the Convention on International Trade in Endangered Species of Wild Fauna and Flora listed the African elephant on CITES Appendix I. This listing banned international trade of African elephants and their body parts by countries that signed the CITES agreement. Hunting elephants is banned in the Central African Republic, Democratic Republic of Congo, Gabon, Côte d'Ivoire, and Senegal. After the ban came into force in 1990, retail sales of ivory carvings in South Africa have plummeted by more than 95% within 10 years.<sup>[79]</sup> As a result of the trade ban, African elephant populations recovered in Southern African range countries.<sup>[76]</sup>

The African Elephant Specialist Group has set up a *Human-Elephant Conflict Task Force* with the aim to develop conflict mitigation strategies.<sup>[77]</sup>

In 2005, the West African Elephant Memorandum of Understanding was signed by 12 West African countries. The Convention on the Conservation of Migratory Species of Wild Animals provided financial support for four years to implement the West African Elephant Conservation Strategy, which forms the central component of this intergovernmental treaty.<sup>[78]</sup>

In 2019, the export of wild African elephants to zoos around the world was banned, with an exception added by the EU to allow export in "exceptional cases where ... it is considered that a transfer to ex-situ locations will provide demonstrable in-situ conservation benefits for African elephants". Previously, export had been allowed in Southern Africa with Zimbabwe capturing and exporting more than 100 baby elephants to Chinese zoos since 2012.<sup>[28]</sup>

## In culture

Many African cultures revere the African Elephant as a symbol of strength and power.<sup>[80][81]</sup> It is also praised for its size, longevity, stamina, mental faculties, cooperative spirit, and loyalty.<sup>[82]</sup> The animal's religious importance is mostly totemic.<sup>[83]</sup> Many societies believed that their chiefs would be reincarnated as elephants. During the 10th century AD, the people of Igbo-Ukwu, near the Niger Delta, buried their leaders with elephant tusks.<sup>[84]</sup>

South Africa uses elephant tusks in their coat of arms to represent wisdom, strength, moderation and eternity.<sup>[85]</sup> The elephant is symbolically important to the nation of Ivory Coast (*Côte d'Ivoire*); the Coat of arms of Ivory Coast features an elephant head escutcheon as its focal point.

In the western African Kingdom of Dahomey (now part of Benin) the elephant was associated with the 19th century rulers of the Fon people, Guezo and his son Glele.<sup>[8]</sup> The animal is believed to evoke strength, royal legacy, and enduring memory as related by the proverbs: "*There where the elephant passes in the forest, one knows*" and "*The animal steps on the ground, but the elephant steps down with strength.*"<sup>[86]</sup> Their flag depicted an elephant wearing a royal crown.



Elephant mask in the Ivory Coast

## See also

- Africa's Elephant Kingdom
- Asian elephant
- Indian elephant
- Sri Lankan elephant
- Sumatran elephant

## Notes

- ↑ Guezo and Glele ruled from 1818 to 1858 and from 1858 to 1889, respectively

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# Chimpanzee

The **chimpanzee** (*Pan troglodytes*), also known as the **common chimpanzee**, **robust chimpanzee**, or simply **chimp**, is a species of **great ape** native to the forest and savanna of tropical Africa. It has four confirmed subspecies and a fifth proposed subspecies. The chimpanzee and the closely related **bonobo** (sometimes called the "pygmy chimpanzee") are classified in the genus *Pan*. Evidence from fossils and DNA sequencing shows that *Pan* is a **sister taxon** to the **human lineage** and is **humans'** closest living relative.

The chimpanzee is covered in coarse black hair, but has a bare face, fingers, toes, palms of the hands, and soles of the feet. It is larger and more robust than the bonobo, weighing 40–70 kg (88–154 lb) for males and 27–50 kg (60–110 lb) for females and standing 150 cm (4 ft 11 in). Its gestation period is eight months. The infant is weaned at about three years old, but usually maintains a close relationship with its mother for several years more. The chimpanzee lives in groups that range in size from 15 to 150 members, although individuals travel and forage in much smaller groups during the day. The species lives in a strict male-dominated hierarchy, where disputes are generally settled without the need for violence. Nearly all chimpanzee populations have been recorded using tools, modifying sticks, rocks, grass and leaves and using them for hunting and acquiring honey, termites, ants, nuts and water. The species has also been found creating sharpened sticks to spear small mammals.

The chimpanzee is listed on the IUCN Red List as an **endangered** species. Between 170,000 and 300,000 individuals are estimated across its range. The biggest threats to the chimpanzee are habitat loss, poaching, and disease. Chimpanzees appear in Western popular culture as stereotyped clown-figures, and have featured in entertainments such as chimpanzees' tea parties, circus acts and stage shows. They are sometimes kept as pets, though their strength and aggressiveness makes them dangerous in this role. Some hundreds have been kept in laboratories for research, especially in America. Many attempts have been made to teach languages such as **American Sign Language** to chimpanzees, with limited success.

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## Etymology


The English word *chimpanzee* is first recorded in 1738.<sup>[a]</sup> It is derived from *Vili* *ci-mpenze*<sup>[a]</sup> or *Tshiluba language* *chimpanze*, with a meaning of "ape".<sup>[a]</sup> The colloquialism "chimp" was most likely coined some time in the late 1870s.<sup>[a]</sup> The genus name *Pan* derives from the Greek god, while the specific name *troglodytes* was taken from the *Troglodytae*, a mythical race of cave-dwellers.<sup>[a]</sup>

## Taxonomy and genetics

**Chimpanzee**<sup>[i]</sup>

Temporal range: 4–0 Ma

Pan P Q S D C P T J K Pan<sup>[i]</sup>



*P. t. schweinfurthii* in Kibale National Park, Uganda

**Conservation status**

Extinct EX EW CR NT LC DD EN LR ST VF WT XN YR ZN ZD ZV ZW ZX ZY ZZ

**Endangered** (IUCN 3.1)<sup>[a]</sup>

**Scientific classification**

Kingdom: **Animalia**

Phylum: **Chordata**

Class: **Mammalia**

Order: **Primates**

Suborder: **Haplorhini**

Infraorder: **Simiiformes**

Family: **Hominidae**

Subfamily: **Homininae**

Tribe: **Hominini**

Genus: ***Pan***

Species: ***P. troglodytes***

**Binomial name**

***Pan troglodytes***  
(Blumenbach, 1775)


**Subspecies**

*Pan troglodytes verus*

*Pan troglodytes elliofi*

*Pan troglodytes troglodytes*

*Pan troglodytes schweinfurthii*



Distribution of subspecies

1. *Pan troglodytes verus* (green)
2. *P. t. elliofi* (grey)
3. *P. t. troglodytes* (red)
4. *P. t. schweinfurthii* (blue)

**Synonyms**

*Simia troglodytes* Blumenbach, 1775

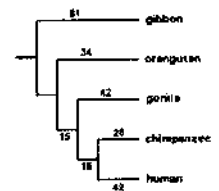
The first great ape known to Western science in the 17th century was the "orang-outang" (genus *Pongo*), the local Malay name being recorded in Java by the Dutch physician Jacobus Bontius. In 1641, the Dutch anatomist Nicolaes Tulp applied the name to a chimpanzee or bonobo brought to the Netherlands from Angola.<sup>[a]</sup> Another Dutch anatomist, Peter Camper, dissected specimens from Central Africa and Southeast Asia in the 1770s, noting the differences between the African and Asian apes. The German naturalist Johann Friedrich Blumenbach classified the chimpanzee as *Simia troglodytes* by 1775. Another German naturalist, Lorenz Oken, coined the genus *Pan* in 1816. The bonobo was recognised as distinct from the chimpanzee by 1933.<sup>[b][c]</sup>

<i>Troglodytes troglodytes</i> (Blumenbach, 1776)
<i>Troglodytes niger</i> E. Geoffroy, 1812
<i>Pan niger</i> (E. Geoffroy, 1812)
<i>Anthropopithecus troglodytes</i> (Sutton, 1863)

**Evolution**

Despite a large number of *Homo* fossil finds, *Pan* fossils were not described until 2005. Existing chimpanzee populations in West and Central Africa do not overlap with the major human fossil sites in East Africa, but chimpanzee fossils have now been reported from Kenya. This indicates that both humans and members of the *Pan* clade were present in the East African Rift Valley during the Middle Pleistocene.<sup>[a]</sup>

DNA evidence suggests the bonobo and chimpanzee species separated from each other less than one million years ago (similar in relation between *Homo sapiens* and Neanderthals).<sup>[a][b]</sup> A 2017 genetic study suggests ancient gene flow (introgression) between 200 and 550 thousand years ago from the bonobo into the ancestors of central and eastern chimpanzees.<sup>[a]</sup> The chimpanzee line split from the last common ancestor of the human line around six million years ago. Because no species other than *Homo sapiens* has survived from the human line of that branching, both chimpanzee species are the closest living relatives of humans; the lineage of humans and chimpanzees diverged from gorillas (genus *Gorilla*) about seven million years ago. A 2003 study argues the chimpanzee should be included in the human branch as *Homo troglodytes*, and notes "experts say many scientists are likely to resist the reclassification, especially in the emotionally-charged and often disputed field of anthropology".<sup>[a]</sup>



Relationships among apes. The numbers in this diagram are branch lengths, a measure of evolutionary distinctness. Based on protein electrophoresis data of Golovan et al.<sup>[a]</sup>

**Subspecies and population status**

Four subspecies of the chimpanzee have been recognised,<sup>[a][b]</sup> with the possibility of a fifth.<sup>[a][c]</sup>

- Central chimpanzee or *tschaga* (*Pan troglodytes troglodytes*), found in Cameroon, the Central African Republic, Equatorial Guinea, Gabon, the Republic of the Congo, and the Democratic Republic of the Congo, with about 140,000 individuals existing in the wild.<sup>[a]</sup>
- Western chimpanzee (*P. troglodytes verus*), found in Guinea, Guinea-Bissau, Mali, Senegal, Sierra Leone, Liberia, Ivory Coast, and Ghana with about 52,800 individuals still in existence.<sup>[a]</sup>
- Nigeria-Cameroon chimpanzee (*P. troglodytes ellioti* (also known as *P. t. vellerosus*)),<sup>[a]</sup> that live within forested areas across Nigeria and Cameroon, with over 6000-9000 individuals still in existence.<sup>[a][c]</sup>
- Eastern chimpanzee (*P. troglodytes schweinfurthii*), found in the Central African Republic, South Sudan, the Democratic Republic of the Congo, Uganda, Rwanda, Burundi, Tanzania, and Zambia, with approximately 180,000 - 256,000 individuals still existing in the wild.<sup>[a]</sup>
- Southeastern chimpanzee, *P. troglodytes marungensis*, in Burundi, Rwanda, Tanzania, and Uganda. Colin Groves argues that this is a subspecies, created by enough variation between the northern and southern populations of *P. t. schweinfurthii*.<sup>[a]</sup>



Two juvenile central chimpanzees, the nominate subspecies

**Genome**

Human and chimpanzee DNA is very similar. A Chimpanzee Genome Project was initiated after the completion of the Human Genome Project. In December 2003, a preliminary analysis of 7600 genes shared between the two genomes confirmed that certain genes, such as the forkhead-box P2 transcription factor which is involved in speech development, have undergone rapid evolution in the human lineage. A draft version of the chimpanzee genome was published on 1 September 2005 by the Chimpanzee Sequencing and Analysis Consortium.<sup>[a][b]</sup>

Genomic information	
NCBI genome ID	202 ( <a href="https://www.ncbi.nlm.nih.gov/genome/?term=202">https://www.ncbi.nlm.nih.gov/genome/?term=202</a> )
Ploidy	diploid
Genome size	13,323.27 Mb
Number of chromosomes	24 pairs

The DNA sequence differences between humans and chimpanzees consist of about 35 million single-nucleotide changes, five million insertion/deletion events, and various chromosomal rearrangements. Typical human and chimp protein homologs differ in an average of only two amino acids. About 30% of all human proteins are identical in sequence to the corresponding chimp protein. Duplications of small parts of chromosomes have been the major source of differences between human and chimp genetic material; about 2.7% of the corresponding modern genomes represent differences, produced by gene duplications or deletions, since humans and chimps diverged from their common evolutionary ancestor.<sup>[a][b]</sup>

**Physical attributes**

Adult chimpanzees have an average standing height of 150 cm (4 ft 11 in).<sup>[a]</sup> Wild adult males weigh between 40–70 kg (88–154 lb)<sup>[a][b][c]</sup> with females weighing between 27–50 kg (60–110 lb).<sup>[a]</sup> In exceptional cases, certain individuals may considerably exceed these measurements, standing over 168 cm (5 ft 6 in) on two legs and weighing up to 136 kg (300 lb) in captivity.<sup>[a]</sup>

The chimpanzee is more robustly built than the bonobo but less than the gorilla. The arms of a chimp are longer than its legs, and can reach below the knees. The hands have long fingers with short thumbs and flat fingernails. The feet are adapted for grasping, the big toe being opposable. The pelvis is long with an extended ilium. A chimp's head is rounded with a prominent and prognathous face and a pronounced brow ridge. It has forward-facing eyes, a small nose, rounded non-lobed ears, a long mobile upper lip and, in adult males, sharp canine teeth. Chimps lack the prominent sagittal crest and associated head and neck musculature of gorillas.<sup>[a][b]</sup>



Skeleton

Chimpanzee bodies are covered by coarse hair, except for the face, fingers, toes, palms of the hands, and soles of the feet. Chimps lose more hair as they age, and develop bald spots. The hair of a chimp is typically black but can be brown or ginger. As they get older, white or grey patches may appear, particularly on the chin and lower region. The skin may range from pale to dark, and females develop swelling pink skin when in oestrus.<sup>[a]</sup>

Chimpanzees are adapted for both **arboreal** and **terrestrial** locomotion. Arboreal locomotion consists of vertical climbing and **brachiation**.<sup>[c][d]</sup> On the ground chimps move both quadrupedally and bipedally, which appear to have similar energy costs.<sup>[e]</sup> As with bonobos and gorillas, chimps move quadrupedally by **knuckle-walking**, which probably evolved independently in *Pan* and *Gorilla*.<sup>[d]</sup> The physical strength of chimps is around 1.5 times greater than humans, due to higher content of **fast twitch muscle fibres**, one of the chimpanzee's adaptations for climbing and swinging.<sup>[d]</sup> According to Japan's Asahi-yama Zoo, the grip strength of an adult chimpanzee is estimated to be 200 kg (441 lb),<sup>[f]</sup> while other sources claim figures of up to 330 kg (727 lb).<sup>[g]</sup>

## Ecology

The chimpanzee is a highly adaptable species. It lives in a variety of habitats, including dry **savanna**, **evergreen** rainforest, **montane forest**, **swamp forest** and dry woodland-savanna mosaic.<sup>[h][i]</sup> In Gombe, the chimpanzee mostly uses **semi-deciduous** and evergreen forest as well as open woodland.<sup>[d]</sup> At Bossou, the chimpanzee inhabits multistage secondary **deciduous forest**, which has grown after **shifting cultivation**, as well as **primary forest** and grassland.<sup>[d]</sup> At Tai, it is found in the last remaining tropical rain forest in Ivory Coast.<sup>[d]</sup> The chimpanzee has an advanced **cognitive map** of its home range and can repeatedly find food.<sup>[d]</sup> The chimpanzee makes a night nest in a tree in a new location every night, with every chimpanzee in a separate nest other than infants or juvenile chimpanzees, which sleep with their mothers.<sup>[d]</sup>



Overnight nest in a tree

## Diet

The chimpanzee is an **omnivorous frugivore**. It prefers fruit above all other food items but also eats leaves and leaf buds, seeds, blossoms, stems, **pith**, bark and **resin**.<sup>[j][k]</sup> A study in Budongo Forest, Uganda found that 64.5% of their chimp feeding time concentrated on fruits (84.6% of which being ripe), particularly those from two species of *Ficus*, *Maesopsis emini* and *Celtis durandii*. In addition, 19% of feeding time was spent on arboreal leaves, mostly *Broussonetia papyrifera* and *Celtis mildbraedii*.<sup>[l]</sup> While the chimpanzee is mostly **herbivorous**, it does eat honey, soil, insects, birds and their eggs, and small to medium-sized mammals, including other primates.<sup>[k][l]</sup> Insect species consumed include the **weaver ant** *Oecophylla longinoda*, *Macrotermes* **termites** and **honey bees**.<sup>[k][l][m]</sup> The western **red colobus** ranks at the top of preferred mammal prey. Other mammalian prey include **red-tailed monkeys**, infant and juvenile **yellow baboons**, **bush babies**, **blue duikers**, **bushbucks**, and **common warthogs**.<sup>[k]</sup>



A mother with young eating *Ficus* fruit in Kibale National Park, Uganda

Despite the fact that chimpanzees are known to hunt, and to collect insects and other invertebrates, such food actually makes up a very small portion of their diet, from as little as 2% yearly to as much as 65 grams of animal flesh per day for each adult chimpanzee in peak hunting seasons. This also varies from troop to troop and year to year. However, in all cases, the majority of their diet consists of fruits, leaves, roots, and other plant matter.<sup>[k][l]</sup> Female chimpanzees appear to consume much less animal flesh than males, according to several studies.<sup>[k]</sup> **Jane Goodall** documented many occasions within Gombe Stream National Park of chimpanzees and western red colobus monkeys ignoring each other within close proximity.<sup>[k][l]</sup>

Chimpanzees do not appear to directly compete with gorillas in areas where they overlap. When fruit is abundant gorilla and chimp diets converge, but when fruit is scarce gorillas resort to vegetation.<sup>[k]</sup> The two apes may also feed on different species, whether fruit or insects.<sup>[k][l][m]</sup> Chimps and gorillas usually ignore or avoid each other when feeding on the same tree, although hostile encounters have occasionally been documented.<sup>[k][l][m]</sup>

## Mortality and health



Chimpanzee named "Gregoire" on 9 December 2006, born in 1944 (Jane Goodall sanctuary of Tchimpounga, Republic of the Congo)

The average lifespan of a chimpanzee in the wild is relatively short, usually less than 15 years, although individuals that reach 12 years may live an additional 15. Wild individuals may live over 25 years and on rare occasions, around 60 years. Captive chimps tend to live longer, with median lifespans of 31.7 years for males and 38.7 years for females.<sup>[n]</sup> The oldest known captive chimp to have been documented lived to 66 years.<sup>[n]</sup>

**Leopards** prey on chimpanzees in some areas.<sup>[o][p]</sup> It is possible that much of the mortality caused by leopards can be attributed to individuals that have specialised in chimp-killing.<sup>[o]</sup> Chimps may react to a leopard's presence with loud vocalising, branch shaking and throwing objects.<sup>[o][p]</sup> There is at least one record of chimps killing a leopard cub, after mobbing it and its mother in their den.<sup>[o]</sup> Four chimpanzees could have fallen prey to **lions** at **Mahale Mountains National Park**. Although no other instances of lion predation on chimpanzees have been recorded, lions likely do kill chimps occasionally and the larger group sizes of savanna chimps may have developed as a response to threats from these big cats. Chimps may react to lions by fleeing up trees, vocalising or hiding in silence.<sup>[o]</sup>

Chimps and humans share only 50% of their parasite and microbe species. This is due to the differences in environmental and dietary adaptations; human internal parasite species overlap more with omnivorous, savanna-dwelling baboons.<sup>[q]</sup> The chimpanzee is host to the louse species *Pediculus schaeffi*, a close relative of *P. humanus* which infests human head and body hair. By contrast, the human pubic louse *Phthirus pubis* is closely related to *Phthirus gorillae* which infests gorillas.<sup>[r]</sup> A 2017 study of **gastrointestinal parasites** of wild chimps in degraded forest in Uganda found nine species of **protozoa**, five **nematodes**, one **cestode**, and one **trematode**. The most prevalent species was the protozoan *Troglochytila ahrassarti*.<sup>[r]</sup>



The chimpanzee louse *Pediculus schaeffi* is closely related to the human body louse *P. humanus*.

## Behaviour

Recent studies have suggested that human observers influence chimpanzee behaviour. One suggestion is that **drones**, camera traps and remote microphones should be used to record and monitor chimpanzees rather than direct observation.<sup>[s]</sup>

## Group structure

Chimpanzees live in communities that typically range from around 20 to more than 150 members, but spend most of their time travelling in small, temporary groups consisting of a few individuals, which may consist of any combination of age and sex classes. Both males and females sometimes travel alone.<sup>[t]</sup> This **fission-fusion society** may include groups of four types: all-male, adult females and offspring, both sexes, or one female and her offspring. These smaller groups emerge in a variety of types, for a variety of purposes. For example, an all-male troop may be organised to hunt for meat, while a group consisting of lactating females serves to act as a "nursery group" for the young.<sup>[t]</sup>





Group in Uganda

At the core of social structures are males, which patrol the territory, protect group members, and search for food. Males remain in their natal communities, while females generally emigrate at adolescence. As such, males in a community are more likely to be related to one another than females are to each other. Among males there is generally a dominance hierarchy, and males are dominant over females.<sup>[29]</sup> However, this unusual fission-fusion social structure, "in which portions of the parent group may on a regular basis separate from and then rejoin the rest,"<sup>[27]</sup> is highly variable in terms of which particular individual chimpanzees congregate at a given time. This is caused mainly by the large measure of individual autonomy that individuals have within their fission-fusion social groups.<sup>[30]</sup> As a result, individual chimpanzees often forage for food alone, or in smaller groups as opposed to the much larger "parent" group, which encompasses all the chimpanzees which regularly come into contact and congregate into parties in a particular area.<sup>[25]</sup>

Male chimpanzees exist in a linear dominance hierarchy. Top-ranking males tend to be aggressive even during dominance stability.<sup>[29]</sup> This is probably due to the chimp's fission-fusion society, with male chimps leaving groups and returning after extended periods of time. With this, a dominant male is unsure if any "political maneuvering" has occurred in his absence and must re-establish his dominance. Thus, a large amount of aggression occurs within five to fifteen minutes after a reunion. During these encounters, displays of aggression are generally preferred over physical attacks.<sup>[29][30]</sup> While chimpanzee social structure is often referred to as patriarchal, it is not entirely unheard of for females to forge coalitions against males.<sup>[30]</sup> There is also at least one recorded case of females securing a dominant position over males in their respective troop, albeit in a captive environment.<sup>[31]</sup>



Mutual grooming, removing lice



Male in Mahale National Park, Tanzania

Males maintain and improve their social ranks by forming coalitions, which have been characterized as "exploitative" and are based on an individual's influence in agonistic interactions.<sup>[32]</sup> Being in a coalition allows males to dominate a third individual when they could not by themselves, as politically apt chimps can exert power over aggressive interactions regardless of their rank. Coalitions can also give an individual male the confidence to challenge a dominant or larger male. The more allies a male has, the better his chance of becoming dominant. However, most changes in hierarchical rank are caused by dyadic interactions.<sup>[29][32]</sup> Chimpanzee alliances can be very fickle and one member may suddenly turn on another if it is to his advantage.<sup>[34]</sup>

Low-ranking males frequently switch sides in disputes between more dominant individuals. Low-ranking males benefit from an unstable hierarchy and often find increased sexual opportunities if a dispute or conflict occurs.<sup>[32][34]</sup> In addition, conflicts between dominant males cause them to focus on each other rather than the lower-ranking males. Social hierarchies among adult females tend to be weaker. Nevertheless, the status of an adult female may be important for her offspring.<sup>[34]</sup> Females in Tai have also been recorded to form alliances.<sup>[29]</sup> Social grooming appears to be important in the formation and maintenance of coalitions. It is more common among adult males than adult females and between males and females.<sup>[32]</sup>

Chimpanzees have been described as highly territorial and will frequently kill other chimps,<sup>[32]</sup> although Margaret Power wrote in her 1991 book *The Egalitarians* that the field studies from which the aggressive data came, Gombe and Mahale, used artificial feeding systems that increased aggression in the chimpanzee populations studied, and might not reflect innate characteristics of the species as a whole as such.<sup>[35]</sup> In the years following her artificial feeding conditions at Gombe, Jane Goodall described groups of male chimps patrolling the borders of their territory, brutally attacking chimps which had split off from the Gombe group. A study published in 2010 found that the chimpanzees' wage wars over territory, not mates.<sup>[36]</sup> Patrols from smaller groups are more likely to avoid contact with their neighbours. Patrols from large groups even take over a smaller group's territory, gaining access to more resources, food, and females.<sup>[30][36]</sup> While it was traditionally accepted that only female chimpanzees immigrate and males remain in their natal troop for life, there are confirmed cases of adult males safely integrating themselves into new communities among West African chimpanzees, suggesting they are less territorial than other subspecies.<sup>[37]</sup>

### Mating and parenting

Chimpanzees mate throughout the year, although the number of females in oestrus varies seasonally in a group.<sup>[34]</sup> Female chimps are more likely to come into oestrus when food is readily available. Oestrous females exhibit sexual swellings. Chimps are promiscuous: during oestrus, females mate with several males in their community, while males have large testicles for sperm competition. Other forms of mating also exist. A community's dominant males sometimes restrict reproductive access to females. A male and female can form a consortship and mate outside their community. In addition, females sometimes leave their community and mate with males from neighboring communities.<sup>[34][34]</sup>



Infant and mother

These alternative mating strategies give females more mating opportunities without losing the support of the males in their community.<sup>[34]</sup> Infanticide has been recorded in chimp communities in some areas and the victims are often consumed. Male chimps practice infanticide on unrelated young to shorten the interbirth intervals in the females.<sup>[34][38]</sup> Females sometimes practice infanticide; this may be related to the dominance hierarchy in females, or may simply be pathological.<sup>[35]</sup>

Copulation is brief, lasting approximately seven seconds.<sup>[32]</sup> The gestation period is eight months.<sup>[39]</sup> Care for the young is provided mostly by their mothers. The survival and emotional health of the young is dependent on maternal care. Mothers provide their young with food, warmth, and protection, and teach them certain skills. In addition, a chimp's future rank may be dependent on its mother's status.<sup>[39][40]</sup> Newborn chimps are helpless; their grasping reflex is not strong enough to support them for more than a few seconds. For their first 30 days, infants cling to their mother's bellies. Infants are unable to support their own weight for their first two months and need their mothers' support.<sup>[39]</sup>

When they reach five to six months, infants ride on their mothers' backs. They remain in continual contact for the rest of their first year. When they reach two years of age, they are able to move and sit independently, and start moving beyond the arms reach of their mothers. By four to six years, chimps are weaned and infancy ends. The juvenile period for chimps lasts from their sixth to ninth years. Juveniles remain close to their mothers, but interact an increasing amount with other members of their community. Adolescent females move between groups and are supported by their mothers in agonistic encounters. Adolescent males spend time with adult males in social activities like hunting and boundary patrolling.<sup>[39]</sup> A captive study suggests males can safely immigrate to a new group if accompanied by immigrant females who have an existing relationship with this male. This gives the resident males reproductive advantages with these females, as they are more inclined to remain in the group if their male friend is also accepted.<sup>[39]</sup>

### Communication

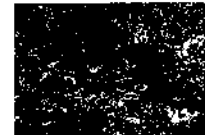
Chimpanzees use facial expressions, postures, and sounds to communicate with each other. Chimps have expressive faces that are important in close-up communications. When frightened, a "full closed grin" causes nearby individuals to be fearful, as well. Playful chimps display an open-mouthed grin. Chimps may also express themselves with the "pout", which is made in distress, the "sneer", which is made when threatening or fearful, and "compressed-lips face", which is a type of display. When submitting to a dominant individual, a chimp crunches, bobs, and extends a hand. When in an

aggressive mode, a chimp swaggers bipedally, hunched over and arms waving, in an attempt to exaggerate its size.<sup>[121]</sup> While travelling, chimps keep in contact by beating their hands and feet against the trunks of large trees, an act that is known as "drumming". They also do this when encountering individuals from other communities.<sup>[122]</sup>

Vocalisations are also important in chimp communication. The most common call in adults is the "pant-hoot", which may signal social rank and bond as well keep groups together. Pant-hoots are made of four parts, starting with soft "hoos", the introduction; that gets louder and louder, the build-up; and climax into screams and sometimes barks; these die down back to soft "hoos" during the letdown phase as the call ends.<sup>[123][124]</sup> Grunting is made in situations like feeding and greeting.<sup>[125]</sup> Submissive individuals make "pant-grunts" towards their superiors.<sup>[126][127]</sup> Whimpering is made by young chimps as a form of begging or when lost from the group.<sup>[128]</sup> Chimps use distance calls to draw attention to danger, food sources, or other community members.<sup>[129]</sup> "Barks" may be made as "short barks" when hunting and "tonal barks" when sighting large snakes.<sup>[130]</sup>

### Hunting

When hunting small monkeys such as the red colobus, chimpanzees hunt where the forest canopy is interrupted or irregular. This allows them to easily corner the monkeys when chasing them in the appropriate direction. Chimps may also hunt as a coordinated team, so that they can corner their prey even in a continuous canopy. During an arboreal hunt, each chimp in the hunting groups has a role. "Drivers" serve to keep the prey running in a certain direction and follow them without attempting to make a catch. "Blockers" are stationed at the bottom of the trees and climb up to block prey that takes off in a different direction. "Chasers" move quickly and try to make a catch. Finally, "ambushers" hide and rush out when a monkey nears.<sup>[131]</sup> While both adults and infants are taken, adult male colobus monkeys will attack the hunting chimps.<sup>[132]</sup> Male chimps hunt more than females. When caught and killed, the meat is distributed to all hunting party members and even bystanders.<sup>[133]</sup>



Adult male Eastern chimpanzee snatches a dead bushbuck antelope from a baboon in Gombe Stream National Park

### Intelligence and cognition



Human and chimpanzee skull and brain. Diagram by Paul Garvie from *Histoire naturelle des mammifères* (1854)

Chimpanzees display numerous signs of intelligence, from the ability to remember symbols<sup>[134]</sup> to cooperation,<sup>[135]</sup> tool use,<sup>[136]</sup> and perhaps language.<sup>[137]</sup> They are among species that have passed the mirror test, suggesting self-awareness.<sup>[138]</sup> In one study, two young chimpanzees showed retention of mirror self-recognition after one year without access to mirrors.<sup>[139]</sup> Chimps also display signs of culture among groups, with the learning and transmission of variations in grooming, tool use and foraging techniques leading to localised traditions.<sup>[140]</sup>

A 30-year study at Kyoto University's Primate Research Institute has shown that chimps are able to learn to recognise the numbers 1 to 9 and their values. The chimps further show an aptitude for photographic memory, demonstrated in experiments in which the jumbled digits are flashed onto a computer screen for less than a quarter of a second. One chimp, Ayumu, was able to correctly and quickly point to the positions where they appeared in ascending order. Ayumu performed better than human adults who were given the same test.<sup>[141]</sup>

In controlled experiments on cooperation, chimpanzees show a basic understanding of cooperation, and recruit the best collaborators.<sup>[142]</sup> In a group setting with a device that delivered food rewards only to cooperating chimpanzees, cooperation first increased, then, due to competitive behaviour, decreased, before finally increasing to the highest level through punishment and other arbitrage behaviours.<sup>[143]</sup>

Great apes show laughter-like vocalisations in response to physical contact, such as wrestling, play chasing, or tickling. This is documented in wild and captive chimpanzees. Chimpanzee laughter is not readily recognisable to humans as such, because it is generated by alternating inhalations and exhalations that sound more like breathing and panting. Instances in which nonhuman primates have expressed joy have been reported. Humans and chimpanzees share similar ticklish areas of the body, such as the armpits and belly. The enjoyment of tickling in chimpanzees does not diminish with age.<sup>[144]</sup>

Chimpanzees have displayed different behaviours in response to a dying or dead group member. When witnessing a sudden death, the other group members act in frenzy, with vocalisations, aggressive displays, and touching of the corpse. In one case chimps cared for a dying elder, then attended and cleaned the corpse. Afterward, they avoided the spot where the elder died and behaved in a more subdued manner.<sup>[145]</sup> Mothers have been reported to carry around and groom their dead infants for several days.<sup>[146]</sup>

Experimenters, however, now and then witness behaviour that cannot be readily reconciled with chimpanzee intelligence or theory of mind. Wolfgang Köhler, for instance, reported insightful behaviour in chimpanzees, but he likewise often observed that they experienced "special difficulty" in solving simple problems.<sup>[147]</sup> Researchers also reported that, when faced with a choice between two persons, chimpanzees were just as likely to beg food from a person who could see the begging gesture as from a person who could not, thereby raising the possibility that chimpanzees lack theory of mind.<sup>[148]</sup>

### Tool use

Nearly all chimpanzee populations have been recorded using tools. They modify sticks, rocks, grass, and leaves and use them when foraging for termites and ants,<sup>[149]</sup> nuts,<sup>[150][151][152][153]</sup> honey,<sup>[154]</sup> algae<sup>[155]</sup> or water. Despite the lack of complexity, forethought and skill are apparent in making these tools.<sup>[156]</sup> Chimpanzees have used stone tools since at least 4,300 years ago.<sup>[157]</sup>

A chimpanzee from the Kasakela chimpanzee community was the first nonhuman animal reported making a tool, by modifying a twig to use as an instrument for extracting termites from their mound.<sup>[158][159]</sup> At Tai, chimps simply use their hands to extract termites.<sup>[160]</sup> When foraging for honey, chimps use modified short sticks to scoop the honey out of the hive, that is, if the bees are stingless. For hives of the dangerous African honeybees, chimps use longer and thinner sticks to extract the honey.<sup>[161]</sup>

Chimps also fish for ants using the same tactic.<sup>[162]</sup> Ant dipping is difficult and some chimps never master it. West African chimps crack open hard nuts with stones or branches.<sup>[163][164]</sup> Some forethought in this activity is apparent, as these tools are not found together or where the nuts are collected. Nut cracking is also difficult and must be learned.<sup>[165]</sup> Chimps also use leaves as sponges or spoons to drink water.<sup>[166]</sup>

A recent study revealed the use of such advanced tools as spears, which West African chimpanzees in Senegal sharpen with their teeth, being used to spear Senegal bushbabies out of small holes in trees.<sup>[167]</sup> An eastern chimpanzee has been observed using a modified branch as a tool to capture a squirrel.<sup>[168]</sup>



Chimps using twigs to dig for ants

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## **PART II: Initial Considerations When Applying the Bill of Rights Act**

### **So I'm applying the Bill of Rights Act - What sort of approach should I adopt?**

Human rights legislation is generally given a broad, purposive interpretation. This means that you should give effect to the purpose behind the right in question, rather than taking a technical or minimalist approach to the wording of a right. This approach is necessary because human rights are fundamental to our democratic social system. It ensures that human rights are dynamic and responsive to changes within our communities.

A good example of how the scope and application of a right may change over time is the right to be secure against unreasonable search and seizure affirmed in section 21 of the Bill of Rights Act.

The classic statement on any intrusion by the state onto private property remains *Entick v Carrington* (1765) 19 State Tr 1029 in which Lord Camden CJ held: "...our law holds the property of every man so sacred, that no man can set his foot upon his neighbour's close without his leave; if he does he is a trespasser, though he does no damage at all; if he will tread upon his neighbour's ground, he must justify it by law."

Although time and technology have moved on since Lord Camden reiterated these common law principles, the principles remain as valid as ever, even though he was at the time concerned with physical intrusions by the state or state actors.

In *Kyllo v US* (2001) 150 L Ed 2d 94 the US Supreme Court said that it would be "...foolish to contend that the degree of privacy secured to citizens by the [protection against unreasonable search and seizure] has been unaffected by the advance of technology."

The Supreme Court in this case was considering the use of a thermal imaging device to detect the presence of cannabis growing in a house. The majority for the Court held that, even though the police did not enter the property of the accused, using the device was a search. Using the device enabled officers

to "explore details of the home that would previously have been unknowable without physical intrusion".

***The Bill of Rights Act appears to have several groups of rights - is this important?***

In approaching the rights set out in the Bill of Rights Act, you need to be aware that they complement each other - they coexist. Individual rights may be read to strengthen and reinforce each other. For instance, it would be difficult to give effect to the right to freedom to manifest one's religion or belief in public without the corresponding right to freedom of movement, expression, assembly, or association. How could street protests take place without the right to the freedoms of expression, assembly, association, and movement? The right to freedom of movement can therefore not only be seen in its own context but also as a foundation through which an individual can exercise a wide variety of civil and political rights.

You may need to consider the potential application of a number of rights, even though they appear in different parts of the Bill of Rights Act.

*What the courts have said*

McEachern C.J.S.C in the British Columbia Supreme Court set out his approach to applying the Canadian Charter of Rights and Freedoms [23] as follows: [24]

...in my view each section and subsection [of the Bill of Rights Act] **should be regarded as complementary, assisting, and explaining each other, and not in isolation...**it is seldom a case raising Charter questions will be one-dimensional... More often, the issues in Charter cases will be **multi-faceted...** In such circumstances the Charter must be read and construed not narrowly, with each section and subsection disembodied from the rest, but rather in the larger sense I have mentioned.

***What happens when the rights in the Bill of Rights Act are in conflict with each other?***

The courts have taken two different approaches to resolving the difficulty when two rights appear to conflict with one another: definitional balancing and ad hoc balancing.

The definitional balancing approach was used in *Re J (An infant): Director-General of Social Welfare v B and B*. [25] The potential conflict in this case,



was whether the parents of a child could refuse life-saving medical treatment. The parents, who were Jehovah's Witnesses, claimed that a blood transfusion was inconsistent with their right to manifest their religious belief in accordance with section 15 of the Bill of Rights Act. The countervailing right at issue was section 8 of the Bill of Rights Act, which affirmed the child's right to life. If the court upheld the parents' right to practice their religion, the state could have been seen to act in a way that was inconsistent with the child's right to life. The Court of Appeal reconciled the issue by interpreting section 15 so that the right of the parents did not extend to situations where the manifestation of their religious belief placed other people's lives in danger. In other words, it defined section 15 so that it could not override the right in section 8. This definitional approach to balancing conflicting rights meant the courts did not have to use section 5 of the Bill of Rights Act to balance the respective merits of sections 8 and 15.

The second approach, ad hoc balancing, is used by the Canadian Supreme Court. [26] Ad hoc balancing requires section 5 to be used to determine whether a decision to restrict someone's right under the Bill of Rights Act is reasonable. The value of other rights is considered in the process of determining whether the limit on the infringed right is reasonable. So, in the case of *Re J (An infant)*, the court would have considered whether a court order authorising the blood transfusion for the purpose of saving a child's life was a reasonable limit on the parents' right to manifest their religion. This approach would probably have achieved the same outcome, but would use a decision-making process that was more consistent with human rights principles. Ad hoc balancing ensures that rights continue to be defined broadly and that limits on rights are not arbitrarily imposed. As Andrew Butler suggests, the ad hoc balancing approach creates a more robust justificatory process to ensure that where the state limits a particular right, it adequately explains its justifications for doing so. [27]

***Case study based on decision of Canadian Supreme Court in Keegstra***

**Scenario:** The accused was charged under Canadian criminal law with wilfully promoting hatred against an identifiable group by communicating anti-semitic statements to his students. Mr Keegstra successfully appealed his conviction on the basis that the criminal offence was an unjustifiable breach of his right to freedom of expression.

**Issue:** How to resolve the right of Mr Keegstra to express his views while protecting the interests of members of the community not to be exposed to racial hatred.

**Canadian Charter problem:** The Canadian Charter protects both the right to freedom of expression and the right to be free from discrimination on the grounds of race. However, the Charter does not make it clear which right takes precedence where there are competing rights.

**Question posed to Canadian Supreme Court:** Does the right to freedom of expression extend to the public and wilful promotion of hatred against an identifiable group, or should the right be read down to exclude statements with content that promotes inequality?

The Court of Appeal in Alberta had held that the Canadian Charter's non-discrimination and equality provisions did not prevent Canadians from criticizing the values of equality and multiculturalism. In other words, the non-discrimination and equality provisions could not be used to limit the scope of the right to freedom of expression to the extent that the Canadian criminal law did.

**Answer:** Although the Supreme Court was split as to whether the criminal offence was a reasonable limit on the right to freedom of expression, the Court was unanimous in holding that the scope of the right to freedom of expression was not limited by the non-discrimination provisions of the Charter. The Court emphasised the neutral content of the right to freedom of expression. To read down the right to freedom of expression by reference to the non-discrimination provisions of the Charter would run contrary to the established principle that the right to freedom of expression applied no matter how offensive or disagreeable the content of the expression was. Dickson CJ stated that it was inappropriate to limit the scope of the right on the grounds that a particular right so required. The large and liberal interpretation given to freedom of expression suggests that the optimal approach is to balance the contextual values and factors in section 5 of the Bill of Rights Act. Dickson CJ considered that the use of this exercise was appropriate because section 5 guarantees and limits the rights by reference to principles fundamental in a free and democratic society. [28]

## SUMMARY

When interpreting or applying human rights legislation remember:

1. Human rights legislation is generally given a broad, purposive interpretation.
2. Individual human rights should be read in a way that the rights are seen to strengthen and reinforce each other.

3. When seeking to limit the scope of a right, consider whether the limitation on the application of the right is reasonable through the global limitation provision, section 5.

## **Interpreting Enactments and Justified Limitations - Sections 4, 5, and 6 of the Bill of Rights Act**

Sections 4, 5 and 6 of the Bill of Rights Act are your guide on interpreting and applying the Bill of Rights Act.

### **Section 4: Status and Effect of the Bill of Rights Act**

The *White Paper* was written on the assumption that a Bill of Rights Act for New Zealand would have the status of supreme law. That is, the courts could strike down as invalid any New Zealand law that was inconsistent with the Bill of Rights.

#### ***Can the Courts strike down legislation that is inconsistent with the Bill of Rights Act?***

The Bill of Rights Act does not have the status of supreme law, so it cannot be used to override other legislation. In fact section 4 of the Bill of Rights Act states that:

#### **4. Other enactments not affected-**

No court shall, in relation to any enactment (whether passed or made before or after the commencement of this Bill of Rights),-

- a. Hold any provision of the enactment to be impliedly repealed or revoked, or to be in any way invalid or ineffective; or
- b. Decline to apply any provision of the enactment- by reason only that the provision is inconsistent with any provision of this Bill of Rights.

Section 4 instructs judges on how to resolve situations where they consider an enactment is inconsistent with the Bill of Rights Act. Section 4 requires the enactment to be applied despite the inconsistency.

However, the Court of Appeal in *Moonen* [29] has said that section 4 comes into play only if:

- the legislation cannot be given a meaning that is consistent with the Bill of Rights Act by virtue of section 6 of the Bill of Rights Act; and
- any limitation on the right cannot be demonstrably justified in terms of section 5.

### **Section 6: Consistent Interpretation**

Section 6 of the Bill of Rights Act requires you to interpret any legislative provision consistently with the Bill of Rights Act wherever possible. In other words section 6 is designed to avoid a situation envisaged by section 4.

The Court of Appeal considered the application of section 6 in *R v Pora*. [30] In her judgment, Elias CJ discussed the importance and significance of section 6 and said: "[P]arliament must speak if it wishes to trench upon fundamental rights. By s6 the New Zealand Parliament has adopted a general principle of legality." [31] In other words, Parliament should be generally regarded as wishing to comply with the law.

In *Re Winnipeg School Division* [32] the Supreme Court of Canada considered whether the human rights legislation was impliedly repealed by subsequent legislation that permitted discrimination. In the course of delivering the judgment of the Court, McIntyre J emphasised that while human rights legislation may be amended or repealed by the Legislature, it cannot do so other than by way of a clear legislative pronouncement. McIntyre J held that:

...To adopt and apply any theory of implied repeal by later statutory enactment to legislation of this kind would be to rob it of its special nature and give scant protection to the rights it proclaims.

Therefore, it seems to be well settled that if Parliament wishes to override basic rights, it needs to do so by using clear and unambiguous language. [33]

### ***Secondary legislation***

The above judgments have implications for secondary legislation (e.g. regulations or rules). Statutes often include powers to make secondary legislation. The authority to make secondary legislation must be exercised consistently with the empowering statute, taking into account the Bill of

Rights Act. If the empowering provision does not expressly allow for the making of secondary legislation that is inconsistent with the Bill of Rights Act, then the secondary legislation will where possible, be read consistently with the Bill of Rights Act.

The courts have made it clear that secondary legislation that is inconsistent with the Bill of Rights Act can be struck down as *ultra vires* unless the regulation- or rule-making power expressly or necessarily authorises the inconsistency. [34] The ability of the courts to use section 6 to limit the application of section 4 is illustrated by the following case study.

*Case study [35]*

**Scenario:** An inmate at a corrections facility attended a disciplinary hearing before the Superintendent charged with an offence under the Penal Institutions Act. He appealed the Superintendent's decision to a Visiting Justice.

**Issue:** Section 45(1)(19) of the Penal Institutions Act provides that the Governor-General may make Regulations for "Ensuring the discipline of inmates, including (without limitation) regulating the laying of complaints relating to offences against discipline and prescribing the procedures for the hearing of such complaints."

The Penal Institution Regulations prescribe the procedures for the hearing of complaints against inmates in accordance with section 45(1)(19). Regulation 144 states: "An inmate whose case is referred by way of appeal to a Visiting Justice under section 35 of the Act may, at his or her own expense, contact his or her legal adviser for the purposes of assisting with the preparation of the appeal, but the legal adviser may not represent the inmate at the appeal."

**Bill of Rights problem:** The Court of Appeal held that the prohibition on legal representation at the appeal was inconsistent with the inmate's right to the observance of the principles of natural justice, so the regulations breached section 27(1) of the Bill of Rights Act. Section 45(1)(19) of the Penal Institutions Act did not explicitly authorise the making of regulations that were inconsistent with the Bill of Rights Act.

Regulation 144 could not be read consistently with the Bill of Rights Act. The Court did not go on to apply a section 5 (justified limitations) analysis because they held that section 27(1) was a flexible standard. That is, an

assessment of whether the principles of natural justice had been observed would depend on the context of the case before them.

**Question:** Does section 4 of the Bill of Rights Act mean that the Regulations remain valid?

The Court of Appeal heard arguments that the regulations remain valid unless they are invalid for reasons other than the Bill of Rights. It was submitted that striking down regulation 144 because of the section 27 guarantee of a right to the observance of the principles of natural justice would invalidate regulation 144 because of an inconsistency with the Bill of Rights Act. Section 4 prevented the Courts taking such action.

**Answer:** The Court held that section 4 was not a relevant factor in holding the regulation invalid. The Court considered the regulation to be invalid because the empowering provision in the Penal Institutions Act needed to be read in accordance with section 6 of the Bill of Rights. Section 45 of the Penal Institutions Act did not authorise the making of a regulation that was inconsistent with the Bill of Rights Act. The Court gave section 45 a meaning that was consistent with the rights and freedoms contained in the Bill of Rights Act.

***The exercise of discretion***

The implications of the judgments discussed above are significant for policy-makers. Frequently, statutes confer discretions on decision-makers. When faced with a discretion as to a course of action, the person exercising the discretion needs to exercise that authority in a way that is consistent with the Bill of Rights Act.

The Canadian Supreme Court expresses it this way: [36]

Parliament cannot have intended to authorize such an unreasonable use of the discretion conferred by it. A discretion is never absolute, regardless of the terms in which it is conferred.

...As the Constitution is the supreme law of all Canada...it is impossible to interpret legislation conferring discretion as conferring a power to infringe the Charter, unless of course that power is expressly conferred or necessarily implied.

In *Police v Beggs* [37] the Full Bench of the High Court considered whether the Speaker of the House of Representatives had invoked his powers under

the Trespass Act consistently with the Bill of Rights Act. Section 3(1) of the Trespass Act 1980 states: "Every person commits an offence against this Act who trespasses on any place and, after being warned to leave that place by the occupier of that place, neglects or refuses to do so." The Court stated that section 3(1) of the Trespass Act could be read consistently with section 16 of the Bill of Rights Act (so section 4 was not relevant). Section 6 of the Bill of Rights Act means that a decision-maker exercising a discretion as to whether to issue a warning under the Trespass Act can exercise the discretion only when it is reasonably necessary for him or her to do so. This is because the act of warning limits rights and freedoms contained in the Bill of Rights Act.

Section 6 of the Bill of Rights Act does not prevent a decision-maker from exercising his or her discretion. Section 6 simply requires the decision-maker to take the Bill of Rights Act into account in the process of determining whether or not to exercise a discretion.

#### **SUMMARY**

If you are developing or amending legislation that intends to override the Bill of Rights Act, the legislation must do so clearly and expressly because:

1. Decision-makers are required to interpret legislation consistently with the Bill of Rights Act wherever possible.
2. When exercising a discretionary decision-making power, the person making the decision needs to exercise that authority - where possible - in a way that is consistent with the Bill of Rights Act.
3. Any regulation or rule made under the authority of a statute that does not purport to oust the Bill of Rights Act can be struck down by the courts as invalid if the regulation or rule is itself inconsistent with the Bill of Rights Act.
4. Section 4 of the Bill of Rights Act comes into play where -
  - the legislation cannot be given a meaning that is consistent with the Bill of Rights Act by virtue of section 6 of the Bill of Rights Act; and
  - any limitation on the right cannot be demonstrably justified in terms of section 5.

#### **Section 5: Justified Limitations**

If the policy you are working on limits one of the rights and freedoms in the Bill of Rights Act, it may still be consistent with the Bill of Rights Act if you can justify it in accordance with section 5.

Section 5 of the Bill of Rights Act states:

Subject to section 4 of this Bill of Rights, the rights and freedoms contained in this Bill of Rights may be subject only to such reasonable limits prescribed by law as can be demonstrably justified in a free and democratic society.

#### **What you need to know about section 5 of the Bill of Rights Act**

Put simply, the section 5 test means that once you have decided there is prima facie (on the face of it) infringement of a right, you must decide whether that limitation on that right can be "demonstrably justified in a free and democratic society". If it fails this test, then the legislative provision, policy, practice, or service is inconsistent with the relevant section of the Bill of Rights Act.

There are a number of matters you will need to take into consideration before continuing with a policy that limits a right, including the following:

- The onus on proving that the limitation on any particular right is reasonable lies with the agency or organisation imposing the limit.
- Whether a limit on a right is reasonable is going to depend on a number of factors including:
  - the significance of the objective of the proposal;
  - the interests addressed by the particular right;
  - the extent to which the proposal limits the rights;
  - the proposal's effectiveness in achieving its objectives.
- The objective in limiting the right must be more than a general goal of protection from harm common to legislation; it requires a specific purpose so pressing and substantial that it warrants the imposition of a limit.
- Economic considerations are unlikely, of themselves, to be considered sufficient justification for limiting a right.
- Any limitation on the right:
  - can be written or unwritten;
  - must have some basis in domestic, that is, New Zealand law;
  - must be **adequately accessible**;



- o must be expressed with **sufficient precision**.

There is some discussion as to whether all rights should be subject to a section 5 analysis or whether it is possible to limit rights on their face. This is because the language used in some of the rights appears to contain in-built limitations. For example, section 21 of the Bill of Rights Act refers to the right to be secure against unreasonable search and seizure. In such cases, although section 5 may still be a relevant factor to be considered, it may not play as prominent a role. Despite this we consider that the most prudent approach for a policy adviser is to continue to define the right broadly and then subject any limitation on the right to scrutiny in terms of section 5 of the Bill of Rights Act. Such an approach will ensure that any limitation placed on the right is subject to a robust justificatory process.

#### *Further discussion on the meaning of section 5*

*What does "demonstrably justified" mean?*

Where a legislative provision, policy, practice, or service appears to be inconsistent with a right, it is up to you or your agency to establish how that inconsistency is justified under section 5 of the Bill of Rights Act. [38] That means justifying your policy or proposed law with evidence such as research, empirical data, findings from consultation, reports, or the results of inquiries or reviews. As with any good policy development, it is important not to act on assumptions, but to provide a well-argued case - based on high-quality analysis and research - that clearly establishes why a particular course of action is necessary. You should avoid relying solely on comparable overseas developments to justify your proposals. The social/political and cultural context in those countries, which would go to demonstrating the justification in their jurisdictions, may be significantly different to our own.

*And "free and democratic society"?*

The courts have also provided us with some guidance on what the phrase "free and democratic society" means. For example, the Canadian Supreme Court in *R v Oakes*, [39] interpreting a similar provision in the Canadian Charter, said that some of the core principles and values of a free and democratic society include:

- respect for the inherent dignity of the human person;
- commitment to social justice and equality;
- accommodation of a wide range of beliefs;

- respect for cultural and group identity;
- faith in social and political institutions which enhance the participation of individuals and groups in society.

*When is something "prescribed by law"?*

Section 5 provides that limitations must be "prescribed by law". In short, they must be accessible and ascertainable for all. "Laws" in New Zealand can be found in, for example, legislation, regulations, codes of practice, and common law. However, "prescribed by law" does not mean just these specific sources. For something to be "prescribed by law" it needs to have the following four factors: [40]

1. The "law" can be written or unwritten.
2. It must have some basis in domestic, that is, New Zealand law.
3. It must be **adequately accessible**. In general, a person can only be expected to comply with a law if they can find out what the law actually is - what legal rules apply in a given situation. So you will need to think about where the policy, regulation, or law is to be published or publicised and just how available it will be to the public.
4. Be expressed with **sufficient precision**. A clear and well-defined law, policy, or practice will make it easier for a person to comply with and to foresee or to find out the consequences of their actions. It will also help officials to know exactly what they are supposed to do. So you will need to think about how detailed the law, policy, or practice should be.

In other words, identifying limits "prescribed by law" under section 5 of the Bill of Rights Act involves looking to the substance rather than the form of the legislation, policy, practice, or service in question. Where the government limits a right or freedom, it must do so on a clear and transparent basis.

#### *Economic considerations*

As a general rule, although it is reasonable to take into account economic issues when conducting a section 5 analysis, you should not generally rely on these factors as the sole justification for limiting a right. The New Zealand Court of Appeal has not yet specifically considered whether an economic argument is, of itself, sufficient at any stage in the section 5 justification process under the Bill of Rights Act. It has, however, stated that economic

concerns are one of the several factors to take into account. In *Moonen (No 1)* [41] the Court held that social, legal, moral, economic, administrative, ethical, and other considerations may all be relevant. The Canadian Supreme Court has said that economic concerns are not, by themselves, sufficient to justify a limitation on the rights and freedoms in the Canadian Charter of Rights. [42]

#### *Possible approaches to applying section 5 of the Bill of Rights Act*

In *Moonen v Film & Literature Review Board (No 2)* [43] the Court of Appeal stated that the steps in *Moonen (No 1)* were intended to be used as guides and not prescriptive requirements. Therefore, although there are a number of possible approaches to applying section 5 of the Bill of Rights Act, we consider that either of the following approaches will provide you with the analytical framework you need to apply section 5.

##### *A. The Moonen test*

In *Moonen v Film & Literature Review Board (No 1)* [44] the Court of Appeal developed a set of guidelines for assisting in determining whether any limitation imposed on a right or freedom affirmed by the Bill of Rights Act is "demonstrably justified" in terms of section 5 of the Act:

- first identify the objective which the legislature was endeavouring to achieve by the provision in question;
- assess the importance and significance of that objective;
- the way in which the objective is statutorily achieved must be in reasonable proportion to the importance of the objective;
- the means used must also have a rational relationship with the objective;
- in achieving the objective there must be as little interference as possible with the right or freedom affected;
- the limitation involved must be justifiable in light of the objective.

The Ministry of Justice has distilled the inquiry under *Moonen (No 1)* into what is essentially a two-step process:

1. First, whether the infringing provision, policy, practice, or service in question serves an important and significant objective; and

2. Second, whether there is a rational and proportionate connection between that objective and the infringing provision, policy, practice, or service, or whether the objective may be achieved in another way which interferes less with the right or freedom affected. [45]

*How do I know if my policy or service delivery serves an important and significant objective?*

To meet the first part of the steps in *Moonen* you should be able to show that your infringing provision, policy, practice or service:

- achieves a clearly defined objective;
- from a common-sense standpoint - meets a pressing and substantial concern [46] rather than one that is more than trivial;
- addresses a specific (rather than generalised) area of public and social concern. [47]

To complete the first part of the section 5 analysis, you will need to be able to clearly and precisely articulate your policy objective. If your objective does not seem to be important or significant, you will need to think about whether there are other ways to achieve the objective without limiting the right.

If the goal/objective does appear to be important and significant, you can proceed to the next question of the inquiry to be made under section 5 of the Bill of Rights Act.

*When is something rationally and proportionately connected to the objective?*

There are two questions that are at the heart of this element of section 5:

1. Does the measure achieve its objective effectively?
2. Is there another means of reasonably achieving the objective without limiting the right or limiting it to a lesser extent? To put it in another way, is the measure so broad that it unreasonably interferes with the rights and interests of those it is not intended to affect?

*B The Noort test*

In *Ministry of Transport v Noort* [48] the Court of Appeal stated that any inquiry as to whether an apparent limitation on a right can be justified requires

consideration of all economic, administrative, and social implications. In the end it is a matter of weighing:

1. the significance in the particular case of the values underlying the Bill of Rights Act;
2. the importance in the public interest of the intrusion on the particular right protected by the Bill of Rights Act;
3. the limits sought to be placed on the application of the Act provision in the particular case; and
4. the effectiveness of the intrusion in protecting the interests put forward to justify those limits.

Many of the points of analysis identified in the *Moonen* test will be brought to bear.

#### *A flexible standard*

These tests are not simply a mechanical or mathematical exercise. The balancing required by section 5 means that advisers and others working in the public sector must exercise their judgement in weighing the various elements of this test.

Although it was previously considered that any limit on a right should form the least possible interference with the particular right, this no longer appears to be the case. The Canadian courts now tend to favour the approach that the policy or practice interferes with the right "as little as reasonably possible". [49]

Section 5 is sufficiently flexible to accommodate different policy contexts. However, sufficient justificatory material must be put forward to satisfy each question in turn - in other words, it is very much a case of "[s]he who asserts must prove". The Canadian Supreme Court has stated: [50]

[While] the impugned law must be considered in its social and economic context, nothing in this jurisprudence suggests that the contextual approach reduces the obligation on the state to meet the burden of demonstrating that the limitation on rights imposed by the law is reasonable and justified.

Context is essential in determining legislative objective and proportionality, but it cannot be carried to the extreme of treating the challenged law as a unique socio-economic phenomenon, of which Parliament is deemed the best judge.

In all cases where you are unsure, you should check with your legal advisers, the Ministry of Justice, or Crown Law Office.

### *Section 6 as a check on limits*

Section 6 of the Bill of Rights Act may also have a bearing on the application of section 5 of the Bill of Rights Act, and the extent to which a limit on a right may be construed as reasonable.

Section 6 of the Bill of Rights Act provides that wherever an enactment can be given a meaning that is consistent with the rights and freedoms contained in the Bill of Rights Act, that meaning is to be preferred over any other meaning.

The courts have held that where a statutory provision places a limit on a right, the limitation itself should be read consistently with the Bill of Rights Act. The limitation should not be read so broadly that the right has no application at all.

This point may be best illustrated by the decision of the Court of Appeal in *Sullivan v Ministry of Fisheries*. [51] The question for the Court in this case was the extent to which a person detained and questioned under Fisheries legislation could rely on advice from his lawyer when answering questions he was required to answer. The legislation provided that a person was required to answer questions put to him or her even though the answers might incriminate him or her. On the face of it, this provision raised issues of consistency with section 23(4) of the Bill of Rights Act - the right to silence - but would have been considered a reasonable limit. The Court stated: [52]

There are few statutory pre-emptions of the right to silence affirmed by the Bill of Rights, and of the constraints on cross-examination of detainees. The Fisheries Act is one such exception. But its limitations on fundamental rights should not be construed expansively having regard to s 6 of the Bill of Rights.

...Just because the Fisheries Act gives power to question, with a concomitant implied power to detain for that purpose, and a duty to answer, it does not mean that a person questioned is to be denied the right to legal consultation

and advice; nor that the person interrogated is obliged to answer effusively rather than strictly correctly. Persons interviewed cannot be required to promote the questioner's obvious or concealed motives, nor to facilitate their own conviction, beyond compliance with a duty to give honest answers which meet the question.

### **SUMMARY**

If the policy or practice being developed appears to infringe the Bill of Rights Act, you will need to be able to justify the limitation. In the process of justifying the limitation you will need to consider:

- the significance of the objective of the proposal;
- the interests that the particular right is addressing;
- the need to promote a policy that limits the right (are there other ways of achieving the objective?);
- the extent to which the proposal limits the rights;
- the effectiveness of the measure in achieving its objectives.

### ***Other considerations***

- The policy that you are developing should have a specific purpose that is sufficiently pressing and substantial to warrant the imposition of a limit.
- Economic considerations are unlikely to be considered sufficient justification for limiting a right in the absence of other factors.

We have developed a number of resources to help you apply section 5 and to understand the interaction between sections 4, 5, and 6 of the Bill of Rights Act. A flow diagram showing the process that you should undertake in applying section 5 appears overleaf. There is a checklist in the back of these guidelines setting out the sorts of questions you should ask in assessing whether you can demonstrably justify a particular policy or practice that appears to be inconsistent with the rights and freedoms of the Bill of Rights Act. A Fact Sheet on section 5 also appears at the back of these guidelines.

### **Section 5 flow diagram - applying section 5**

## Foreword

### Whakataki kōrero

Tēnā koutou katoa

Bottlenose dolphins and other marine mammals are an iconic species in Te Pēwhairangi (Bay of Islands). Sadly, their numbers are declining at an alarming rate. We know that the dolphins and other marine mammals are spending too much time in the company of humans.

Without urgent action, the bottlenose dolphins may become locally extinct as soon as 2022. Fortunately, we have a window of opportunity to ensure their protection.

This proposal has been developed by a roopu (group) of Ngā Hapū o te Pēwhairangi (Hapū of Te Pēwhairangi (Bay of Islands)) and the Department of Conservation Te Papa Atawhai.

Your feedback will help ensure that your views are taken into account in deciding on this proposal. We all have a role to play in shaping the development of this important mahi (work).

I look forward to hearing from you.

Hon Dr Ayesha Verrall  
Acting Minister of Conservation

Thank you for your interest in protecting the marine mammals in Te Pēwhairangi (Bay of Islands). This document shares the details of the proposed sanctuary. It has the following sections:

Section one covers:

- ▶ Background on the matter
- ▶ Department of Conservation Te Papa Atawhai and hapū partnership
- ▶ Defining the problem

#### The problem Ngā āwangawanga

Section two is the core of this document.

It covers:

- ▶ The proposed solution, the marine mammal sanctuary proposal overview
- ▶ Process for considering how the proposal would be implemented
- ▶ Cost benefit analysis

#### The proposal Kaupapa kōrero

Section three covers:

- ▶ Information about how to make a submission
- ▶ The process for considering a marine mammal sanctuary proposal
- ▶ Future management should one be declared

#### Submissions Ngā tuku kōrero



RE: Emailing: CCI17042021\_0001.jpg

"J" "A"

**Subject:** RE: Emailing: CCI17042021\_0001.jpg  
**From:** Alice Sinclair <asinclair@doc.govt.nz>  
**Date:** 23/04/2021, 1:23 pm  
**To:** Doug and Helen <totarahill@xtra.co.nz>

Kia ora Doug,

Apologies for the delay in response.

We have been busy working on your refined request. The refined request has extended the date that our response is due with you (previously due 11 May, now due 18 May). However, we are seeking to provide our response as soon as possible.

Kind regards  
Alice

-----Original Message-----

From: Doug and Helen <totarahill@xtra.co.nz>  
Sent: Saturday, 17 April 2021 9:55 am  
To: Bay of Islands (Te Pōwhairangi) Marine Mammal Sanctuary <boimms@doc.govt.nz>; Alice Sinclair <asinclair@doc.govt.nz>  
Subject: Emailing: CCI17042021\_0001.jpg

Good morning all

please see the attached.

Doug Schmuck

Your message is ready to be sent with the following file or link attachments:

CCI17042021\_0001.jpg

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Your query has been received

"A"

**Subject:** Your query has been received  
**From:** do-not-reply@doc.govt.nz  
**Date:** 23/04/2021, 10:06 am  
**To:** <totarahill@xtra.co.nz>

Kia ora Doug

Thank you for your official information request to the Department of Conservation.  
Your reference number is OIAD-822.

We will endeavour to respond to your request as soon as possible and no later than 20/05/2021, being 20 working days after the day your request was received. If we are unable to respond to your request by then, we will notify you of an extension of that timeframe.


If you have any queries email us at [governmentservices@doc.govt.nz](mailto:governmentservices@doc.govt.nz).

Ngā mihi

Government Services  
Department of Conservation  
*Te Papa Atawhai*

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Re: Official Information Request; Proposed Marine Mammal ...

"A"

**Subject:** Re: Official Information Request; Proposed Marine Mammal Sanctuary : request for clarification  
**From:** Doug and Helen <totarahill@xtra.co.nz>  
**Date:** 13/04/2021, 2:20 am  
**To:** Sue Reed-Thomas <SReedThomas@doc.govt.nz>

Good evening Ms Reed-Thomas

Thank you for your email and I have considered your outline carefully and yes I will be making submissions to the proposed BOIMMS in due course.

But before I clarify my requests for information to help you or Mr Duffey reply, let me make myself plain. I have been a mariner pretty much all of my life and as a mariner have a concise view of my regard for marine mammals as they have in all ways always meant good luck and abiding seas when we crossed courses. Only twice have I had physical encounters with them that turned out badly that I will forever regret.

Now acting under the parameters of the 1978 Act the Department has proposed a set of "Terms of Engagement" with Dolphin in the BOI that are amplified over and above what as of ten days ago I was unaware of as the "Regulations"; acting only on my own professional and personal code of conduct at sea in regards to all marine mammals.

So the matter to hand is that the Department has made a call and/or predetermined if you please, an assertion that not only have I broken my own code from my youth but the laws by which I have navigated the water of New Zealand for 33 years. And this Madame, is a form of humbug by bad research and/or lack of "Best Scientific Research" and/or lack of understanding the available "Best Scientific Research" that is at the foundation of this proposal that I refuse and/or will never accept.

Furthermore, by the very fact that the Minister of Conservation was at the meeting with Ms Peters and some of the stakeholders on the 25th of February this year when she was going to be the decision maker on the proposal would be a fairly strong assertion of predetermination in and of itself. But I guess circumstances unfortunately have intervened and a new decision maker should now be standing alone, which for this proposal or any proposal I hope is the case.

In any event of argument to the contrary, the most important thing is what is in the long term the best solutions for the interface with Dolphin so that they can coexist with human activity. And I think we can all agree that there is going to be certainly more of that in the BOI.

Now for Ms Peters:

1. Clearly the Department has employed her under contract; not problem there. So please just confirm that she is indeed still employed.
2. So for how long has she been under contract and what were/are her director.s of employment? Also not problem there. So please just outline her role/roles.
3. During the period of her employment did she use the information gathered for the Department to form the backdrop of her thesis? No problem there if the Department gave her specific permission to do so. So please just state the fact she had the department's permission and provide the supporting correspondence.
4. In the process of her research in the BOI and her subsequent thesis, was this information circulated to the offices of the Minister of Conservation prior to the formation of the proposal for the BOI? This is where predetermination may likely be at issue if her research went to the Minister with no correlation with the existing scientific research that Department sent me on request in early March. So please

Re: Official Information Request; Proposed Marine Mammal ...

"A"

confirm that Ms Peters and/or Mr Duffey has not sent any research material to offices of the Minister in the process of BOIMMS proposal.

5. Does Ms Peters own or partly own a marine mammal consultancy that could in any way seem a conflict of interest with her employment doing research for the Department or is this the purpose of her contract? So please explain the difference.

Now there is only one reason I am asking these questions. And that is so I understand the veracity of the information driving this proposal for the BOI: the history of the interaction with Dolphin by the commercial stakeholders involved that are supposed to be under the supervision of the employees of the Department; and the Department's position in regards to the existing "Regulations" verses some new set of "Rules of Engagement" that came directly from what appears to be misdirected research by an unqualified person.

Yours faithfully

Doug Schmuck

On 12/04/2021 2:53 pm, Sue Reed-Thomas wrote:

Tēnā koe Mr Schmuck,

Thank you for your email and Official Information request to Philip Duffey on 30 March 2021 which has been referred to me for reply.

Firstly, I would like to address your assertion of predetermination of the marine mammal sanctuary public process. The Department does not agree with this. The public process for the Sanctuary proposal has not yet occurred. Notice of the marine mammal sanctuary proposal is expected to occur later this month on behalf of the Minister of Conservation. This will start a public consultation period for 28 days whereby any member of the public will be able to make a submission on the proposal. Following this, all submissions will be provided to the Minister of Conservation before a decision on the proposal will be made (in accordance with section 22 of the Marine Mammals Protection Act 1978). I encourage your participation in this public process. Further information on this process and on the proposal will be released in a public consultation document when the proposal is notified.

In relation to your request under the Official Information Act, I would like to ensure that our search for official information targets what you are looking for. I therefore seek clarification of the following matters:

**1. The terms of employment and duration of Ms Peters and her roles with the Department during that time.**

-By "terms of employment" do you mean contractual arrangements under which the Department employs Ms Peters?

**2. The construct of the current proposal's timing and parties in the Department whom organized it.**

-Would "a timeline of the marine mammal sanctuary proposal's development" be an accurate clarification of your request to "construct of the current proposal's timing"?

**4. The correspondence train between the Ministers of Conservation and yourself and specifically Ms Peters as an employee of the Department.**

-This request is broad and needs more specificity please. Specifying a timeframe, subject matter and medium (e.g. email) should help narrow the request.

**5. The Department's knowledge of any commercial interests owned wholly or partly by Ms Peters that may have consequential implications in her role with the Department.**

-Does your request relate specifically to the marine mammal sanctuary proposal?

If you would like to discuss how to clarify your requests you can call Philip Duffey on 027 2365 746. It would then be helpful to have any clarification confirmed by email.

Re: Official Information Request; Proposed Marine Mammal ...

"A"

Naku noa,

Sue Reed-Thomas  
Director – Operations, Northern North Island  
Department of Conservation Te Papa Atawhai

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RE: Official Information Request; Proposed Marine Mammal ...

"A"

**Subject:** RE: Official Information Request; Proposed Marine Mammal Sanctuary : request for clarification  
**From:** Philip Duffey <pduffey@doc.govt.nz>  
**Date:** 13/04/2021, 8:12 am  
**To:** "totarahill@xtra.co.nz" <totarahill@xtra.co.nz>  
**CC:** Sue Reed-Thomas <SReedThomas@doc.govt.nz>

Kia ora Doug,

For clarity the OIA request we are referring to is attached.

Regards

Philip Duffey

M: [REDACTED]

**From:** Jenny McLeish <jmcleish@doc.govt.nz> **On Behalf Of** Sue Reed-Thomas  
**Sent:** Monday, 12 April 2021 2:54 PM  
**To:** totarahill@xtra.co.nz  
**Cc:** Philip Duffey <pduffey@doc.govt.nz>  
**Subject:** Official Information Request; Proposed Marine Mammal Sanctuary : request for clarification

Tēnā koe Mr Schmuck,

Thank you for your email and Official Information request to Philip Duffey on 30 March 2021 which has been referred to me for reply.

Firstly, I would like to address your assertion of predetermination of the marine mammal sanctuary public process. The Department does not agree with this. The public process for the Sanctuary proposal has not yet occurred. Notice of the marine mammal sanctuary proposal is expected to occur later this month on behalf of the Minister of Conservation. This will start a public consultation period for 28 days whereby any member of the public will be able to make a submission on the proposal. Following this, all submissions will be provided to the Minister of Conservation before a decision on the proposal will be made (in accordance with section 22 of the Marine Mammals Protection Act 1978). I encourage your participation in this public process. Further information on this process and on the proposal will be released in a public consultation document when the proposal is notified.

In relation to your request under the Official Information Act, I would like to ensure that our search for official information targets what you are looking for. I therefore seek clarification of the following matters:

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-By "terms of employment" do you mean contractual arrangements under which the Department employs Ms Peters?

**2. The construct of the current proposal's timing and parties in the Department whom organized it.**

- Would "a timeline of the marine mammal sanctuary proposal's development" be an accurate clarification of your request to "construct of the current proposal's timing"?

**4. The correspondence train between the Ministers of Conservation and yourself and specifically Ms Peters as an employee of the Department.**

-This request is broad and needs more specificity please. Specifying a timeframe, subject matter and medium (e.g. email) should help narrow the request.

**5. The Department's knowledge of any commercial interests owned wholly or partly by Ms Peters that may have consequential implications in her role with the Department.**

-Does your request relate specifically to the marine mammal sanctuary proposal?

Official Information Request; Proposed Marine Mammal San...

'A'

**Subject:** Official Information Request; Proposed Marine Mammal Sanctuary : request for clarification  
**From:** Sue Reed-Thomas <SReedThomas@doc.govt.nz>  
**Date:** 12/04/2021, 2:53 pm  
**To:** "totarahill@xtra.co.nz" <totarahill@xtra.co.nz>  
**CC:** Philip Duffey <pduffey@doc.govt.nz>

Tēnā koe Mr Schmuck,

Thank you for your email and Official Information request to Philip Duffey on 30 March 2021 which has been referred to me for reply.

Firstly, I would like to address your assertion of predetermination of the marine mammal sanctuary public process. The Department does not agree with this. The public process for the Sanctuary proposal has not yet occurred. Notice of the marine mammal sanctuary proposal is expected to occur later this month on behalf of the Minister of Conservation. This will start a public consultation period for 28 days whereby any member of the public will be able to make a submission on the proposal. Following this, all submissions will be provided to the Minister of Conservation before a decision on the proposal will be made (in accordance with section 22 of the Marine Mammals Protection Act 1978). I encourage your participation in this public process. Further information on this process and on the proposal will be released in a public consultation document when the proposal is notified.

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-Does your request relate specifically to the marine mammal sanctuary proposal?

If you would like to discuss how to clarify your requests you can call Philip Duffey on 027 2365 746. It would then be helpful to have any clarification confirmed by email.

Naku noa,

Sue Reed-Thomas  
 Director – Operations, Northern North Island  
 Department of Conservation Te Papa Atawhai

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Official Information Request; Proposed Marine Mammal San...

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RE: Official Information Request; Proposed Marine Mammal ...


"A"

If you would like to discuss how to clarify your requests you can call Philip Duffey on 027 2365 746. It would then be helpful to have any clarification confirmed by email.

Naku noa,

Sue Reed-Thomas  
 Director – Operations, Northern North Island  
 Department of Conservation Te Papa Atawhai

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Request pursuant to the Information Act.eml

**Subject:** Request pursuant to the Information Act  
**From:** Doug and Helen <totarahill@xtra.co.nz>  
**Date:** 30/03/2021, 8:02 am  
**To:** Bay of Islands (Te Pêwhairangi) Marine Mammal Sanctuary <boimms@doc.govt.nz>

Good morning Phil

With respect, it would appear that we have a developing situation that may have a direct impact on the BOIMMS.

Setting aside what may be a cause and effect of predetermination in a public process, there now appears to be the potential for a conflict of interest or both that will even be more fatal to it.

With that said, my interests in the veracity of evidence and credibility of its source, so that I can make comprehensive submissions to effect a good outcome for the two parties involved; those being the Dolphin and the interaction of people with them.

I therefore am concerned that the stated purposes for the BOIMMS might be wholly unsupportable if any of the above is likely, and secondly that what is becoming clear, is that there is no uniform set of "Rules of Engagement" whereby all mariners can be aware of the impact their presence extraordinary to a closing course; that is in effect, "Stalking"! And or if there are; is not clear or transparent to the greater boating public.

I therefore request, pursuant to the Official Information Act, the following:

1. The terms of employment and duration of Ms Peters and her roles with the Department during that time.
2. The construct of the current proposal's timing and parties in the Department whom organized it.
3. The instructions to Ms Peters as an employee whereby she use that same information in the preparation of her Thesis.
4. The correspondence train between the Ministers of Conservation and yourself and specifically Ms Peters as an employee of the Department.

RE: Official Information Request; Proposed Marine Mammal...

"A"

5. The Departments knowledge of any commercial interests owned wholly or partly by Ms Peters that may have consequential implications in her role with the Department.

Regards

Doug Schmuck

P.S. I give you the opportunity to reply to the above without any direct involvement with the Minister.

--Attachments:

Request pursuant to the Information Act.eml

10.3 KB

Emailing: CCI17042021\_0001.jpg

"B"

**Subject:** Emailing: CCI17042021\_0001.jpg  
**From:** Doug and Helen <totarahill@xtra.co.nz>  
**Date:** 17/04/2021, 9:55 am  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary <boimms@doc.govt.nz>, asinclair@doc.govt.nz

Good morning all  
please see the attached.  
Doug Schmuck

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⌋

"B"  
Doug's Opua Boat Yard



1 Richardson Street, Opua, Bay of Islands  
Ph (09) 402 7055, A/h (09) 407 4577  
totarahill@xtra.co.nz

17 April 2021

Alice Sinclair  
Team Lead Permissions  
DOC

Dear Ms Hayward ; attention Ms Sinclair

REF:OIAD-796 DOC-6632061

Thank for your letter 16 April regarding clarification of the information requested.

Perhaps there is a more simplistic approach for what I need from this process. A purpose or purposes that are mutual between DOC and myself in the greater interest of Marine Mammals; Dolphin in particular, that can and are being effected in the changing environments in which we co-habitat.

As a mariner for the last 70 years, I have learned more in the last six weeks about them because of the proposed BOIMMS than I had ever imagined. So I am glad for DOC efforts in this regard as it reinforces my belief in my own code of conduct at sea over my lifetime.

But the simple facts seem to remain that the BOI may very likely be unfit for purpose for what is proposed. So the whole question revolves around the facts in research that will produce the best long-term solutions for these "Sea Folk" whom are not yet at all, endangered like their evolutionary counter parts on the land. And therein lies my interests.

Therefore item number 1 is amendable per your suggestion with just permit holders operational areas and types of marine mammals that they pursue. This will form a general view of the total extent of these operations around New Zealand and where and what they do.

As for item number 2, can likewise be simplified from DOC legal profiles on the cases of enforcement where Doc was compelled to file proceedings in court for any breach of either the Act or the Regulations.

The only request extraordinary to what I suggest above is any breach or assumed breach in the BOI that will help focus on the issues to hand with local "Stakeholders" around their permit parameters. This will allow the ability to compare the various levels of compliance within the industry and/or their intercourse within any of the Marine Mammal Sanctuaries to date.

I hope that this is being more constructive for the purposes of the proposal.

Regards

  
Doug Schmuck

CC: Philip Duffey



Department of  
Conservation  
*Te Papa Atahuri*

"B"

OIAID-796 DOC-6632061

16 April 2021

Doug Schmuck  
[totarahill@extra.co.nz](mailto:totarahill@extra.co.nz)

Dear Mr Doug Schmuck

Thank you for your Official Information Act request to the Department of Conservation (DOC), dated 11 April 2021. Your request is in addition to two recent requests, dated 30 March 2021 and 6 April 2021.

In relation to this request, I would again like to ensure that our search for official information targets what you are looking for. I therefore seek clarification or amendment of the following requests:

1. "The complete summary of all commercial marine mammal permits under your jurisdiction that are in effect at this point in time, their terms of operations/conditions applied."
  - If amendable, we will provide you with a summary of all commercial marine mammal permits under DOC's jurisdiction, subject to any reasons to withhold under the Official Information Act.
  - Please clarify if by "their terms of operations / conditions applied" you are seeking *all terms* of operation / conditions applied to each *individual permit*, or whether you are seeking "the generic terms of operations / conditions that are within the standard permit template".
  - If you are seeking *all terms* of operation / conditions applied to each *individual permit*, DOC will consider whether to charge a fee for collation of this information. DOC will also consider whether the request meets the 'substantial collation' threshold under section 18(f) of the Official Information Act.
  - If you are seeking the terms of operation / conditions applied to each *individual permit* please clarify whether you wish to refine your request (as this may impact any fees and / or whether section 18(f) applies). For example, you may refine your request by location, or by operation / condition type (eg species the permit applies to, a copy of the special conditions only, condition(s) specifying when the permit can be suspended, revoked, restricted or amended etc).
2. "Any and all enforcement procedures in breach and/or perceived breach of the "Regulations" since 1992."

OIAID-796 DOC-6632061

"3"

- Please clarify if by "any and all enforcement procedures in breach and/or perceived breach of the "Regulations" since 1992" you are referring to "all *legal proceedings* initiated by DOC against marine mammal viewing permit holders who may have breached the terms and conditions of their permit".
- If you are seeking *all breaches* please clarify whether you can refine your request, for example by location or timeframe. Again, this may reduce any fees charged and / or the application of section 18(f).
- If you are seeking to obtain a list of *all breaches* (whether or not legal proceedings were initiated) DOC will consider whether to charge a fee for collation of this information. DOC will also consider whether the request meets the 'substantial collation' threshold under section 18(f) of the Official Information Act.

Please note, any clarification or amendment of a request is considered to be a new request for the purpose of calculating the maximum statutory timeframe for response—see section 15(1AA) of the Official Information Act.

If you wish to discuss this further, please contact Alice Sinclair, Team Lead Permissions, by email [asinclair@doc.govt.nz](mailto:asinclair@doc.govt.nz) or by phone 027 647 7832.

Yours sincerely



**Natasha Hayward**  
Kaihautu- Whakamahere-Tutohu | Director Planning Permissions and Land  
Kirikiriroa | Hamilton  
Te Papa Atawhai | Department of Conservation

Your query has been received

"B"

**Subject:** Your query has been received  
**From:** do-not-reply@doc.govt.nz  
**Date:** 13/04/2021, 10:13 am  
**To:** <totarahill@xtra.co.nz>

Kia ora Doug

Thank you for your official information request to the Department of Conservation.  
Your reference number is OIAD-796.

We will endeavour to respond to your request as soon as possible and no later than 11/05/2021, being 20 working days after the day your request was received. If we are unable to respond to your request by then, we will notify you of an extension of that timeframe.


If you have any queries email us at [governmentservices@doc.govt.nz](mailto:governmentservices@doc.govt.nz).

Ngā mihi

Government Services  
Department of Conservation  
*Te Papa Atawhai*

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"B"

Doug's Opua Boat Yard



1 Richardson Street, Opua, Bay of Islands  
Ph (09) 402 7055, A/h (09) 407 4577  
totarahill@xtra.co.nz

16 April 2021

Philip Duffey  
Mgt Planner  
DOC

Dear Ms Hayward

REF: OFFICIAL INFORMATION ACT REQUEST CLARIFICATION 15/4/21

Thank you for your request for clarification regarding my 6 April 2021 letter on the matter. I have considered your request and will try and assist you in reply.

As for your item #1, I am requesting an outline of all legal proceedings initiated by DOC where there was a presumption of breach of the operational conditions by any permit holder pursuant to the 1978 Act. This should include matters like location, terms of the permit, and a brief note as to the parameters of the breach, i.e. what marine mammal was involved, duration of the breach, and resolutions.

By this I am interested in establishing a general view of the enforcement issues faced by DOC in the overall management of their duties under the 1978 Act.

This may lead to further requests about these matters in more detail for specific areas depending on each of their circumstances and in the BOI in particular.

As for your item #2, I am requesting an outline of all correspondence to the NRC and visa versa the NRC to DOC, about any harbour under their jurisdiction from Feb 2016 onwards regarding the 1978 Act and/or Regulations. This should include matters like location, specific reference to the matters of concern, and any proposals in the form of consultation and/or reply.

By this I am interested in establishing the position of the NRC in any long term planning matters that will effect navigation inside any of their harbour limits.

This may lead to further requests and or processes in discovery if this information confirms any implications of amendments to the Marine Mammals Protection Regulations Act 1992.

As for your item #3, I am requesting an outline of all correspondence to the Director General/legal team, from Feb 2016 and any reply regarding any concerns by DOC in the management of their duties under the 1978 Act and/or Regulations.

By this I am interested in establishing any form of legislative initiatives that may directly affect the processes for the BOIMS specifically and all other sanctuaries in general.

Kind regards

  
Doug Schmuck





Department of  
Conservation  
*Te Papa Atawhai*

Thursday 15 April 2021

Doug Schmuck  
[totarahill@xtra.co.nz](mailto:totarahill@xtra.co.nz)

Dear Mr Doug Schmuck

Thank you for your Official Information Act request emailed to Te Papa Atawhai, Department of Conservation (DOC), dated Tuesday 6 April 2021. I note my colleague Sue Reed-Thomas has contacted you previously in regard to your earlier request dated 30 March 2021.

In relation to this request under the Official Information Act, I would again like to ensure that our search for official information targets what you are looking for. I therefore seek clarification or amendment of the following requests:

1. "All legal proceedings regarding the Commercial Permit holders for interaction with Marine Mammals in the BOI since 16 November 1992."

- Please clarify if by "all legal proceedings regarding the Commercial Permit holders for interaction with Marine Mammals in the BOI since 16 November 1992" you are referring to "all legal proceedings initiated by DOC against marine mammal viewing permit holders who may have breached the terms and conditions of their permit in the Bay of Islands".

2. "All correspondence with the Northland Regional Council regarding the proposed designation of Marine Mammal sanctuaries within their jurisdictions and in particular, "harbours"."

- Does this request relate only to the current Te Pēwhairangi (Bay of Islands) marine mammal sanctuary proposal? If so, narrowing your request to a timeframe from January 2020 would ensure our search for information would target what you are looking for. Without this clarification, the scope of this request is very broad and will potentially require substantive collation.

3. "Any and all correspondence with the Director General of Conservation and/or his legal team with regards to input for the introduction of legislation to amend the Marine Mammals Protection Regulations 1992."

- Please advise if you are happy with this request to be narrowed to material from January 2020 (similar to request two above), in terms of "any and all correspondence with the Director General of Conservation and/or his legal

"3"

team with regards to input for the introduction of legislation to amend the Marine Mammals Protection Regulations 1992".

To enable us to respond in a timely manner please direct your clarification to the following email: [boimms@doc.govt.nz](mailto:boimms@doc.govt.nz)

Please note, any clarification or amendment of a request is considered to be a new request for the purpose of calculating the maximum statutory timeframe for response—see section 15(1AA) of the Official Information Act.

If you wish to discuss this further, please contact Philip Duffey, Management Planner, mobile: 027 2365 746.

Yours sincerely



**Natasha Hayward**  
Kaihautu- Whakamahere-Tutohu | Director Planning Permissions and Land  
Kirikiriroa | Hamilton  
Te Papa Atawhai | Department of Conservation

Your query has been received

"B"

**Subject:** Your query has been received  
**From:** do-not-reply@doc.govt.nz  
**Date:** 7/04/2021, 9:21 am  
**To:** <totarahill@xtra.co.nz>

Kia ora Doug

Thank you for your official information request to the Department of Conservation.  
Your reference number is OIAD-775.

We will endeavour to respond to your request as soon as possible and no later than 05/05/2021, being 20 working days after the day your request was received. If we are unable to respond to your request by then, we will notify you of an extension of that timeframe.


If you have any queries email us at [governmentservices@doc.govt.nz](mailto:governmentservices@doc.govt.nz).

Ngā mihi

Government Services  
Department of Conservation  
*Te Papa Atawhai*

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Request pursuant to the Official Information Act

'' ''  
B

**Subject:** Request pursuant to the Official Information Act  
**From:** Doug and Helen <totarahill@xtra.co.nz>  
**Date:** 6/04/2021, 6:25 am  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary <boimms@doc.govt.nz>

Good morning Phil

In my review of the Marine Mammals Protection Acts and Regulations from 1971 onwards and corresponding Acts in between regarding marine reserves and conservation principles, I see many overlaying responsibilities and duties of DOC that seem to come into question in the current proposal historically for the BOI. These, setting aside the legal obligations of "Onus of proof", bring into question the methods by which DOC has brought this proposal forward in the backdrop of the legal format already established in legislation.

I therefore request pursuant to the Official Information Act three briefs of information:

1. All legal proceedings regarding the Commercial Permit holders for interaction with Marine Mammals in the BOI since 16 November 1992.
2. All correspondence with the Northland Regional Council regarding the proposed designation of Marine Mammal sanctuaries within their jurisdictions and in particular, "harbours".
3. Any and all correspondence with the Director General of Conservation and/or his legal team with regards to input for the introduction of legislation to amend the Marine Mammals Protection Regulations 1992.

Your earliest attention to this request will be appreciated for the purposed of my submissions to the proposed BOIMMS.

Regards

Doug Schmuck

Re: Update on Te Pēwhairangi (Bay of Islands) marine mamm...

"d"

**Subject:** Re: Update on Te Pēwhairangi (Bay of Islands) marine mammal sanctuary consultation process  
**From:** Doug and Helen <totarahill@xtra.co.nz>  
**Date:** 14/04/2021, 7:54 am  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary <boimms@doc.govt.nz>

Thanks Phil

So be it mate!

Regards

Doug Schmuck

On 13/04/2021 8:09 am, Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary wrote:

Good morning Doug,

The public drop in sessions we are currently planning to hold are all listed below. If anything changes with these dates or locations we will send an update.

All members of the public will have access to details of the Sanctuary proposal, including the consultation document, and will be able to make a submission on the proposal.

Regards

Phil Duffey

**From:** Doug and Helen <totarahill@xtra.co.nz>

**Sent:** Saturday, 10 April 2021 4:05 AM

**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary <boimms@doc.govt.nz>

**Subject:** Re: Update on Te Pēwhairangi (Bay of Islands) marine mammal sanctuary consultation process

Good morning Phil

With respect, this is it? Can you please confirm the consultation process for the other "STAKEHOLDERS" from Mangonui Harbour to Auckland that represent over 90% of the potential users of the BOI for recreational boating?

Regards

Doug Schmuck

On 9/04/2021 4:14 pm, Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary wrote:



Re: Update on Te Pēwhairangi (Bay of Islands) marine mamm...

"2"

**Friday 9 April 2021**

Kia ora koutou,

This email is to let you know that the consultation period for the Pēwhairangi (Bay of Islands) marine mammal sanctuary proposal is now expected to open **on or around 20 April 2021** for a 28 day period. We had planned for consultation to begin mid-April, but there have been some unavoidable delays.

Earlier this week, Minister Kiri Allan stepped down from her role as Minister of Conservation for medical reasons. Our thoughts are with Minister Allan and her whānau, and we wish her a speedy recovery. The proposal is now being progressed by Acting Minister of Conservation Hon Dr Ayesha Verrall.

When the sanctuary proposal is notified, a public consultation document will be released to assist people who would like to make a submission. We will also be holding a series of drop-in sessions during the public consultation period.

Because of the revised timeline, these sessions will now be on the following dates and times:

1. **Wednesday 21 April 2021 – 5 pm to 7 pm at the Paihia War Memorial Hall, Paihia**
2. **Friday 30 April 2021 – 10 am to 2 pm at the Procter Library, Kerikeri**
3. **Saturday 1 May 2021 – 10 am to 1 pm at the Paihia War Memorial Hall, Paihia**
4. **Saturday 1 May 2021 – 2 pm to 4 pm in Russell, location to be confirmed**


We will keep you up to date with any further developments.

Ngā mihi,

The Sanctuary Team

**Unsubscribe**

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Your query has been received

"D"

**Subject:** Your query has been received  
**From:** do-not-reply@doc.govt.nz  
**Date:** 23/04/2021, 10:06 am  
**To:** <totarahill@xtra.co.nz>

Kia ora Doug

Thank you for your official information request to the Department of Conservation.  
Your reference number is OIAD-822.

We will endeavour to respond to your request as soon as possible and no later than 20/05/2021, being 20 working days after the day your request was received. If we are unable to respond to your request by then, we will notify you of an extension of that timeframe.


If you have any queries email us at [governmentservices@doc.govt.nz](mailto:governmentservices@doc.govt.nz).

Ngā mihi

Government Services  
Department of Conservation  
*Te Papa Atawhai*

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Official Information Act

"D"

**Subject:** Official Information Act  
**From:** Doug and Helen <totarahill@xtra.co.nz>  
**Date:** 21/04/2021, 8:42 pm  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary <boimms@doc.govt.nz>

Good evening Phil

I attended the consultation at Paihia tonight with Ms Peters and a gentleman named "Kipper", as I took his name.

One of the issues that came up was reference research that Ms Peters relies on regarding specific effects on the Dolphin in the BOI that she said makes them an endangered population separate from the other coastal groups of Dolphin to whom they are related.

I therefore request this research over and above what you already kindly sent me as clearly it could be an important element in my thinking on the proposal.

And because Ms Peters was a little unclear what title of this document is, I assume that you will know.

I do accept that there are some complexities here that need to be addressed of which seems to be general knowledge of all boaties with regards to the "Regulations".

Regards

Doug Schmuck



Official Information Act

"E"

**Subject:** Official Information Act  
**From:** Doug and Helen <totarahill@xtra.co.nz>  
**Date:** 21/04/2021, 8:42 pm  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary <boimms@doc.govt.nz>

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I do accept that there are some complexities here that need to be addressed of which seems to be general knowledge of all boaties with regards to the "Regulations".

Regards

Doug Schmuck

Official Information Request

"F"

**Subject:** Official Information Request  
**From:** Doug and Helen <totarahili@xtra.co.nz>  
**Date:** 23/04/2021, 12:56 pm  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary <boimms@doc.govt.nz>

Good afternoon Phil

Further to my previous requests I now request in writing DOC position on two matters both expressed by you in the first instance and Ms Peters in public forum on both.

1 That DOC believe that the Bottlenose Dolphin in the BOI are addicted to bow riding that is a direct cause of changes in their survival behaviours.

2. That research evidence that DOC is relying on is that the Bottlenose Dolphin in the BOI are on the verge of "extinction".

Regards

Doug Schmuck

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(

Official Information Request

"F"

**Subject:** Official Information Request  
**From:** Doug and Helen <totarahill@xtra.co.nz>  
**Date:** 23/04/2021, 12:56 pm  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary <boimms@doc.govt.nz>

Good afternoon Phil

Further to my previous requests I now request in writing DOC position on two matters both expressed by you in the first instance and Ms Peters in public forum on both.

1 That DOC believe that the Bottlenose Dolphin in the BOI are addicted to bow riding that is a direct cause of changes in their survival behaviours.

2. That research evidence that DOC is relying on is that the Bottlenose Dolphin in the BOI are on the verge of "extinction".

Regards

Doug Schmuck

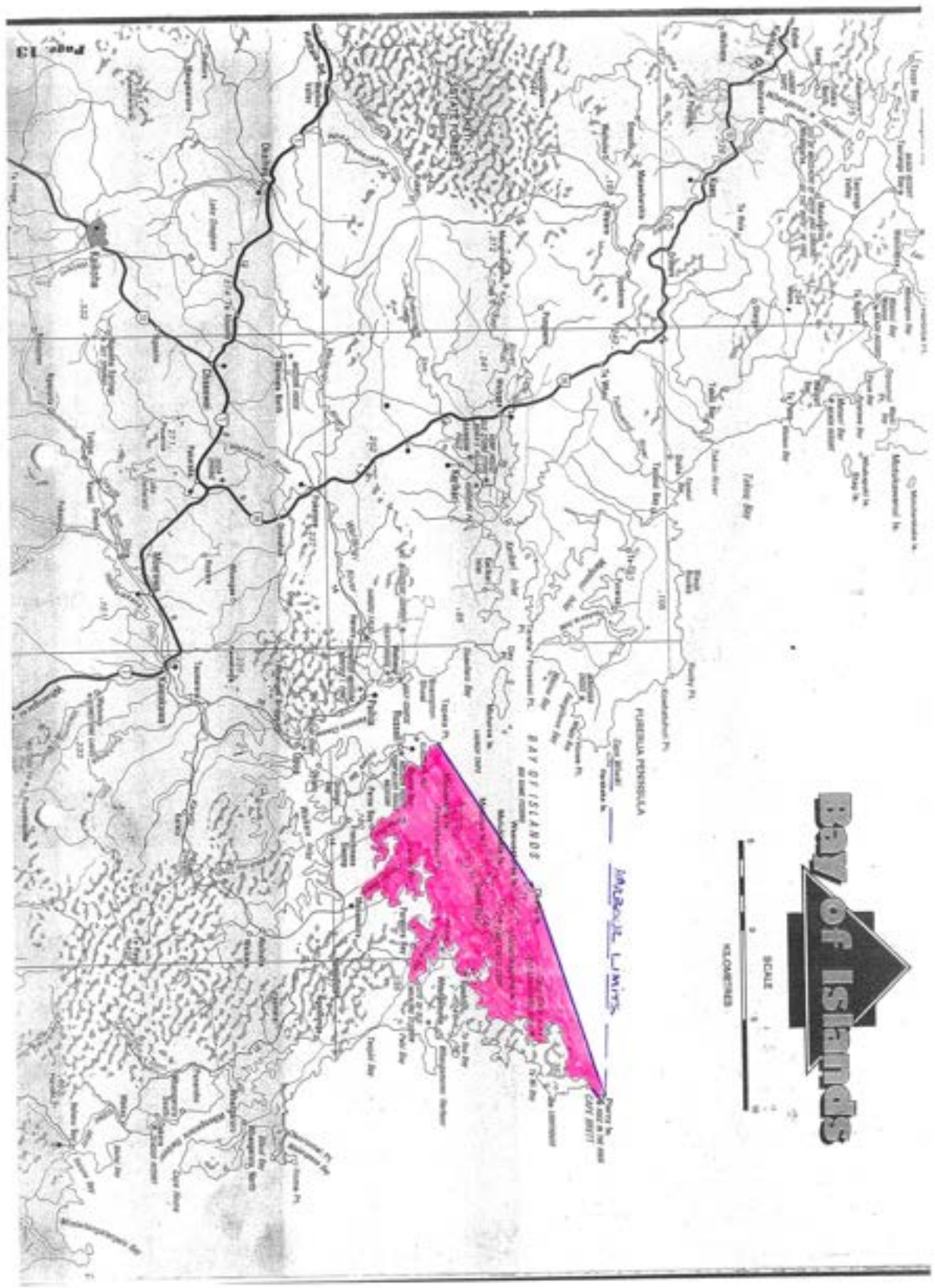
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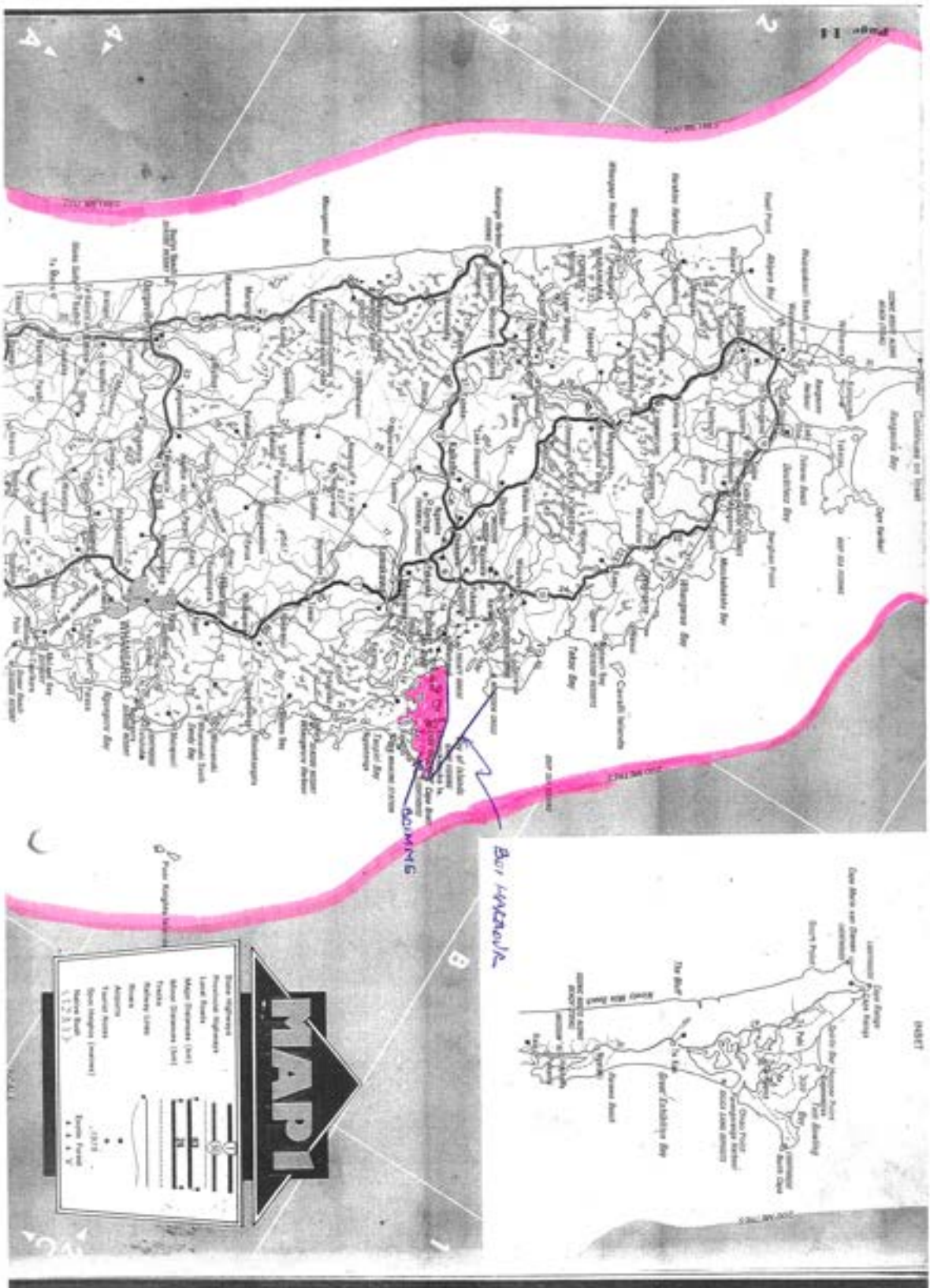
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"8"

## BOIMMS BOLD VIEW CONCEPT PLAN

1. Map plan page 13 for the area of the BOIMMS and future MARINE RESERVE.
  - a. Abolishment of all commercial marine mammal interaction operations in the BOI within the harbour limits.
  - b. Establishment of the BOIMMS boundaries as identified in this submission text in conjunction with this concept plan.
  - c. Establishment of those areas within the BOIMMS for special vessel traffic enforcement of the "Regulations" pursuant to the Act in the periods of December to April as proposed 20 April 2021.
  - d. Acknowledgment of all existing property rights as of 20 April 2021 within and along the boundaries of the sanctuary and the role that they will play in the future of sanctuary.
  - e. Acknowledgment of the existing uses of the sanctuary by the boating public as an anchorage of refuge with all the corresponding activities surrounding marine recreation; regional harbour regulations; except for gathering and/or catching of sea food of any kind and/or transiting the sanctuary at vessel/craft speeds that are proven to be environmentally detrimental to marine mammals and/or humans alike.
  - f. After the creation of the BOIMMS, the public notification to establish a Marine Reserve pursuant to that Act, that will work in conjunction with and for the enhancement of the BOIMMS and all of its many facets and resources for all future generations; (this, a long term process after all relevant information evaluations as outlined in this submission text).
2. Map plans page 14 and 15 for a legislative compliance boundary to the 200 meter depth around the North Island.
  - a. This to be publicly notified and a subsequent notice to mariners in relation to the Acts for the protection of all marine mammals within that halo around any land form of the North Island.
  - b. Specific designations of areas for future sanctuaries where populations of marine mammals are proven to be adversely affected by human interaction; that may also need further protection in conjunction with the creation of Marine Reserves.
  - c. Acknowledgement of administrative authorities by region as to the geographical limits of the 200 meter depth coastal compliance area boundaries that will work together with Department of Conservation enforcement procedures of the "Regulations".













## WS-BOIMMS-125155: 2

17 May 2021



DOUG'S OPUA BOATYARD  
1 RICHARDSON STREET  
OPUA 0200  
B.O.I. Ph/Fax (09) 402 7055  
GST No. 051-243-021

### FURTHER SUBMISSIONS TO THE BOIMMS PROPOSAL

My name is Doug Schmuck and after receiving from DOC further information as outlined in my original submissions, I wish to redact some of them whilst making additional comments to others with regard to the information provided; and that I concur with the views of the Harbour Master of the BOI as the resident maritime expert.

1. In reverse order then, I therefore redact completely issue #10 as being out of scope.
2. Issue # 9 is also redacted in regards to the Treaty of Waitangi principles whereby this proposal is meant to in some manner address and/or redress "Proven Grievances" when there is little or no proof of breach of those principles. And that in any event are claim matters before the High Court of New Zealand which makes the premise of the proposal "Secondary Legislation" without due legislative process.
3. Issue #8 is only redacted to state the obvious support by DOC in continuing to uphold the commercial permits, regardless of the "Best Scientific Research" pointing to their likely effects on Dolphin; is not only flawed but means all like permits have been potentially ultra vires to the purpose of the MMPA for economic reasons; and is therefore likely in breach of the s5 Bill of Rights Act 1990.
4. Issue #7 remains the same with particular regard to issues #'s 1-5 that are not addressed in this proposal.
5. Issue # 6 remains the same save that a review of the outcomes of these proposals will likely be the end result pursuant to the laws of New Zealand.

And if that is the case, I stand on my recommendations for "Bolder Solutions" I-V, predicated on the requirement of "Best Scientific Research" which has not been provided, but is a basic mandate of the Acts that are there to protect Marine Mammals when in interface with human activity.

This where the terms "Endangered" and "Extinction" just become a set of evocative statements in reduction to the absurd; without corresponding proofs of environmental effects affecting current impacts on Dolphin in the BOI.

This because the evidence shows that the Courts will uphold enforcement of the regulations against non-permit holders. So whom is at core of the fault but the Department itself? A permit is not an inalienable right when it comes to the environment when there will be no Dolphin to pester and/or fish to eat! So what manner of Treaty partner it that or have we consulted the Dolphin on this point??

Surely there is no authority invested within 196 Acts to allow a Minister to change the course of law without debate on the issues I have raised.

**WS-BOIMMS-130158**

**From:** Tuiscope [REDACTED]  
**Sent:** Thursday, 6 May 2021 12:03 pm  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary  
**Subject:** BOI-MMS

**Follow Up Flag:** Follow up  
**Flag Status:** Completed

#### BOI MMS SUBMISSION

**From:**  
Tui Allen



**Contact details (use any):**

Landline: [REDACTED]  
Mobile: [REDACTED]  
Email: [REDACTED]  
Website [www.tuiscope.co.nz](http://www.tuiscope.co.nz)

I support the proposed Marine Mammal Sanctuary because marine mammals are more important to me, and to the environment, than humans are. I am perfectly serious about this and I am also perfectly sane. There are too many humans in the world and too few marine mammals. Humans are a scourge on the marine environment and marine mammals are the exact opposite – they offer hope for the future of the oceans but not if they go extinct first. I also want my grandchildren to have a planet to live on that is worth living on.

I've devoted a big chunk of my life to thinking myself into the minds of dolphins and reflecting this through carefully researched fiction. See my novel "RIPPLE" which suggests some possible consequences of dolphin extinction, that even DOC has probably not considered. Ripple has now been optioned for a feature length animated movie which has the power to bring my ideas straight into the public viewpoint.

I am sick and tired of humans thinking that dolphins are there as a source of income for them.

I travelled when young across the Pacific under sail, with no working engine, no whirling propeller, just a wing in the wind and a fin in the sea like the dolphins and whales. That was how I came to know them in their world on their terms.

If people want to see these fabulous beings, that should be the only way to do it. Without any motor at all, and certainly without whirling props. So under sail or oar or paddle only. Noise, whether from whirling props, jet-engined boats or just screaming humans, pollutes their world and spoils their ability to navigate. No swimming either, as our human sunscreens are known to be dangerous for them. And how do

swimmers get close to them? Nearly always in a propeller-driven or noisy-engined boat.

**Amendments I suggest to the proposal:**

Of course I understand why you must limit the proposal for now, but any amendments made to it should be in favour of the marine mammals – not humans. And never reduce its impacts for financial reasons of applicants. Human financial concerns are not as important as the future of the planet. When the planet is dying around us, what use is a pile of cash to the last people starving on the beaches of a broiling world with diminishing water and no food. What do we tell our grandchildren about why there are no dolphins anymore?

My amendments are:

- Ban all fishing in the two proposed inner sanctuary areas, one of which is in my own home waters (Jacks Bay) I have spoken to tangata whenua here who agree with this, despite themselves being KEEN AND EXPERT FISHERMEN! The other inner zone (between Motuarohia and Moturua) ought also to have all fishing banned. Then if the dolphins begin to use it as sanctuary, they have food there. (I would like to see this fishing ban extended to the entire oceans of the world, but I realise this may be beyond DOC's powers for now.) Humans can live without fish and are healthier for it. Dolphins can't. The dolphins do not come onto my land and steal my fruit and veges. Let's extend them the same courtesy in return.
- Extend the inner sanctuary that is proposed for my area (Jacks Bay) to cover the entire world's oceans too. I do realise this may also be difficult to implement for now.

I was delighted when you set up the MM centre in Russell next to the boating club. I have seen the rangers out there doing their observations and taking care of the dolphins. They have seen me out there in my kayak.

The other thing you may not have thought about with the whole MMS idea is that by creating it, you are also creating a kayakers paradise. No more will boats be allowed to roar past at high speed, their wakes threatening to capsize us.

I have shared these waters with dolphins before. But it was not a case of them riding my wake. I'm way too slow for that. It was a case of them choosing to take ME into THEIR slipstream and drag me around the bay, often returning to collect me again because I was too slow to hold onto their slipstream. Even this may not be allowed in future but I understand and accept that.

I have also been lucky enough to go out with Ingrid Visser, who has called me up by phone, met my kayak, and taken me aboard her boat, to spend the day photographing and helping with her orca research.

There may be some businesses who do not like the BOIMMS proposal for now, but businesses may emerge later that are far friendlier to MMs and which will be just as lucrative anyway. Kayak businesses for example and rowing. They will also be better for our human health. I am pushing 70 and still happily kayaking around the BOI because I've always physically subscribed to the "Use it or lose it" philosophy.

It's time humans around the world woke up to the need to conserve the last few cetaceans before it is too late.

These facts came from a well-researched article in the Phuket news:

Whales are the single best [natural solution](#) for fighting climate change. However, [300,000 dolphins](#), whales and porpoises are killed every year in fishing nets according to the World Wildlife Fund (WWF), either getting caught as bycatch or in a lost or discarded net. The WWF says that industrial fishing is the biggest threat to cetaceans. Scientists estimate that [50% to 80%](#) of the world's oxygen comes from the phytoplankton in the ocean and that it sequesters [40% of all CO2](#). Whale poo acts as a fertiliser for it, making the marine mammal an essential part of the earth's ecosystem. Increasing the whale population by just 1% would be the equivalent of planting [2 billion trees](#).

Industrial fishing is destroying 3.9 billion acres (an area over three times the size of the Amazon) of seafloor every year by bottom trawling. This is when a boat drags a heavy-weighted net along the ocean floor and kills everything in its path. According to a [study](#) published in 2021 bottom trawling releases one gigaton of CO2 per year, which is higher than all pre-pandemic aviation emissions.

Most of the world's large ocean plastic is [ghost gear](#) (discarded fishing equipment). [One study](#) found that 70% (by weight) of macro plastics (above 20cm) floating on the ocean's surface was fishing related. This fishing equipment continues to kill fish and other animals for years, even decades after it was discarded. Eliminating fish from your diet is the single biggest thing you can do to reduce ocean plastic pollution.

Tui Allen  
Author of Ripple  
[www.tuiscope.co.nz](http://www.tuiscope.co.nz)

**WS-BOIMMS-130161**

**From:** Vidas & Annette Petraska [REDACTED]  
**Sent:** Friday, 7 May 2021 6:26 am  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary  
**Subject:** Submission to Oppose Proposed BOI Mammal Dolphin Sanctuary

**Follow Up Flag:** Follow up  
**Flag Status:** Completed

Hon Dr Ayesha Verrall  
Minister of Conservation  
Dear Minister

Whilst I am in favour of protecting dolphins, my submission is to oppose the proposed Marine Mammal Sanctuary - *specifically its location*.

I have enjoyed boating in the Bay of Islands for 55 years, every summer exploring its many coves and swimming in its many bays.

Boats mostly traverse only a small part of the bay, outlined in black.

The *Proposed Reserve* is right in this *Recreational Zone* and takes up a very large part of it which will impact heavily on the summer recreation boaties.

**Black BOI Recreational Zone** - the area most frequented by Boaties.  
**Red Zone - Proposed Marine Reserve**  
**Green Zone - Suggested Location Marine Reserve**

In 55 years of boating in the BOI, I have seen dolphins all over the BOI and mostly to the North and South of Roberton Island . The most dolphins (50+) that I have seen at any one time has been when large charter boats were regularly feeding the dolphins in Oke Bay several years ago for the entertainment of their passengers and this activity is now prohibited.

In the many thousands of hours of boating in BOI I have only seen dolphins twice in the proposed sanctuary area. I have never seen whales or seals in the proposed sanctuary zones. I have spotted whales in the outer parts of the BOI.

From my observation in recent years boat skippers have taken a more responsible view to keeping well clear of pods of dolphins than in the past. DOC's report stating multiple occasions where 60+ vessels were

attempting to interact with the dolphins is a thing of the past and is no longer relevant.

A prominent sign placed on each of the popular beaches that boaties visit in the BOI informing them on the dolphin situation and boatie's expected behaviour would achieve DOC's desired results in protecting dolphins and would be a self regulating situation as boaties are not thugs and do like dolphins and would reprimand and shame offenders into observing correct behaviour. In the same way that existing "Light No Fires." signs that have been erected on beaches have resulted in fires not being lit on BOI beaches anymore.

The proposed 5 knot zones unfairly favours commercial ferries over recreational vessels. They will still be able to speed from Paihia and Russell to Roberton Island, Otehei Bay and the Hole in the Rock with no need to go near the 5 knot zones. Commercial operators are year round activities whereas private boaties are largely a "January holiday phenomena".

All this adds up to my recommendation to DOC to better advertise to boaties "not to hound dolphins" and find a location of the Proposed BOI Marine Mammal Sanctuary that impacts less on people and still benefits and protects marine mammals. I suggest a sanctuary on the Northern side of the BOI as shown in the diagram.

Yours sincerely

Vidas Petraska

A large, solid grey rectangular block redacting the signature of Vidas Petraska.



**WS-BOIMMS-130164**

**From:** heather stevens [REDACTED]  
**Sent:** Sunday, 9 May 2021 6:14 pm  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary  
**Subject:** Objection to proposed Mammal sanctuary

**Follow Up Flag:** Follow up  
**Flag Status:** Completed

From: Heather Stevens  
Ph: [REDACTED]  
E: [REDACTED]

My family has owned the land around Jacks Bay for 75 years, I personally for 70 years. Dolphins were non existent for the first 30+ years of my life, but I agree their numbers have decreased in recent years. However reasons for the decrease is questionable. I saw no reference in the paperwork of research about the dolphins food chain decreasing (the BOI has been over fished, in fact raped of fish,for years); what about the temperature of the waters with climate change; ?

Having been in Jacks Bay all my life, it has always been a very quiet place in winter, but in summer it is busy place of boats and people having wonderful holidays for a short few weeks. Water activity is the main holiday attraction. To make a speed restriction of 5 knots for all Jacks Bay, Manawaroa, Paroa Bay, Orowaka etc owners/visitors would mean a huge change to how we have all enjoyed the life in the Bay. There is a ski lane within the area for goodness sake. Fishing is the favourite past time but to travel at 5 knots to get to fishing areas is ridiculous. The bays in the proposed areas are not deep bays either - surely dolphins need a bit of depth?

The area around Deep Water Cove is already a special area, where fish would be in good supply, good deep water, and more away from busy sea traffic. We don't have to re-invent the wheel to help these lovely creatures.

How could the proposed plan be policed in any reasonable way. If you can't keep control of the over fishing, the demolition of the scallop beds, and similar, how will this proposal do anything but make so many rate payers very frustrated.

Thank you for the opportunity to oppose this proposal. I live in hope that common sense will prevail.

Heather Stevens

PS. I have no problem in banning the tourist boats, and certainly stop the swimming with the dolphins. When we come across a pod of dolphins, it is because we are en route to another part of the BOI, not out in search of them.

**WS-BOIMMS-130167: 1**

SUBMISSION REGARDING PROPOSED MARINE MAMMAL SANCTUARY  
IN THE BAY OF ISLANDS

**History**

My name is Pip Kempthorne, owner of property at 34 Jacks Bay Road in Jacks Bay. My parents bought property incorporating Manawaora Bay, Jacks Bay and Dicks Bay in 1947, and since then have farmed the area, started the Jack 'n Jill motor camp and subsequently retired to the small bay in the south western corner of Jacks Bay. As an individual, I am committed to making sure that we have an environment that will enable dolphins to be able to flourish in the Bay of Islands and I know my whole wider family are committed to this outcome.

**Review of research and the proposed marine mammal sanctuary.**

After hearing about the proposed marine mammal sanctuary (hereinafter referred to as MMS), I undertook a Google search on the subject, and the first article that I read on the subject was a synopsis of a more detailed study on the declining population of dolphins in the Bay of Islands (hereinafter referred to as BOI). The hyperlink to this article is as follows:  
[https://www.massey.ac.nz/massey/about-massey/news/article.cfm?mnarticle\\_uuid=4B09D526-C745-8100-3297-FBFBD5FE7AB9](https://www.massey.ac.nz/massey/about-massey/news/article.cfm?mnarticle_uuid=4B09D526-C745-8100-3297-FBFBD5FE7AB9).

At the conclusion of this article with a connection to Massey University (whom it appears conducted the detailed research) the following comments were made. "Dr Karen Stockin, Director of Coastal-Marine Research Group and supervisor of Ms Peters (who did much of the detailed analysis), says that cause and effect cannot be conclusively drawn from these research findings. The facts remain we are dealing with a dolphin population that appears to have accelerated its decline and intervention is needed."

I then went on to review the more detailed report (A scan of this report is attached to this emailed submission)

It is not surprising that cause and effect was not identified as the study went into great length about the research methodology, methods to calculate the dolphin population, review of commercial sightseeing operations, and other factors that they thought had contributed to population decline of dolphins in the BOI. The report itself did not draw any conclusions regarding how to arrest the population decline. Despite this lack of evidence, there has apparently been recommendations made to create this MMS which would create a no interaction zone along with changes to the permit systems to view dolphins, community engagement, education and enforcement.

It would appear that the creation of a MMS sanctuary is an attempt to make some form of intervention, without knowing whether this will work, while neglecting many of the issues that have been recognised as problematic for a long period of time.

**Impact on land owners and boat owners inside proposed MMS**

As a property owner in Jacks Bay, and an owner of a boat regularly accessing the greater BOI, this proposed MMS with a 5 knot speed limit directly impacts myself, my immediate and wider family with houses in Jacks Bay, as well as property owners in Paroa Bay, Manawaora Bay, Jacks Bay, Dicks Bay, Opugna Cove, Te Hue and Orakawa Bay.

The distance from Jacks Bay to Whangawahine Point is 2.1 nautical miles, and I will be required to travel at a speed of no more than 5 knots, thus taking 25 minutes to get to the imaginary line between Whangawahine Point and Tapeka Point, each time I venture into the greater BOI.

This area within the BOI is lightly populated, with residents and boat owners operating in a responsible manner, with great respect for the local area and respectful of nature and wildlife including the dolphin population.

The proposed MMS is situated right in the middle of an area that has been designated as a water skiing zone, with a designated ski lane operational in Dicks Bay. Traditionally, Jacks Bay has been an area where water skiing has been carried out over many decades.

**Other considerations when reviewing effectiveness of MMS proposal**

While a series of restrictions will apply to people operating boats inside the affected area of the proposed MMS, there will be no restrictions applied to the vast majority of boats who are travelling from Opuia, Russell, Paihia, Waitangi, Doves Bay and the Kerikeri Inlet area. These areas are heavily populated with local residents and is the place from where the bulk of the visitors will launch their own boats or rent boats and jet skis to explore the BOI. It is also the source of the thousands of domestic and international tourists that pay the commercial sightseeing operators to take them out into the greater BOI, often specifically to see dolphins in the wild. It is well recognised that it is this group that has created the problem that has been identified in the first place.

Not only will this proposed MMS not do anything to change the behaviours of individual boat owners operating outside the proposed MMS, it explicitly excludes the requirement that all commercial sightseeing operators maintain a 400 metre distance from dolphins. It is well recognised that these commercial sightseeing operators specifically seek out the pods of dolphins and rush to the last sighting so they can give their customers the experience that they paid for.

Even if the proposed MMS was established, and the speed restrictions effectively written into a statute, , how are these restrictions to be enforced, and who will be responsible for determining the speed of a particular boat, issuing an infringement notice, and subsequently prosecute any offender in the courts of New Zealand.

There have been discussions regarding an education programme which I would be in favour of. However, the local boat owners are already aware of the issues surrounding dolphins and ways of protecting them. The real issues come with casual visitors to the BOI who are uninformed of the regulations, of not only the proposed MMS, but even the rules of the sea. How will this proposed MMS deal with casual visitors who are generally unaware of the impact of their behaviours on the natural environment and on the dolphins.

The decline in the dolphin population has also coincided with a reduction in the available fish catch for the recreational fisher in the BOI. There is a wide acceptance that this has been influenced by commercial fishermen operating inside the waters of the greater BOI. Despite this known fact, the major intervention that has been proposed is the implementation of a MMS, which has no causal link to arresting the decline in the population of dolphins in the BOI.

The research reports that I have read do not explain how or why dolphins will use the proposed MMS area rather than the traditional areas where they forage for food, or are resting and milling

around. I have been travelling through these waters of the BOI since the 1960s, and I have very rarely seen dolphins inside the proposed MMS. I have generally found the dolphins in considerably deeper waters outside the proposed MMS. What will change the dolphin's behaviours if the proposed MMS is established.

**Conclusion**

In conclusion, I oppose the proposed MMS in its entirety.

The reasons for this conclusion is as follows:

1. There is no evidence that the creation of the proposed MMS will have any impact on arresting the decline in the dolphin population of the BOI.
2. There is a significant impact on land owners and boat owners inside the proposed MMS, and yet there is no attempt to change the behaviours of the boating users not covered by the proposed MMS.
3. The commercial sightseeing operators are responsible for the vast majority of the interactions between dolphins and humans in the BOI, and yet they retain their ability to interact with the dolphins and are even excluded from the 400 metre interaction limit currently required of other boat owners.
4. This is an attempt to make an intervention and take some action, when the proposed action will not conclusively achieve the desired outcome, and leaves the current reasons potentially behind the decline in the dolphin population (including commercial fishing, unregulated and commercial sightseeing operators interacting with dolphins) unchanged from the status quo.

I would like to present my submission personally, and make a public submission if at all possible. I will make sure that I am available to attend any public hearing on this matter, and welcome the opportunity to present my case.

Yours sincerely

Pip Kempthorne

Address: [REDACTED]  
Email: [REDACTED]  
Telephone [REDACTED]

**WS-BOIMMS-130167: 2**

Peters & Stockin 2016 – Responses of bottlenose dolphin to vessel activity in Northland, New Zealand



Final progress report for the Department of Conservation, Northland  
February 2016

## **Responses of bottlenose dolphin (*Tursiops truncatus*) to vessel activity in Northland, New Zealand**



**Catherine H Peters & Karen A Stockin**

Coastal-Marine Research Group  
Institute of Natural and Mathematical Sciences  
Massey University





Peters & Stockin 2016 – Responses of bottlenose dolphins to vessel activity in Northland, New Zealand

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***Note from the authors***

This report meets a requirement of a tendered research contract between the Department of Conservation and Massey University. The department initiated this research in direct response to concerns over sustainability of the tourism industry in the Bay of Islands, New Zealand. As part of the consultation for this study, operators were engaged by both the department and Massey University and kept informed of the proposed research.

In the framework of this study and in agreement with the associated Department of Conservation contract, some of the data presented here were collected aboard tour vessels operating in the Bay of Islands. Access to the tour vessels for the specific purpose of the pre-determined research remit was agreed between all stakeholders including but not limited to the Department of Conservation and the tour operators at the outset of research project. Operators invited the Principle Investigator (Catherine Peters) and associated research assistants to board their platforms with the express intent of collecting data with respect to the predetermined research remit. On a daily basis, permission to board each tour vessel was further discussed between the observers (Catherine Peters and/or the research assistants) and the tour operators. Furthermore, an introduction of the on-board researchers to the patrons was undertaken along with a brief dialogue about the data collection being undertaken and the overarching purpose of the study.

Disclaimer: Data presented herein represents only data collected within the BoI between December 2012 to April 2015 and is in accordance with the specific contract objectives outlined by the Department of Conservation. Extended data collected both temporally and spatially outside these objectives are the focus of a PhD underway to be fulfilled by Miss Peters. Material presented in this report should not be cited in any format without the written consent of the authors and the Department of Conservation.

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### 1. Executive summary

Presently, three commercial marine mammal tourism operators are permitted to view and swim with bottlenose dolphins (*Tursiops truncatus*) in the Bay of Islands (BoI), New Zealand. Concerns over the local decline of the species (Tezanos-Pinto 2013; Tezanos-Pinto et al. 2013) and developments in the industry following previous research findings have resulted in the need for a comprehensive review of the current management regime using updated empirical data on habitat use, site fidelity, and behavioural responses, including vessel interactions. The present report describes the results of a dedicated continuous study between December 2012 and April 2015 and provides management recommendations to ensure adequate protection of this local population of *nationally endangered* bottlenose dolphins (Baker et al., 2010).

Data collection between December 2012 and April 2015 comprised a total of 81,892 km of track surveyed whilst on effort (4,027 hrs). Coastal bottlenose dolphins (referred to hereafter as bottlenose dolphins) were the most encountered species within the study area with 0.05 bottlenose dolphin sightings/hour (88.0%, n=2,015).

Season-specific extent of bottlenose dolphin range use within BoI waters indicated a variable resight rate, with a total of 96 uniquely identifiable individuals documented. The current estimate is less than previously reported, with a 65.5% decline since 1999 (278 identified in 1997-1999 (Constantine 2002)) and a 39.6% decline since 2005 alone (159 in 2003-2005 (Tezanos-Pinto et al., 2009)). All 19 core frequent users ( $\geq 8$  sighting/lunar month) were observed year round. The majority (60.4%, n=58) were defined as infrequent users ( $\leq 1$  sighting/lunar month). Frequent users and occasional visitors (2-7 sighting/lunar month) represented a further 19.8% (n=19) each. While broad scale distribution is consistent with previous studies (Hartel et al., 2014), fine-scale habitat use has shifted to a small area around Tapeka Point and the eastern end of Roberton Island, resulting in minimal use of current designated rest areas (7.0%, n=16). A mean of 2.8 bottlenose dolphin groups encountered per day was observed across the study period (range 0-5, SE=0.03, n=692 days). The largest number of sightings occurred in summer and autumn, with 0.03 sightings/km effort (31.0%, n=626 and 30.9%, n=624 of all sightings, respectively) and least in winter with 0.01 sightings/km effort (12.8%, n=259). Groups containing immature dolphins were also more frequent in summer, including 55.2% (n=466) of all calves and neonate sightings, suggesting reproductive seasonality in the BoI. A total of 10 identifiable adult females were observed with 12 young of the year calves. Only three (25.0%) are suspected to have survived their first two years to perceived independence, representing an increase in mortality in the first two years of life, as compared to 1994-2006 (Tezanos-Pinto 2009 and Tezanos-Pinto et al., 2015).

This study indicates sensitisation to vessel interactions with disruption to critical behaviours, representing further sensitisation compared to Constantine et al. (2003). Whilst behavioural budget comparisons can be drawn with previous studies in the BoI, until now it was not possible to determine the broader extent of vessel disturbance to dolphin groups. The current study addresses this via the analysis of behavioural transitions, time to return to behavioural state and behavioural bout length. Dolphins in the BoI spend on average 85.7% of daylight hours with at least one vessel, with a cumulative diurnal behavioural budget (control + impact) that varies significantly from the control behavioural budget (goodness-of-fit test,  $G^2_{adj}=0.37$ , df=1,  $p<0.001$ ).

The current level of effort correlated with significant effects on all behaviours by time of day/season, vessel presence, vessel number, vessel type and vessel activity. Overall, dolphins spent more time traveling, resting and foraging in absence of vessels within 300 m of the dolphin group, which in the

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presence of vessels decreased by 69.7%, 133.3% and 160.0% respectively. In addition, dolphins generally spent more time socialising, diving and milling in presence of vessels, which increased by 126.3%, 300.0% and 247.6%, respectively.

Key biologically important behaviours decreased significantly in the presence of vessels with resting ( $z=1.060$ ,  $p<0.001$ ) and foraging ( $z=1.560$ ,  $p=0.036$ ) bouts shorter by 22.9% and 13.3%, respectively. As the number of vessels present with dolphins increased up to two vessels, the behavioural budget decreased for resting (95%) and foraging (57.1%). As the number of vessels present within 300 m of the focal dolphin group increased from  $\geq 2$  to  $\geq 4$ , the magnitude of change increased with particularly strong effects noted during the presence of  $\geq 4$  vessels on the behavioural budget of foraging (64.3%). Un-permitted vessels had the strongest effect on foraging (87.5% decline). Resting didn't occur in the presence of un-permitted vessels. Overall, private vessel presence resulted in a decrease in foraging (62.5%) and resting (95.0%), as well as permitted vessel presence (68.8% and 100.0%, respectively). Permitted vessels had the largest magnitude change on resting. The likelihood to stay in a given state in the presence of vessels was reduced for foraging and resting by 11.5% and 21.2%, respectively. No resting bouts were initiated when a vessel was already interacting with dolphins. Time required to return to a given behavioural state was significantly affected by the presence of vessels for all 6 behaviours (Table 16). Primarily when foraging ( $z=4.732$ ,  $p=0.004$ ) or resting ( $z=4.447$ ,  $p<0.001$ ), bottlenose dolphins took significantly longer to return to these states in the presence of vessels, with time increasing by 262.0% and 725.6%, respectively.

Poor compliance with MMPR (1992) was observed across all vessel types. Beyond this, non-compliance was also observed for permitted vessel conditions resulting in 63.2% ( $n=12$ ) violation of mandatory conditions, at varying levels, across operators. Results indicate current mitigation efforts have not been successful. Clear and/or easy to follow regulations are more likely to be respected. Private vessels were the most prevalent type of vessels recorded in the BoI (36.0%,  $n=6,274$ ). However, both permitted and un-permitted vessels also demonstrated a strong presence, accounting for 33.0% ( $n=5,752$ ) and 31.0% ( $n=5,403$ ) of the vessels observed in the bay, respectively. All vessel types exerted significantly more cumulative viewing effort in spring/summer than autumn/winter. Cumulatively, permitted vessels spent significantly more time viewing dolphin groups (range=0-138, median=62.5,  $n=5,752$ ) than un-permitted vessels (range=0-48, median=29,  $n=5,403$ ) (Kruskal-Wallis:  $h=39.63$ ,  $df=2$ ,  $p<0.001$ ). Private vessels spent significantly less time with dolphin groups (range=0-45, median=16,  $n=6,274$ ) than permitted (Kruskal-Wallis:  $h=29.43$ ,  $df=2$ ,  $p=0.013$ ) and un-permitted vessels (Kruskal-Wallis:  $h=27.04$ ,  $df=2$ ,  $p=0.018$ ).

The local BoI bottlenose dolphin population is at high risk of a continued decline to localised extinction unless critical action is taken. Management in the BoI must address all vessels utilising the area to address the trend of continued decline. Protection measures should be adaptive, extend beyond permit conditions and need to be supplemented with educational and enforcement programs (Keane et al., 2008) to promote compliance with regulations. Cumulative existing effort with dolphins needs to be down regulated. Clearly defined legislation which allows significant authority, including that of revoking operator permits (Bejder et al., 2006b; Higham & Bejder, 2008) and penalising any non-compliance, regardless of vessel type, in a way that is fair and reasonable is required. This study demonstrated that 88.0% of all encounters between permitted vessels and marine mammals are with bottlenose dolphins. The localised loss of this species from the BoI would result in the local marine mammal tourism industry losing its economic core and long-term viability in the region.

## 2. Introduction

Worldwide, the marine environment and our use of it is changing. One such way is the ever-adapting cetacean focused tourism industry. This type of tourism can present a potentially sustainable use of cetaceans and an economically viable alternative to whaling (Hoyt 1995). Cetacean watching may improve public attitude towards the marine environment (Orams 1997) and promote support for conservation issues (Bejder et al., 1999; Dwyer et al., 2014), while simultaneously benefiting local economies (Berggren et al., 2008; Hoyt 2001). However, during the last decade cetacean watching has become more interactive than the traditional passive vessel viewing (Spradlin et al., 2001). This can place cetaceans at higher risk of being harassed and/or injured by an unknown number of unpredictable effects associated with cetacean watching/swimming (Bejder et al., 2006; Frohoff & Dudzinski 2001; Parsons 2012). As long-term data on the possible effects of tourism is increasing, it is becoming apparent such activity may be having effects not only at the behavioural level but also at the population level (Bejder et al., 1999; Lusseau 2004). The inter- and intra-species response to watching/swimming has been shown as variable and the need to carefully manage each population separately at a local level has become apparent. This is difficult to achieve in wide ranging cetaceans but more achievable in dolphin populations repeatedly frequenting an area with tourism activity.

New Zealand (NZ) has more than matched the rapid worldwide growth in cetacean focused tourism (O' Connor et al., 2009). Changes in dolphin behaviour in response to tour activity have also been noted in a range of other dolphin species in New Zealand waters including Hector's (*Cephalorhynchus hectori*) (Bejder et al., 1999; Martinez et al., 2011), dusky (*Lagenorhynchus obscurus*) (Lundquist et al., 2012; Markowitz et al., 2009), and common dolphins (*Delphinus* sp.) (Meissner et al., 2015; Neumann & Orams 2005; Neumann & Orams 2006; Stockin et al., 2008).

In New Zealand, previous research focusing on the *nationally endangered* bottlenose dolphins (*Tursiops truncatus*) in Doubtful and Milford Sounds indicate a number of effects of tour activities ranging from changes in dive behaviour (Lusseau 2003), displacement from areas by tour activities (Lusseau 2004), and changes in residency patterns (Lusseau 2005). Motor noise appears to be a key element in these interactions, with effects less pronounced if vessels were driven carefully, in accordance with MMPR's (Lusseau 2006). Research in Fiordland demonstrated a decline in population abundance, as well as in the reproduction rates of the local population of bottlenose dolphins (Lusseau 2006; Lusseau et al., 2006), though tourism may only be one of many factors driving these trends (Currey et al., 2011) and population management options have been presented.

Within NZ waters, coastal bottlenose dolphin inhabit three discontinuous coastal regions (Figure 1), with little mixing between genetically distinct populations (Tezanos-Pinto et al., 2009). Such a population structure (little or no inward or outward genetic migration) means any effects on the North Eastern population would not be mitigated by populations further north and/or south (Baker et al. 2010).

In the Bay of Islands, NZ (referred to hereafter as BoI), dolphin tourism focuses specifically on viewing and swimming with the bottlenose dolphin (Constantine 2002). Indeed, the BoI has a comparably high level of commercial swimming-with-dolphin activities targeting this species. Presently, there are three operators (Fullers Great Sights, Explore NZ and Carino Sailing and Dolphin Adventures) that hold permits under the MMPR (1992) to commercially interact with marine mammals and swim with bottlenose dolphins. These operators cumulatively offer up to ten trips per day that are permitted to view and/or swim with bottlenose or common dolphins in BoI waters. During the course of this study only one swim with common dolphins was observed. In

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addition, a fourth operator in Tutukaka (Dive Tutukaka) is running a dive operation and is permitted to view marine mammals that they mainly encounter en route to the dive sites, and to swim with common or bottlenose dolphins. Collectively, these operators may exert a high human disturbance levels on dolphin populations in the region.



**Figure 1:** Discontinuous coastal regions of New Zealand inhabited by coastal bottlenose dolphin

Within the BoI, Constantine (2002) documented 278 unique bottlenose dolphins with 59 core users and demonstrated dolphin behaviour differed by vessel number; in particular, bottlenose dolphins rested less and engaged more in milling behaviour when the permitted vessels were present. Furthermore, Constantine et al. (2004) noted that an increase from 49 to 70 permitted trips per week and a subsequent change in trip departure times, resulted in a further decrease in resting behaviour. Successful swims have also been reported to decrease from 48% in 1994-1995 to 34% in 1997-1998, while evidence of sensitization to vessels has also been demonstrated (Constantine et al., 2004). Dolphin response varied according to swimmer placement from the vessels, with only *line abreast* placement resulting in a decrease in avoidance, while *in path* exhibited the highest level of avoidance. If a swim attempt was successful, it involved a mean of 19% of the group, with juveniles more likely to interact with swimmers than adults (Constantine 2002). Observations regarding juveniles and recent studies in the area are notable given the high calf mortality detected in bottlenose dolphins in the BoI (Tezanos-Pinto et al., 2009; 2014).

Abundance trends and developments in the industry have resulted in the need for a comprehensive review of the current management regime (Tezanos-Pinto 2013). The apparent decline of bottlenose dolphin abundance in the BoI (Tezanos-Pinto 2009; 2013) is of particular note. A detailed re-evaluation of tourism effects was undertaken to assess the immediate and potential cumulative effects of current tourism activities on dolphin behaviour. While basic activity budgets served to replicate analyses presented in Constantine (2002) and Constantine et al. (2004) for comparative purposes, more comprehensive analyses were applied to assess behavioural transitions and to model increases in tourism pressure accordingly. Further to this behavioural analysis included un-permitted



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and private vessel covariates not previously assessed independently. The current research did not focus on staggered vs discrete departure times or changes in the number of permitted vessels as both remained stable throughout unlike in previous research. When historical research began in late 1996, a maximum of 36 swimmers were allowed in the water per vessel/trip. This changed part way through the previous research to 18 swimmers per vessel/trip and three swim drops per operator per trip. The permitted operators adopted the change in swimmer number at various times and, as a result, the assessment of such change was challenging and, thus, could not be examined. Swimmer number was assessed in the current study. This project presents an opportunity to further assess and review the effects of swimmers on the behaviour of bottlenose dolphins.

The Department of Conservation (DOC) contracted this research to obtain a scientific evidence base for management decisions. Results and sound scientific analysis presented herein form the basis of management advice to the department based on the current status quo of bottlenose dolphins in the BoI.

### 3. Objectives

The DOC is tasked with the management protection and conservation of marine mammals under the MMPA (1978), primarily achieved through the MMPR (1992). This is achieved through the regulation of behaviour of persons coming into contact with marine mammals, for example commercial operators which are required to hold a permit under the regulations. Whilst the department had knowledge of a decline in the local bottlenose population, given the complexity of tourism pressures in the BoI it was unable to determine which aspects of current management needed to be improved. The Department of Conservation commissioned this study to obtain sound scientific advice on how to improve management of the threatened local bottlenose population by better mitigating the tourism impacts it is exposed to. Specifically, this present study aims:

1. Examining season-specific extent of bottlenose dolphin range use within BoI waters.
2. Examining inter-seasonal use of regional waters of bottlenose dolphin within BoI waters.
3. Quantifying and documenting the type, level and operational effort of existing bottlenose dolphin tourism activity within BoI waters.
4. Determining the potential effects of interacting with bottlenose dolphins as currently permitted (viewing and swimming). This includes describing behavioural responses of dolphin groups, and determining if such responses have population level consequences for seasonal and inter-seasonal range use.
5. Integrating the recommendations of former historical research. Specific questions were addressed in order to better understand the effects of vessel traffic on bottlenose dolphins and develop clear measures and guidance. This includes describing behavioural responses of groups and specified age groups. This will be used to determine if such responses have population level consequences for seasonal and inter-seasonal range use. This is based on 1-3 above to i) avoid or minimise human impacts, and ii) measure impacts that quantify thresholds over which further impacts must not occur.
6. Producing statements and recommendations based on 1-4 above regarding existing and future tourism activity particularly in the BoI waters, but also in the wider regions generally.

More explicitly:

1. What is the current level of effort (i.e. swimming and viewing, private and commercial, permitted and non-permitted)? Does the actual current level of effort of swimming and viewing

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trips correlate with any significant effects on dolphin behaviour? What implications could this have on the level of effort permitted in the BoI for each activity? Note: this answer needs to take into account the actual level of effort per day in the BoI for each activity, and the current maximum number of permitted trips for each activity.

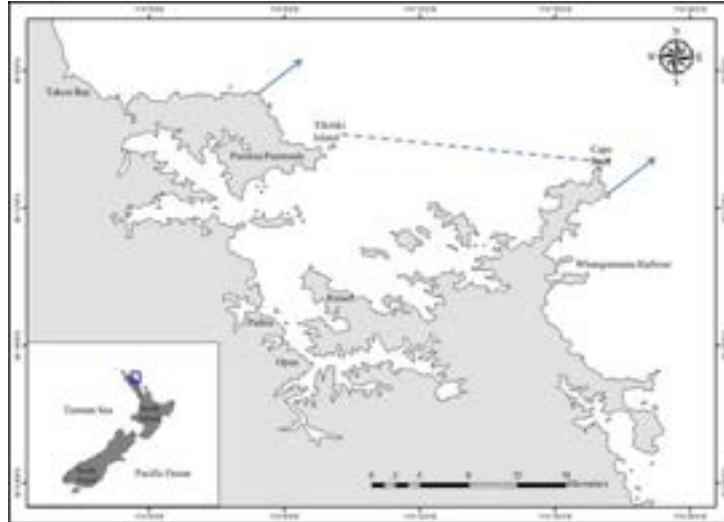
2. What are the short-term behavioural responses of dolphins in relation to commercial and non-commercial viewing and swimming vessels? Are these activities significant for the population of the BoI? Should these activities be reduced, remain at current levels, or could the level of activity be increased? Do behavioural responses vary between individuals, groups, and specified age groups, if so how? Do behavioural responses vary between what is currently and what was previously reported?
3. What further conditions (if any) could be considered in order to minimise any determined effects? These conditions should address the following questions:
  - a) What is the occupancy patterns of bottlenose dolphins? Do the occupancy patterns of bottlenose dolphins in the BoI indicate some areas should be excluded from the commercial operators' permit areas and / or tourism pressure in general, year round or season-specifically?
  - b) What is the mean time each permitted operator spends with the dolphins? What is the amount of time permitted operators cumulatively spend with dolphins? What period/s during the day do permitted operators activities exert the greatest effort? In what season do permitted operators activities exert the greatest effort?
  - c) What is the mean time each non-permitted vessel spends with dolphins? What is the cumulative amount of time non-permitted vessels spend with dolphins? What period/s during the day does non-permitted vessel activity exert the greatest effort?
  - d) Are there any conditions that need review since previous studies? Is the limit on the length of time each permitted operator spends with the dolphins for viewing and swimming, once an interaction is established, still appropriate? Are departure times of permitted vessels appropriate and do they have an effect? Is the current number of swimmers appropriate? Are the current conditions on swimming or swim approaches mitigating any observed effect on bottlenose dolphins, i.e. such as line abreast method for swimming approaches, etc.?
  - e) What are the operators' levels of compliance with permit conditions and regulations?
4. What is the potential long-term significance of the current level of tourism activities on bottlenose dolphins in the BoI?
5. Once questions 1,2,3 and 4 have been answered, what are the implications of the current tourism effects in the BoI and how can these findings be used to inform on the wider area? What recommendations could be suggested for managing permitted operations in these areas?

#### **4. Materials and methods**

##### **4.1. Study area**

Data were collected in BoI waters, Takou Bay to Whangamumu (Latitude 34°51 to 35°05'S, Longitude 173°16 to 174°28'E), on the north east coast of North Island, New Zealand (Figure 2). The bay itself is an irregularly shaped 16km-wide, 260km<sup>2</sup> drowned valley system and a natural sheltered harbour (Hartel et al., 2014), containing 144 islands in addition to numerous peninsulas and inlets. The survey area was particularly selected as it includes the current and potential future areas (including marine mammal tour permit exclusion areas) utilised by dolphin tour operators.

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**Figure 2:** Bay of Islands study area, New Zealand. The dashed line indicates operational limits for Carino sailing and dolphin adventures. All other permitted vessels operational limits are depicted as the area between the arrows.

#### 4.2. Survey platforms

Surveys were conducted year round from December 2012 to April 2015, between sunrise and sunset, and therefore included the peak tourism season (December-March) in the BoI. Data were collected from two primary platforms: 1) Research vessel *Te Epiwhania*, a 5.8 m Stabicraft vessel powered by a 100 hp four-stroke engine; and 2) seven platforms of opportunity (permitted vessels) based in BoI (Figure 3). Both types of platforms have proven utility in tourism effects studies, although each has its own limitations (refer to Bejder & Samuels 2003 for review). Both platforms were used concurrently in order to collect complementary data, and methods standardised, thereby overcoming some of the analytical and logistical limitations of using only one research platform and allowing for cross referencing of data.

All platforms were used to quantify and document 1) the type and number of vessels within 300 m relative to the focal dolphin group, 2) vessel movements, 3) swimmer deployment and swim approach parameters, 4) number and identity (where possible) of dolphins interacting with permitted vessels via photo-id and 6) general occurrence in relation to abiotic parameters. Further to this, the research vessel was also used to collect data on dolphin occurrence, behaviour in relation to presence and absence of vessels via *focal dolphin group* observations and conduct whole group photo-ID (Neumann 2005). Opportunistic platforms were used to perform *focal permitted vessel* observations of changes in dolphin behavioural state and frequency during an encounter (Lundquist 2012; Markowitz et al., 2009; Martinez 2010).

#### 4.3. Surveys

As platform height is known to affect the detectability of cetaceans at sea, survey conditions were assessed in relation to the observational platform used (Hammond et al., 2002). Owing to the lower eye height of *Te Epiwhania*, and consequently reduced detectability of dolphins, surveys were

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conducted in good weather conditions (Beaufort sea state, BSS,  $\leq 3$ ) and in good visibility ( $\geq 1$  km) (Dwyer et al., 2015). Surveys on board the permitted vessels were conducted in good to moderate weather conditions (BSS  $\leq 4$ ) and in good visibility ( $\geq 1$  km). Surveys were discontinued in precipitation, fog or if the BSS exceeded the acceptable limit.

#### 4.4. Research vessel methodology

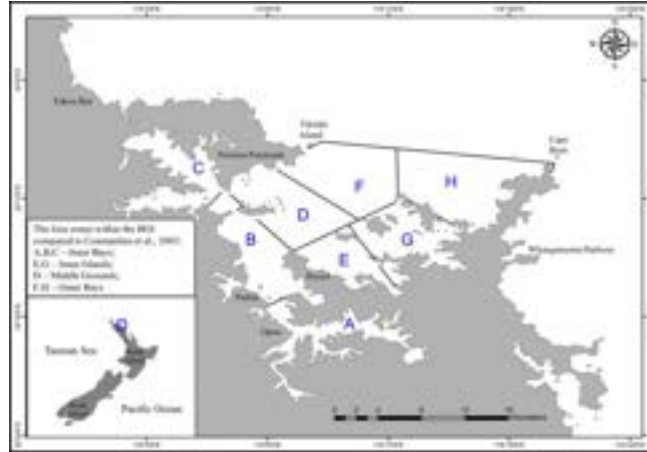
Survey transects were selected on the beginning of the day based on prevailing weather, sea conditions and on the extent any particular area had been previously surveyed within that month (the overall intention being to cover most areas, where possible, within any given month, Figure 4, Dwyer et al., 2015). Direction of travel was based upon sea state and wind direction; with vessel speed maintained at approximately 11 knots (knts) in accordance with published methods (Cañadas & Hammond 2008; Dwyer et al., 2015; Stockin et al., 2008a).

At the onset of each survey, start time on the water, observer ID, observer assignments, tides and environmental conditions (*e.g.*, visibility, swell height and BSS) were recorded. Once the initial data had been collected, the vessel was operated at survey speed and *on survey* mode commenced. Subsequently, the following variables were logged at 15 min intervals: BBS, swell height, observer field of view and glare (de Boer et al., 2008). Observational and environmental data were collected using either a HTC Touch Pro2 Windows Mobile device or Acer Iconia B1 tablet computer with associated Garmin GLO GPS device. CyberTracker (CyberTracker Conservation, Version 3.296+) software was programmed to record continuous GPS tracks (with GPS recordings every 30s).



**Figure 3:** Massey University research vessel *Te Epiwhania* (A) and Bay of Islands permitted vessels: *Explore NZ DV* (B), *Explore NZ DIV* (C), *Explore NZ DIII* (D), *Fullers Great Sights Dolphin Seeker* (E), *Fullers Great Sights Tangaroa* (F), *Fullers Great Sights Tutunui* (G) and *Carino Sailing and Dolphin Adventures* (H). (Photographs: A. Coleing, M. Quintin, C. Peters).

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**Figure 4:** Designated survey zones (modified from Constantine et al., 2003) utilised between December 2012 and April 2015, in Bay of Islands waters, NZ.

During *on survey* mode, dolphins were detected by naked eye and/or binoculars using a scanning methodology (Mann 1999). At the start of each observation period, a systematic scan began. Three experienced observers continuously scanned to the horizon (Lusseau 2006), with one observer scanning from 055 to 175°, a second searching from 175 to 315° and a final observer scanning from 055 to 315°. Observers started in opposite directions to ensure an approximate equal time interval between successive scans for any point within the field of view. To prevent fatigue, observers rotated their positions every hour or at each *on survey* point. Standard sighting cues including splashing, fins breaking surface waters, vessel behaviour and presence of birds were used to detect dolphin groups (Constantine 2002; Lusseau 2006).

Once a group was located, all observers were focused on data collection pertaining to the focal group encountered (Mann 1999; Stockin et al., 2008a; b). As such, no further search effort was undertaken for new groups during this time. In accordance with the Marine Mammal Protection Regulations (MMPR) 1992 (Part 3), the research vessel was operated so as not to disrupt the normal movement or behaviour of any marine mammal. When the research vessel was within 300 m of any marine mammal, it was manoeuvred at a constant idle or *no wake* speed in such a way that no animal was separated from the focal group. This involved approaching groups from the side or behind and moving in the same direction as the group as far as possible (Stockin et al., 2008b).

Once within 300 m of the group, environmental parameters including water depth ( $\pm 0.1$  m) and SST (sea surface temperature) ( $\pm 0.1^\circ\text{C}$ ) were recorded using an on board depth sounder and a hand-held digital thermometer, respectively (Stockin et al., 2009a). Biotic parameters pertaining to group size and composition, group behaviour and associated species were logged respective to time and GPS coordinates (as above). Species and ecotype were confirmed at the onset on data collection. External morphological separation of the 2 ecotypes was deemed an appropriate criterion for classification (Zaeschmar 2015; Visser et al. 2010). The oceanic form is comparatively more robust and typically exhibit wounds and scars, presumed to be inflicted by the cookie cutter shark (*Isistius* spp.) (Constantine 2002, Dwyer and Visser 2011). In contrast, the New Zealand coastal form does not usually exhibit cookie cutter shark scarring (Constantine 2002), is smaller in body size and paler in colour.

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A group was defined as any number of individuals observed in apparent association, moving in the same direction and often but not always, engaged in the same activity >5 body length apart (Constantine 2002; Constantine et al., 2004; Shane 1990). Groups were considered independent if they were encountered at a spatial or temporal scale that prevented the same individuals becoming resampled (Stockin et al., 2009a). For this study, subsequent groups were considered independent if separated by >5 km or sighted >30 min after the previous group. Where feasible, this was additionally confirmed via photo-identification. Photo-identification of individual bottlenose dolphins was conducted during encounters using a Nikon D90 camera fitted with a AF-S VR ZOOM-NIKKOR 70-300MM F4-5.6G IF- ED lens, following previously outlined methods (Dwyer et al, 2015; Tezanos-Pinto et al., 2009; 2013) and at times when the dolphin behaviour and the sea state were conducive to undertaking photo-identification. Images of the dorsal fin of each identified individual was compared across encounters in order to assess the minimum number of individuals using BoI waters, site fidelity and any possible individuals exhibiting continued attraction to vessels.

Group sizes were logged according to three categories; the absolute *minimum* number of dolphins counted, the absolute *maximum* number of individuals believed to be in the group and the *best estimate* for the most likely number of dolphins in the group (Dwyer et al., 2015). Group size estimates were recorded for mixed (any combination of adults accompanied by juvenile and/or calf and/or neonate) and adult only groups (Table 1).

When determining the predominant behavioural state of the focal group, all dolphins were scanned from left-to-right. This ensured inclusion of all individuals in the group and avoided potential biases caused by specific individuals or behaviours (Mann 1999).

**Table 1:** Age class definitions of bottlenose dolphins based on Constantine et al., (2003) for the Bay of Islands waters, New Zealand.

Age class	Definition
<i>Neonate</i>	Classified by the presence of white dorso-ventral foetal folds down their sides (Cockcroft & Ross 1990b, Kastelein et al., 1990). Typically displayed poor motor skills and were often uncoordinated upon surfacing to breathe (Mann & Smuts 1999). The neonate stage usually lasts up to 3 months of age.
<i>Calf</i>	Defined as dolphins that were approximately one-half or less the size of an adult and were closely associated with an adult, often swimming in 'infant position' (i.e., in contact under the mother) (Mann & Smuts 1999).
<i>Juvenile</i>	Approximately two-thirds the size of an adult and were frequently observed swimming in association with their mothers but were never observed swimming in 'infant position' (i.e., in contact under the mother; Mann & Smuts 1999), suggesting they had been weaned (Mann et al., 2000).
<i>Adult</i>	All dolphins (including assumed mothers) that were fully-grown, i.e., equal or greater than 3m in total body length.

Every three minutes, in addition to the predominant behaviour, the following variables were also recorded: group dispersal, group heading, and number of vessels. Group dispersal was defined as:

- State 1: dolphins 0 – 2 dolphin body lengths apart
- State 2: dolphins 3– 6 dolphin body lengths apart
- State 3: dolphins 7 – 10 dolphin body lengths apart
- State 4: dolphins >11 dolphin body lengths apart

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Predominant behaviour protocol assumes the behaviour observed at the surface is representative of the behaviour occurring under the surface (Baird & Dill 1996). States were defined so as to be mutually exclusive and cumulatively inclusive to describe the behavioural budget of the bottlenose dolphins. Behavioural states definitions are based on previous studies to maintain consistency (Table 2).

**Table 2:** Definitions of behavioural states of bottlenose dolphin groups in Bay of Islands waters, New Zealand, with abbreviations for each state given in parentheses (Constantine 2002; Constantine et al., 2004; Lusseau 2003; Neumann 2001a).

Behavioural state	Definition
<i>Foraging (F)</i>	Dolphins involved in any effort to pursue, capture and/or consume prey, as defined by observations of fish chasing (herding), co-ordinated deep and/or long diving and rapid circle swimming. Diving may also be performed, i.e. arching their backs at the surface to increase their speed of descent. Dolphins show repeated unsynchronised dives in different directions in a determined location. High number of non-coordinated re-entry leaps; rapid changes in direction and long dives are witnessed. Presence of prey observed.
<i>Milling (M)</i>	Dolphins exhibit non-directional movements; frequent changes in bearing prevent animals from making headway in any specific direction. Different individuals within a group can swim in different directions at a given time, but their frequent directional changes keep them together. Milling can be associated with feeding and socialising.
<i>Rest (R)</i>	Dolphins observed in a tight group (<1 body length apart), engaged in slow manoeuvres with little evidence of forward propulsion. Surfacing appear slow and are generally more predictable (often synchronous) than those observed in other behavioural states.
<i>Socialising (S)</i>	Dolphins observed in inter-individual interaction events among members of the group such as social rub, aggressiveness, chasing, mating and/or engaged in any other physical contact with other dolphins (excluding mother-calf pairs). Aerial behavioural events such as horizontal and vertical jumps are frequent.
<i>Travel (T)</i>	Dolphins engaged in persistent, directional movement making noticeable headway along a specific compass bearing at a speeds of >3 knts but not involving porpoising.
<i>Fast Travel (FT)</i>	Dolphins engaged in persistent, directional movement making noticeable headway along a specific compass bearing at speeds of >3 knts involving porpoising. Group spacing varies and individuals swim with short, relatively constant dive intervals.
<i>Slow Travel (ST)</i>	Dolphins engaged in persistent, directional movement making noticeable headway along a specific compass bearing at speeds of <3knts often-involving periods of other behaviours (foraging/socialising/milling).
<i>Diving (D)</i>	Dolphins engaged in persistent, non-directional movements; frequent periods sub-surface with short surfacing's. Different individuals within a group can dive in different directions at a given time, but their frequent directional changes keep them together.

In order to minimise the potential bias when not all group members behave in a uniform manner, the 50% rule was applied (Lusseau 2003). The behavioural state was determined as the category in which >50% of individuals were involved in, with all represented behaviours logged when an equal

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percentage of the group were engaged in different behaviours (Stockin et al., 2009). Dolphin group behavioural state was therefore recorded every three minutes as well as the response of the dolphin to vessels/swimmers. Responses were defined relative to the movement direction of the dolphins in relation to vessels/swimmers (see table 3 and section 4.6).

Behavioural events were defined as recognisable instantaneous behaviours (see appendix 1 for full definitions), and were additionally recorded using all occurrence sampling.

The effect of vessel traffic was categorised as follows in order to standardise assessment;

- *Research vessel present with all other vessel types absent (absence)*: absence of vessels anywhere within 300m other than research platform (verified by reticular binoculars).
- *Research vessel present with other vessel types present (presence)*: considered initiated whenever at least one vessel of any type is within 300m of a focal group additional to the research vessel. The distance of 300m (verified by reticular binoculars) was chosen because under the MMPR (1992), all vessels must slow to idle or no wake speed when there is an intention to view a marine mammal (Regulation 18(1)) and pilot assessment indicated vessels within 300m could be accurately assessed.

Vessel types were categorised in four independent groups: *permitted* (permitted swim or view dolphin vessels), *un-permitted* (commercially operated vessels not holding a permit to swim or view dolphin, i.e. all commercially operated kayaks, jet skis, yachts etc.) *research* (any vessel involved with research activity) and *private* (all vessels not included in the other categories, i.e. privately owned kayaks, jet skis, yachts etc.). All categories were further assessed by engine type (e.g. inboard, outboard, jet, paddle). Vessels present were also classified according to time of day, weekend or weekdays as well as month. Public holidays (e.g. Waitangi Day) were considered as weekend because traffic was deemed to be similar to that of weekends (as per Martinez 2010). Vessel speed when in encounter was estimated by assessing distance travelled in 20 seconds and categorised by 7 different speeds (0-5, 6-10, 11-15, 16-20, 21-25, 26-30, 30+).

After observational data were logged and photo-identification completed, the research vessel returned to the original track line, returning to *on survey* effort mode in order to search for further independent groups. Identical protocols were applied over consecutive months and years to allow for inter-seasonal and inter-annual comparisons.

**Table 3:** Definitions of behavioural responses to vessels and swimmers of *Tursiops* in Bay of Islands waters, New Zealand (Constantine 2002).

Behavioural response	Definitions
<i>Attraction</i>	At least one dolphin changed its direction of travel and actively moved towards a vessel or swimmer(s) reducing the distance between them to $\leq 4$ dolphin body lengths.
<i>Avoidance</i>	At least one dolphin changed direction/path and actively swam away from vessel or swimmer(s) more than 3 times in succession, increasing the distance between them. Also, dolphins dived and surfaced away from the swimmers.
<i>Neutral</i>	No apparent change in behaviour, despite an initial approach within 5 m of vessel or swimmer(s), continued swimming and did not appear to be attracted towards them in any way. Also when dolphins are present within more than 5 m of a vessel or swimmer(s) but not actively swimming away from them (i.e. swimming away no more than 3 times in succession).



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#### **4.5. Opportunistic vessel-based platforms methodology**

A second vessel-based platform was utilised for opportunistic data collection. Commercial vessels (here on board both wildlife cruises/dolphin-watching and swim-with dolphin permitted vessels) were appropriate platforms for the following reasons:

1. Such platforms allow documenting dolphin group behaviours during close vessel/swimmers interactions at a finer scale than from research-vessel platforms alone.
2. Such platforms are ideal to conduct photo-identification in order to identify individuals engaging in interactions with vessels and/or swimmers.

Observations were undertaken whenever possible (if space was available and weather conditions were favourable). Methodology used at start of survey was the same as the research vessel. Once a group was encountered, dolphin behaviour, group dispersion and responses to swimmers were recorded every three minutes (where possible), following the same protocol as research-vessel observations in order to assess the frequency and type of behavioural changes. All observations were made using the same CyberTracker system as the research vessel on Motorola Defy Mini handheld mobile phones.

Photo-identification was also undertaken to identify any known individuals repeatedly interacting with dolphin-watching and swim-with-dolphin vessels. Photo-identification methods followed those used on bottlenose dolphins in the BoI (Constantine 2002; Tezanos-Pinto et al., 2013) and other regions (Silva et al., 2009; Wilson et al., 1999). For each sighting, effort was made to photograph randomly all individuals present in a group. Photos were taken of the dorsal fin as primary identifiers and flanks and/or any other areas with identifiable marks as secondary identifiers. A digital SLR Nikon D100 with a 70-300mm lens was used.

#### **4.6. Swimming with dolphins**

A total of 7 commercial vessels in the BoI are permitted to view and swim with bottlenose dolphins (though only five vessels can swim under the authority of the permits at any one time). Skippers and companies used different swim techniques (e.g. free swimming/snorkelling and boom netting, Figure 5). In this study, a swim encounter consisted of one or several swim attempts. These attempts were judged to have commenced when the first swimmer entered the water and ended when the last swimmer got back on board the vessel. When more than one swim attempt took place, it was noted whether it occurred with the same swimmers. The end of a swim encounter was when all swim attempts ceased and the vessel had moved over 300m away from the focal dolphins. Swim attempts were monitored from both the research vessel and permitted vessel platforms, when possible, and included all vessels observed putting swimmers in the water, i.e. permitted, non-permitted and private vessels. The number of water entries (swim attempts) and length of time that swimmers spent in the water per swim attempt were the primary variables used for analysis of swim-with-dolphin tours.

Swimmer placement was documented and categorised for every swim attempt as:

- Line abreast: swimmers placed ahead or to the side of dolphins' path of travel,
- In path: swimmers placed directly in dolphins' path of travel,
- Around vessel: vessel stationary and dolphins perform non-directional behaviour, i.e., milling, around the vessel when swimmers enter the water.
- Other: none of the above definitions are applicable.

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**Figure 5:** Swim techniques used with bottlenose dolphin in the Bay of Islands waters, New Zealand: A) boom netting; and B) free swimming/snorkelling. Photo credit: C. Peters and T. Guerin.

Dolphin response to swimmers was adapted from Constantine (2002) and Martinez et al. (2011) as follows:

- Neutral presence: no apparent change in dolphin behaviour. At least one dolphin remained within 5 m of the swimmers for at least 10 seconds. Presence was recorded when at least one dolphin was within 5 m of the swimmers,
- Neutral absence: no apparent change in dolphin behaviour. Dolphins were >5 m away from the swimmers and did not approach within 5m of the swimmers,
- Avoidance: change in dolphin behaviour. Dolphins were within 5 m of vessel prior to swim start and departed when swimmers entered the water,
- Interaction: change in dolphin behaviour. Dolphins were >5 m away from the swimmers and at least one dolphin approached the swimmers at least once and for at least 10 seconds.

The different reasons for ending a swim encounter were as follows:

- Unsuccessful swim encounter, i.e. the skipper decided not to pursue the dolphin group,
- Loss of sight of dolphins, i.e. the dolphin group could not be viewed again from the surface after initial sighting,
- Skipper's decision, due to time restrictions, i.e. the maximum time allowed for encounter was reached, or because swimmers were no longer interested in swimming,
- Presence of juveniles/calves/neonates during the swim attempt,
- Environmental conditions deteriorating.

Data collected during a swim encounter can be summarised as:

- 1) Total number of swimmers,
- 2) Swimmer placement,
- 3) Number of swim attempts,
- 4) Entry and exit time for each swim attempt,
- 5) Number of other permitted vessels interacting with the same dolphin pod.

Eighteen swimmers were the maximum number permitted per vessel in the water at any time, with up to three separate swim drops permitted. The permitted vessels would occasionally take additional swimmers on board and use one of two strategies to provide the opportunity to swim. The first was as a swap of swimmers, wherein they would be allowed to enter the water once a primary swimmer became tired, or otherwise concluded their swim session. The second was when the trip was booked as a double load: that is, two or more separate groups of swimmers on the same trip. The first group would engage in a normal swim tour while the second group watched, and then the two groups

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would switch and the second load of swimmers would enter the water. The number of swimmers per encounter was used to classify each tour as follows:

- Light –  $\leq 9$  swimmers
- Normal – 10-18 swimmers
- Swap – 19-22 swimmers
- Double-load –  $\geq 22$  swimmers

#### **4.7. Data analysis**

A multi-scale approach was applied to all analyses, building on this foundation and replicating key methodologies from previously published work (particularly that of Constantine et al., 2003; 2004; Tezanos-Pinto et al., 2013). The latest tools, techniques, and analytical approaches were applied to further investigate bottlenose dolphin interactions with vessel activity in the BoI.

Statistical analyses were conducted using R i386 (Version 3.2.0, R Development Core Team, 2013) with the significance threshold set at 0.05 unless stated otherwise. Data were initially tested for normality and heterogeneity of variance and subsequently analysed using the Shapiro-wilk and Bartlett tests, respectively. All data was also tested for significant variation between platform used and annual variation, if significant variation was not detected data were combined for subsequent analysis. If significant variation was indicated results were analysed independently and/or only one vessel data was utilised where appropriate. Results of first tests determined whether parametric or non-parametric statistics applied, as appropriate. In order to avoid pseudo-replication, only mutually exclusive data (not overlapping temporally) were used in analysis, determined via random selection on a day-by-day basis. Only data collected from one platform of opportunity were included per day however multiple encounters within the day were included.

#### **4.7.1. Season-specific and inter-seasonal use of BoI waters by bottlenose dolphin**

##### **4.7.1.1. User type and site fidelity**

Digital photo-identification photographs were renamed with information on region (BoI), species, photographer, camera, year (last two digits), month, date, frame number, vessel, survey number and encounter number (i.e. BoI\_TT\_CHP\_D90\_130419\_0169\_RB\_62\_90). Analysis of identification data began with grading all photos according to a quality scale (as per Tezanos-Pinto et al., 2013), with only excellent and good quality photographs included in the analyses. All photos of the same individual were grouped in each encounter and matched to a temporary BoI catalogue. Individual dolphins were primarily identified and matched based on long term markings, nicks and notches on the dorsal fin, with secondary features such as scarring (including rake marks due to the short length of study relative to mark loss rate) and additionally fin shape (Dwyer et al., 2015; Würsig & Jefferson 1990). Dolphins were considered marked if there was at least one primary and two secondary features. Before adding a new individual or resighting of a previously identified individual in the catalogue all images were independently checked by three researchers (Cat Peters, Manue Martinez and Thibaud Guerin) (Tezanos-Pinto 2009). When there were doubts about the identity of the individual, a fourth experienced researcher was consulted. Further final consultation on the catalogue and matching to previous catalogues will be performed before full population analysis. After a confirmed match (or new individual identification number was assigned), the data were entered into a database. A 'sighting' refers to an individual identification photograph obtained during an encounter with a unique individual (ID) and the associated data collected during each encounter (Dwyer et al., 2014).

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Site fidelity in the BoI was investigated using lunar month (a month measured between successive new moons) to give biological relevance through tidal association. Seasonal sighting rates were additionally included as a function of number of encounters, as per Constantine (2002) and Tezanos-Pinto (2009), and defined by Parra et al. (2006). Between December 2012 and April 2015, a total of 31 consecutive lunar months occurred. However, one month (beginning 20<sup>th</sup> April 2015) was deleted from the database. This month was removed as it was not a complete. A total of 30 'effective' lunar months were included in analysis. Individual site fidelity was calculated by expressing the number of lunar months and times within a lunar month a dolphin was identified as a proportion of the total number of months in which at least one survey was conducted; and the number of seasons a dolphin was identified as a proportion of the total seasons surveyed (Cagnazzi et al., 2011; Dwyer 2009; Dwyer et al., 2014; Parra et al., 2006). To minimise the chance of dependence in the data, only one sighting record per individual per day was used (Cagnazzi et al., 2011; Dwyer 2009; Dwyer et al., 2014; Parra et al., 2006b).

User type was based on sighting frequency and grouped into three categories: frequent users, occasional visitors and infrequent users of the BoI following Constantine (2002) and Tezanos-Pinto (2009). This was achieved by fitting a Poisson distribution to test the null hypothesis that individuals were sighted randomly with regards to frequency. This distribution was selected given that it expresses the probability of a number of events occurring in a period of time (e.g., lunar months) with a known average rate (e.g., frequency of sightings). The point at which the frequency of observed sightings exceeds the expected frequency of the Poisson distribution was considered to indicate 'frequent users'. To assess relative changes by season a weighted ratio of the total number of sighting records per unique individual was calculated for each category.

#### **4.7.1.2. Calf survival and identification**

All analysis was designed to allow comparison with Tezanos-Pinto (2009).

An approximate indication of *date of birth* was based on the first sighting of a female accompanied by a neonate. As female dolphins were only observed giving birth on one occasion exact birth time and date could not be utilised. A neonate could have been born 1-3months prior to the date of first sighting (see table 1 for neonate definition, Tezanos-Pinto 2009). As per Tezanos-Pinto 2009, other methods for estimating calf age were deemed inappropriate.

If a mother-calf pair were resighted after 12 months from the date of the first pair sighting a young of the year (neonate or calf <1 year old) was assumed to have survived its first year of life. Only data from dolphins known to be neonates or very young calves on a given year were used to avoid potential errors caused by uncertainties regarding a calf's year of birth or age. Given that the minimum weaning age in the bottlenose dolphin has been estimated at 18-20 months (Smolker et al., 1992; Wells and Scott 1999) an older calf (1-3 years old) was assumed to have survived its second year of life if the pair were resighted 24 months after the first pair sighting. A calf was assumed to have died if the mother was resighted in two consecutive encounters without the calf (Steiner and Bossley 2008) and the calf was <18 month of age. The interval between the first sighting of the mother-calf pair to the last sighting of the pair was used to estimate the minimum approximate age a calf survived (Tezanos-Pinto 2009).

As calves usually lack markings, individual identity was inferred from the close association with the identified mother. A mother-calf pair that was observed in frequent association for 3 years after parturition was assumed to be the same calf, as long as estimated age correlates, due to calves

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staying in frequent association with mothers for up to three years (Smolker et al., 1992). Conversely, if the mother was sighted with an old calf (1-3 years old) and subsequently with a neonate, those were considered different calves. If the mother was not sighted during the next year but was resighted on the third year with an older calf, the calf sighted during the first year was assumed to be the same calf and therefore to have survived. When a mother-calf pair was not resighted in the BoI in consecutive years, the data were excluded for estimation of calving rate or mortality (Tezanos-Pinto 2009). Calf mortality was calculated as the proportion of young of the year (<1 year old) that were assumed to have died, divided by the total number of young of the year assigned to individually identified mothers and with a documented fate during that year (Tezanos-Pinto 2009). Second year calf mortality was calculated as the proportion of calves that were assumed to have died before reaching 24 months of life, divided the total proportion of calves assigned to individually identified mothers with a documented fate during their second year of life.

#### **4.7.1.3. Group size and composition**

For analytical purpose, group composition was analysed according to the presence or absence of immature individuals (i.e. adult only *versus* adults and juveniles *versus* mixed groups). On a broad scale, group size was classified as  $\leq 20$  or  $> 20$  animals. Fine scale analysis classified dolphin group size into nine categories (1-5, 6-10, 11-15, 16-20, 21-25, 26-30, 31-35, 36-40 and  $> 40$ ). Mean group sizes were calculated to assess whether the following factors had an effect on dolphin group size: month (and season), time of day and behaviour.

#### **4.7.1.4. Distribution**

Interaction data collected from both research and opportunistic platforms were examined at various spatial (e.g. proximity to vessel, regional distribution) and temporal (e.g. diurnal, seasonal and annual) scales. If significant variation was found within each test group data were tested separately.

Survey effort and dolphin group encounters were plotted using a Geographic Information System (GIS), created using ArcGIS version 10.3 (©ESRI Inc.). GPS location of each independent dolphin group encountered was plotted taking into consideration the following variables: size, composition and the distance observed from shore. All effort and sighting data was gridded as effort per km covered / km<sup>2</sup> and sightings per km<sup>2</sup> respectively using the planar method to allow trends in sightings to be analysed in the context of unevenly distributed effort. Kernel density of sightings was calculated using the Kernel density tool present in ArcToolbox of ArcGIS as per previous studies (Hartel et al., 2014). Distance from nearest shore was calculated using the Calculate Geometry Tool in ArcMap. Austral seasons used were summer (December, January, February), autumn (March, April, May), winter (June, July, August) and spring (September, October, November). Diurnal categories were created to account for varying length of daylight across the year. To that effect, a time of day index was calculated. The difference between the time of the sample and sunrise was divided by the length of daylight (time of sunset – time of sunrise). This index represented a percentile of daylight hours where sunrise equals 0, midday=0.5 and sunset=1.0. This index was used to classify each sample as morning (<0.33), midday (0.33-0.66), or afternoon (>0.66) (Lundquist 2011).

#### **4.7.1.5. Behaviour**

The behavioural state in which  $\geq 50\%$  of the animals were involved was examined, therefore excluding any group where two behavioural states were recorded simultaneously. Group size

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patterns in behaviour were investigated by comparing group behaviour and group size at the onset of encounter. Behavioural distribution was calculated quantifying proportion of all observations of a behavioural state within each 1km x 1km grid cell surveyed. Kruskal-Wallis analysis defined where trends seen in the data were significant.

#### 4.7.2. Type, level and operational effort of bottlenose dolphin tourism

##### 4.7.2.1. Variable analysis

AIC model analysis was utilised to determine variables of importance in the behavioural budget of dolphins for further analysis. The behavioural counts underwent a full analysis with models tested for appropriateness based on season, time of day, and vessel presence on behavioural transitions. Results showed the most appropriate analysis for data collected and indicated whether dolphin behaviour changes are due to natural (time of day, season) and/or anthropogenic (vessel presence) factors. Markov chains were included in this model analysis (Lundquist 2012; Lusseau 2003b; Martinez 2010; Stockin et al., 2008a). Results of model analysis revealed important parameters for further investigation.

##### 4.7.2.2. Development of transition probability matrices

Assumptions described in Lusseau (2003), including 1) the probability that a transition will occur remains the same over time and 2) annual variation had no effect on the outcome were met here. Two 1<sup>st</sup>-order behavioural chains were constructed, one for the absence of vessels except for the research vessel and one for the presence of vessel(s) within 300 m (research vessel plus at least one more vessel, following the methodology used by Lundquist et al., 2012).

Whilst no assumption is made that the research vessel had no effect on dolphin behaviour, the vessel was consistently driven in accordance with best practice in order to allow it to act as a reliable control. The research vessel was always operated by the same skipper to aid consistency. When no vessel was present with the dolphins other than the research platform between two behavioural samples, the transition between these two samples in the *absence* chain were tallied. Following the same principle, a transition was considered to be part of the *presence* chain if at least one vessel (in addition to the research vessel) was found interacting with the dolphins. As a result, the transition between two succeeding events when the situation changed (i.e. presence to absence, and absence to presence) was discarded once the sequence was selected ( $\geq 15$  min as determined appropriate by Meissner et al., 2015).

In order to assess whether the presence of vessels had an effect on the behavioural transitions, transition probabilities from preceding to succeeding behavioural state were determined for both absence and presence chains by:

$$P_{ij} = \frac{a_{ij}}{\sum_{j=1}^5 a_{ij}}; \sum_{j=1}^5 P_{ij} = 1 \quad (1)$$

where  $i$  and  $j$  refer respectively to the preceding and succeeding behavioural state with  $i$  and  $j$  ranging from 1 to 5 (five behavioural states),  $a_{ij}$  is the number of transition recorded from the behaviour  $i$  to  $j$  and  $p_{ij}$  corresponds to the transition probability between behaviour  $i$  and  $j$  in the chain. Therefore, each calculated transition corresponds to the proportion of time the specific succession was observed in the chain. Pairs (each absence transition to its presence counterpart) were tested for the effects of vessel presence on the behavioural transitions by the mean of a Z-test for proportions (Fleiss, 2003).

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A Z-test for proportions was used to assess whether two groups differ significantly on a single categorical characteristic. The assumptions for using a Z-test are: 1) Samples must be independent; and 2) Sample sizes must be large enough to run the test. Alpha was set to 0.05 corresponding to the critical values of  $Z=\pm 1.96$ . Therefore, if the Z-value found is greater or lower than  $\pm 1.96$ , the null hypothesis (proportion 1=proportion 2) is refuted, and the two proportions are different.

$$Z = \frac{(\hat{P}_1 - \hat{P}_2)}{\sqrt{\hat{P}(1-\hat{P})\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}} \quad (2)$$

With

$$\hat{P}_1 = \frac{x_1}{n_1}; \hat{P}_2 = \frac{x_2}{n_2} \quad (3)$$

And

$$\hat{P} = \frac{x_1 + x_2}{n_1 + n_2} \quad (4)$$

With  $x_1$  and  $x_2$  representing the proportions for the group 1 and 2,  $n_1$  and  $n_2$  standing for the total number of the group 1 and 2 respectively.

Using a Z-test to calculate probabilities between different chains allowed for proportions, combined with a Holm-Bonferroni sequential correction, to account for multiple comparisons (Holm 1979). This made it possible to test whether interactions with vessels had a significant effect on the behaviour of dolphins.

The mean time (i.e. number of transitions) it took to the dolphins to return to each behavioural state after disturbance for both chains was also assessed:

$$E(T_j) = \frac{1}{\pi_j} \quad (5)$$

with  $T_j$  the number of time (i.e. number of transitions) it takes the dolphins to return to a behaviour  $j$  given that they are currently in this state and  $\pi_j$  the probability to be in the behavioural state  $j$  in the chain. The number of transitions obtained was multiplied by the length of the transition unit (three minutes, since each sample was collected every three minutes) in order to convert the results in minutes and estimate the mean time it took the dolphins to return to a specific state. Each mean absence time was compared to its presence counterpart to assess a potential effect of vessel presence. In addition, the mean length of behavioural bouts for each chain was calculated. Bout length represents the mean length of time dolphin groups spend in a particular behavioural state before changing to a different state (Lundquist et al., 2012). This was calculated following Lusseau (2003):

$$\bar{t}_{ii} = \frac{1}{1 - p_{ii}} \quad (6)$$

With  $p_{ii}$  the probability of transitioning from state  $i$  to state  $i$ . Standard errors for bout lengths were calculated as:

$$SE = \sqrt{\frac{p_{ii} * (1 - p_{ii})}{n_i}} \quad (7)$$

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With  $n_i$  representing the number of times the behavioural state  $i$  was counted as the preceding behaviour. Each mean bout length was compared between the two chains with a Z-test. Bottlenose dolphin cumulative diurnal behavioural budget (control + impact behavioural budget) variation from control chain was tested with a goodness-of-fit test (Lusseau 2003).

#### **4.7.3. Determine the potential effects of interacting with bottlenose dolphins**

*Focal group* data collected from the research vessel were used to compare the behavioural parameters of dolphin groups relative to the number of vessels present, vessel approach and departure, time of day, and season. Parameters examined included activity states and their transition probabilities. *Focal tour* data collected from permitted vessels were used in conjunction with data collected from the research vessel (if not significant difference between vessel types was found) to assess dolphin responses to specific tour activities (e.g. reversing, deployment of swimmers). Behavioural states of dolphins interacting with another vessel prior to approach were excluded from the analysis.

##### **4.7.3.1. Behaviour and vessels**

Each consecutive 3-min behavioural observation was classified according to the season, daylight index and number and type of vessels present.

To evaluate how bottlenose dolphin behaviour varied relative to the number (i.e., 0 to  $\geq 4$ ) and type (i.e., commercial permitted, commercial un-permitted and private vessels) of vessels present within 300 m, it was necessary to account for natural variation by time of year and time of day (i.e. day light index). All vessels within 300m were included in analysis of vessel presence, but only included as interacting if positioned to view.

Log-linear analysis was conducted using  $R$ 's AIC function utilizing LogLik package. The presence of vessels likelihood to alter dolphins moving from one behavioural state to another, called transition, was tested. This was accomplished by using count data from transition matrices. Models were tested in  $R$  for all combinations of parameters and interactions between parameters. The goodness of fit for each model was compared to the goodness-of-fit for the fully saturated model in order to calculate the maximum likelihood for the model being tested. This takes into account the effect of the missing parameters (Lusseau 2003). Degrees of freedom were the difference in degrees of freedom between the two models. Evaluating the significance of this difference determined which parameters were significant and degrees of freedom were the difference between the two models degrees of freedom (Lusseau 2003; Lundquist et al., 2012).

Akaike Information Criteria (AIC) values (Akaike 1974) were calculated to choose the best-fitting model. AIC assists in selecting the most parsimonious model. Each model is strengthened for providing information and reduced for each using extra parameter to do so (Anderson et al., 2000; Caswell 2001). Due to sample size limitations, it was not possible to include different numbers and types of vessels in the log-linear analysis. Annual effects were not tested for in AIC as no significant annual variation in behaviour was found in previous analyses. Therefore, a simple presence/absence analysis was performed to determine whether vessels had a significant effect on behavioural transitions of bottlenose dolphins. Following this, separate analyses were conducted on behavioural budget and bout lengths for different numbers and types of vessels.



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#### **4.7.3.2. Quantify and document the type, level and operational effort of existing bottlenose dolphin tourism activity within BoI waters**

To evaluate levels of vessel traffic in BoI waters and quantify operational effort, each count of a vessel interacting with dolphins during a focal follow was considered an independent sampling unit. Vessel traffic analysis sought to examine the presence (min), number and type of vessels (permitted, Un-Permitted and Private) interacting with dolphins. Further to this, the overall number of vessels that interacted with a single group and interacted simultaneously with a group were assessed and compared using Kruskal-Wallis analysis and further defined by location. The number of approaches made by each vessel category was defined by vessel type and the type of approach examined.

The cumulative time that a focal group spent in the presence of vessels was defined as the total time the group spent with or without vessels per day. The continuous time that a focal group spent in the absence of vessels was defined as the mean length of time (minutes) dolphins were without vessels uninterrupted (no vessels additional to the research vessel) per day. When a vessel interacted with a focal group more than once, successive encounters were cumulated and interaction time was summed. The duration of encounters was examined with regards to vessel type and the maximum time of 90 mins (50 mins allowed with adults and/or 30 mins with calves/juveniles) allowed in the permits.

The speed and direction of each vessel approach and departure was collected for every vessel within 300m, analysis was categorised by vessel type for comparison. Approach methods were categorised as: non-invasive (no approach; parallel), invasive (J; in-path/head-on) and unspecified (direct; reverse; drift). To ensure independence across all encounters, if a vessel encountered a focal dolphin group and attempted to interact more than once with that same group, the second attempt was excluded from the speed analysis (Martinez 2010).

#### **4.7.3.3. Swimmers**

Swim data were examined according to the platform of observation used, due to differences observed in regulation compliance. For analytical purpose, group composition was analysed according to the presence or absence of immature individuals (i.e. adult only *versus* adults and juveniles *versus* mixed groups). Fine scale analysis classified dolphin group size into nine categories (1-5, 6-10, 11-15, 16-20, 21-25, 26-30, 31-35, 36-40 and >40). Mean group sizes were calculated to assess whether the following factors had an effect on dolphin group size: month (and season), time of day and behaviour. This aligned with group size and composition for all encounters.

Distance of all swim attempts from nearest shore was calculated using the Calculate Geometry Tool in ArcMap (ArcGIS version 10.3 (©ESRI Inc.)). Behaviour of bottlenose dolphins in the presence of swimmers was analysed for all swim attempts; these were analysed in three categories (approach, neutral and avoid).

Each swim tour was classified based on season, number of permitted tour boats present, and number of swimmers (light:  $\leq 9$ , normal: 10-18, swap: 19-22 or double-load:  $\geq 22$ ). Number of tour boats present ranged from one (only the boat from which the observation was made was present) to four (all four permitted dolphin-swim boats were present, only 4 of 6 were permitted for swimming on any one day). The presence of other vessels (those which were not permitted) was not included in this analysis.

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Four response variables were calculated with data obtained from opportunistic platforms: number of swim attempts, mean length of swim drops, swimmer placement at start of each swim drop, and length of swim period (from time of entry on first swim drop to time of exit on last swim drop). Histograms were examined and response variables were transformed as necessary to achieve a normal, homogeneous distribution. Analysis of variance (ANOVA) was performed for each of the three response variables to determine if there were significant differences by season, number of tour boats, or tour type. The Tukey HSD statistic was used in post-hoc comparisons to evaluate significant differences between the various classifications. Of particular interest was the variation in the orientation of a bottlenose dolphin focal group with respect to swimmers and/or vessel in relation to time into an encounter, recorded at three-minute intervals from the start of an encounter.

To allow intra-species comparisons, previously utilised methods were used (Bejder et al., 1999; Martinez 2010). In order to account for the effect of a continued interaction with the dolphins, data during swim encounters were scored cumulatively. For example, if swimmers entered the water at 21 minutes that swimmer scored in the >21-24min as opposed to the >18-21 minutes' interval. Such scoring was deemed necessary since swimmers did not always enter the water immediately after a group had been detected. Additionally, the presence of vessels cannot be dissociated from a swim encounter because swimmers are launched from a vessel-platform.

Following Bejder et al. (1999), the observed proportions of responses in each time interval were analysed with logistic regression (LR). LR provides a tool for modelling such changes in proportions in the binomial form (Harraway 1995). Here, LR models predicted the probability of a dolphin group heading towards or away from the vessel and/or swimmers, based on the observed proportion of orientations classified as towards or away in each time interval. LR models were then fitted to the observed proportion of responses in each time interval to evaluate the effect of time into encounter on group orientation (Harraway 1995). These were in the form:

$$\pi = \frac{\exp(\beta_0 + \beta_1 T + \beta_p T^p)}{1 + \exp(\beta_0 + \beta_1 T + \beta_p T^p)}$$

where  $\pi$  was the probability of movement towards or away from a vessel and/or swimmer. LR models involved either a constant only ( $\beta_0$ , Model 1) or a constant with higher powers of T (time into an encounter) up to a cubic (P=3: Models 2 to 4). These models were as follows:

Model 1: Constant  $\beta_0$

Model 2: Constant  $\beta$  plus linear term in T.

Model 3: Constant  $\beta$  plus linear and quadratic terms in T.

Model 4: Constant  $\beta$  plus linear, quadratic, and cubic terms in T.

Models were further tested for goodness-of-fit using the deviance statistic for each model and the deviance differences (both of which followed a chi-squared distribution). A significant deviance difference indicated that the predictive value of the model was significantly improved by the addition of the new factor. Analysis of residuals between observed and the corresponding predicted proportions (probabilities) confirmed whether a model was a good predictor of the probability of a dolphin group heading towards or away from swimmers and/or vessel(s) as a function of time into an encounter.

Here, modelling of dolphin responses was based on the assumption that if dolphin movements relative to vessels and/or swimmers were random, the expected proportion of each response (towards, away, or neutral) would be expected to be 0.33. If the 95% confidence intervals for the

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predicted probabilities are above and exclude the expected value, dolphin groups exhibit significant response to a vessel.

## 5. Results

### 5.1. Overall effort

Data collection between December 2012 and April 2015 comprised 1,472 vessel-based surveys (Table 4), with the majority (85.9%, n=1,265) being conducted from the different opportunistic platforms, while the remaining (14.1%, n=207) were from the independent research vessel (Table 4).

A total of 81,892 km of track were surveyed whilst on effort (4,027 hrs), including 8,550 km (476 hrs) and 73,342 km (3,596 hrs) from the research vessel (Figure 6, 7) and the other opportunistic platforms (Figure 8, 9), respectively. Surveys undertaken on the tourism vessels were not exhaustive but representative of the trips tour operators may have undertaken during that period.

**Table 4:** Seasonal summary of surveys by platform, between December 2012 and April 2015, in Bay of Islands waters, New Zealand. NOTE: one survey per day was conducted on Te Epiwhania and a combination of a maximum of two per day on all various permitted vessels due to a return to Paihia and possible change of crew.

	<i>Te Epiwhania</i>	<i>DIII</i>	<i>DIV</i>	<i>DV</i>	<i>Tutunui</i>	<i>Tangaroa</i>	<i>Dolphin Seeker</i>	<i>Carino</i>	Total	Seasonal effort (km)	Seasonal effort (hrs)
Spring	36	66	62	0	59	4	76	61	364	18,089	1,008
Summer	81	144	0	0	105	0	0	79	409	22,545	1,085
Autumn	53	102	34	22	87	2	55	56	411	21,832	1,143
Winter	37	0	88	0	0	46	117	0	288	19,426	791
Total	207	312	184	22	251	52	248	196	1,472	81,892	4,027

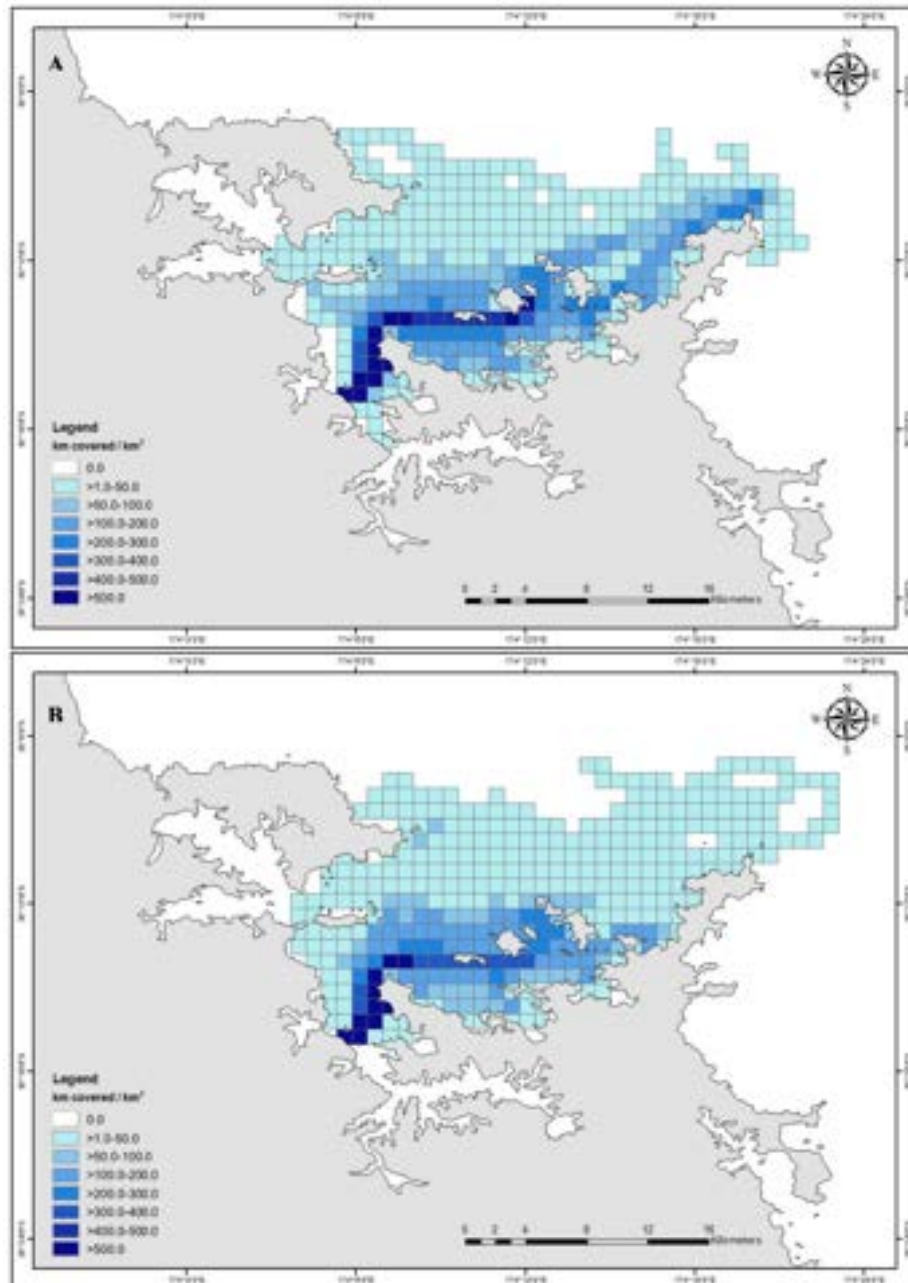
#### 5.1.1. Research vessel effort

Between December 2012 and April 2015, bottlenose dolphin groups were followed for a total of 812 hrs (4,597 km), of which 248 hrs (30.6%) were spent in the absence of other vessels. Total survey effort for the research boat is detailed in Figure 8 & 9.

#### 5.1.2. Permitted vessel effort

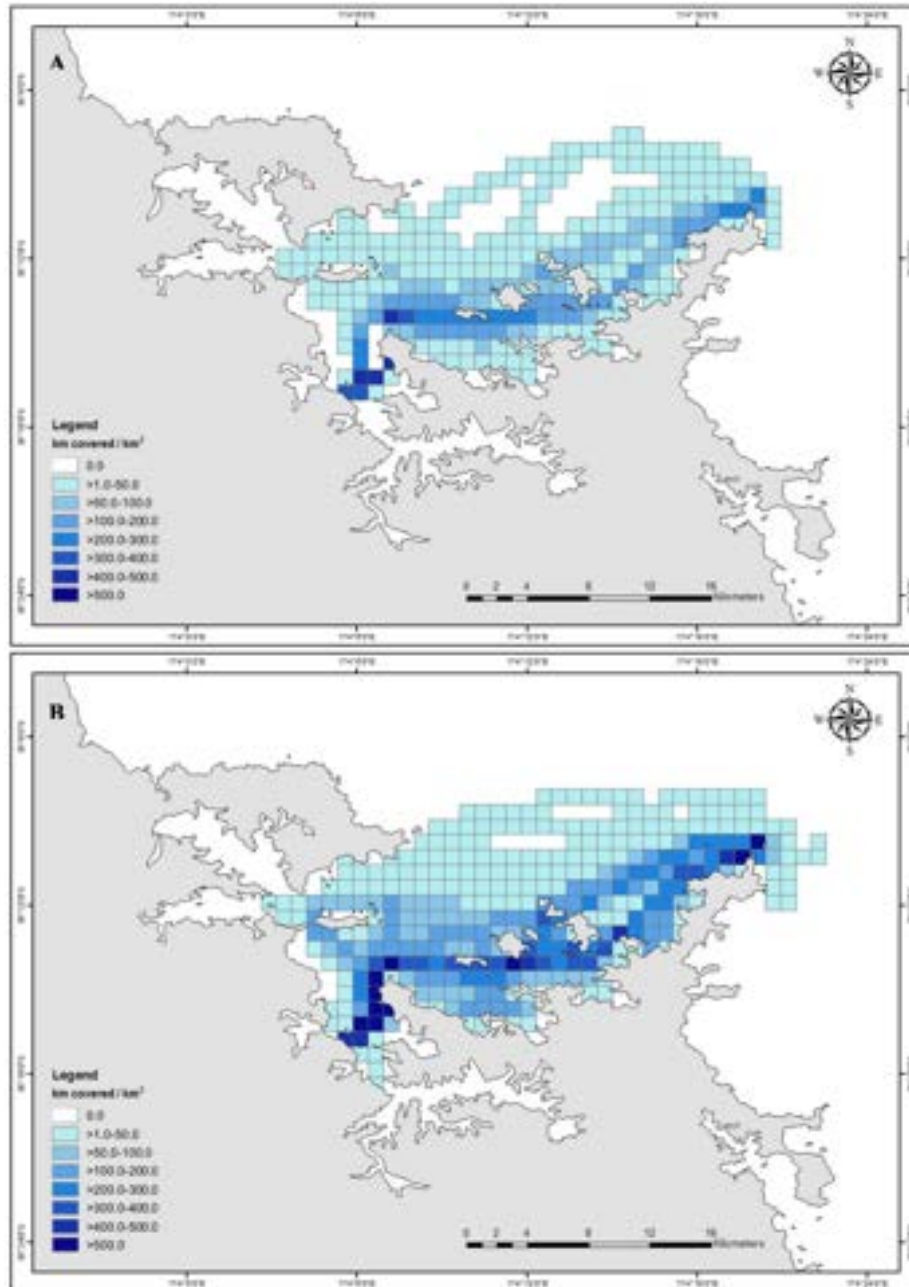
During the same time period, dolphin groups were followed from the various opportunistic platforms for a total of 604 hours (3,562km). Total survey effort for permitted vessels is detailed in Figure 6 & 7. Surveys on board opportunistic vessels favoured zones D, E, G and H (Figure 6 & 7). Permitted vessels spent a mean of 103 min in the presence of marine mammals per trip (range=0-127, n=2,290) with a mean trip length of 248 min (range=129-271, n=2,290).

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**Figure 6:** Permitted vessel effort per km (mutually exclusive) between December 2012 and April 2015, in Bay of Islands waters, New Zealand with A) Spring and B) Summer gridded measures of effort, coloured according to the proportion of kilometres (km) travelled within each grid cell (1km x 1km).

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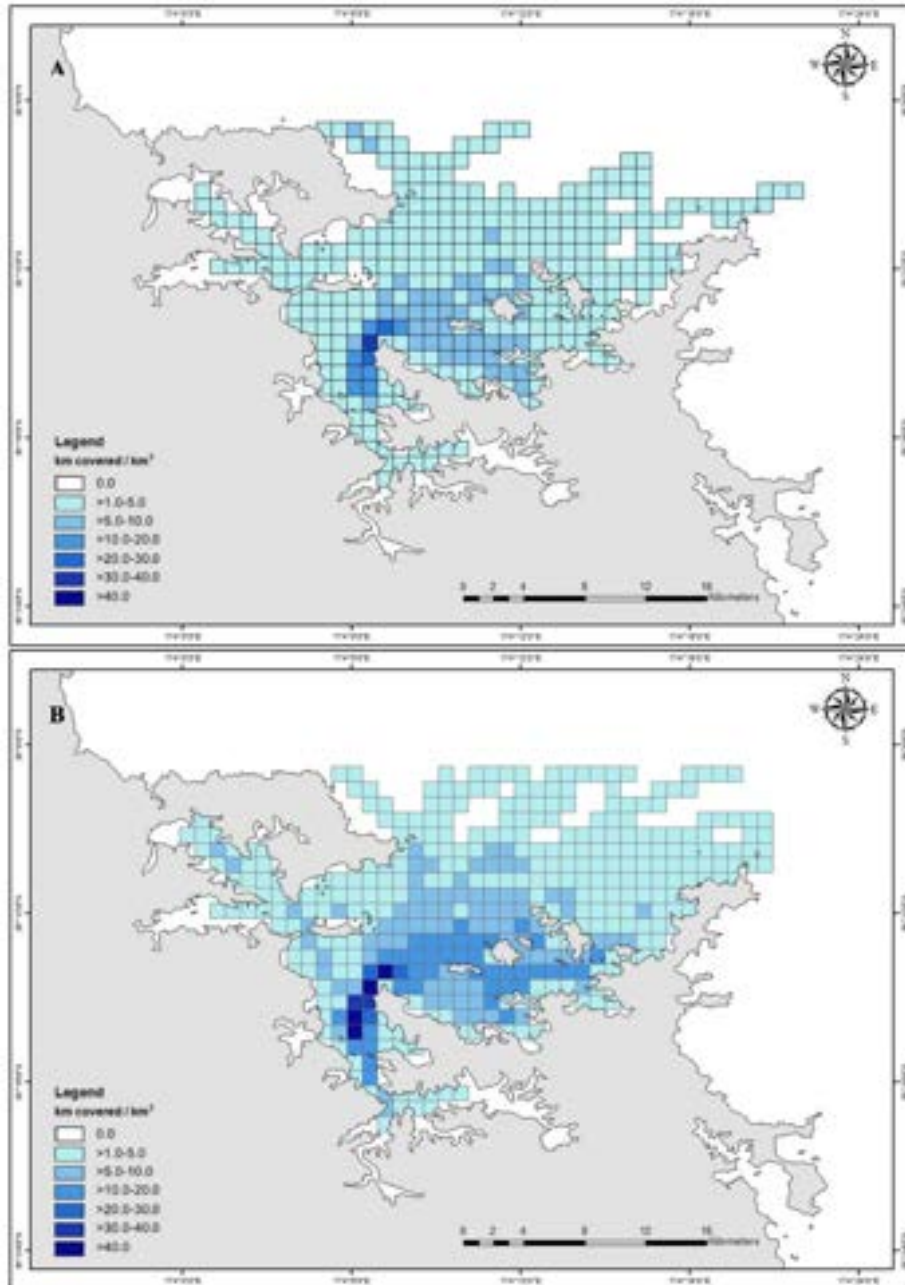


**Figure 7:** Permitted vessel effort per km (mutually exclusive) between December 2012 and April 2015, in Bay of Islands waters, New Zealand with A) Autumn and B) Winter gridded measures of effort, coloured according to the proportion of kilometres (km) travelled within each grid cell (1km x 1km)

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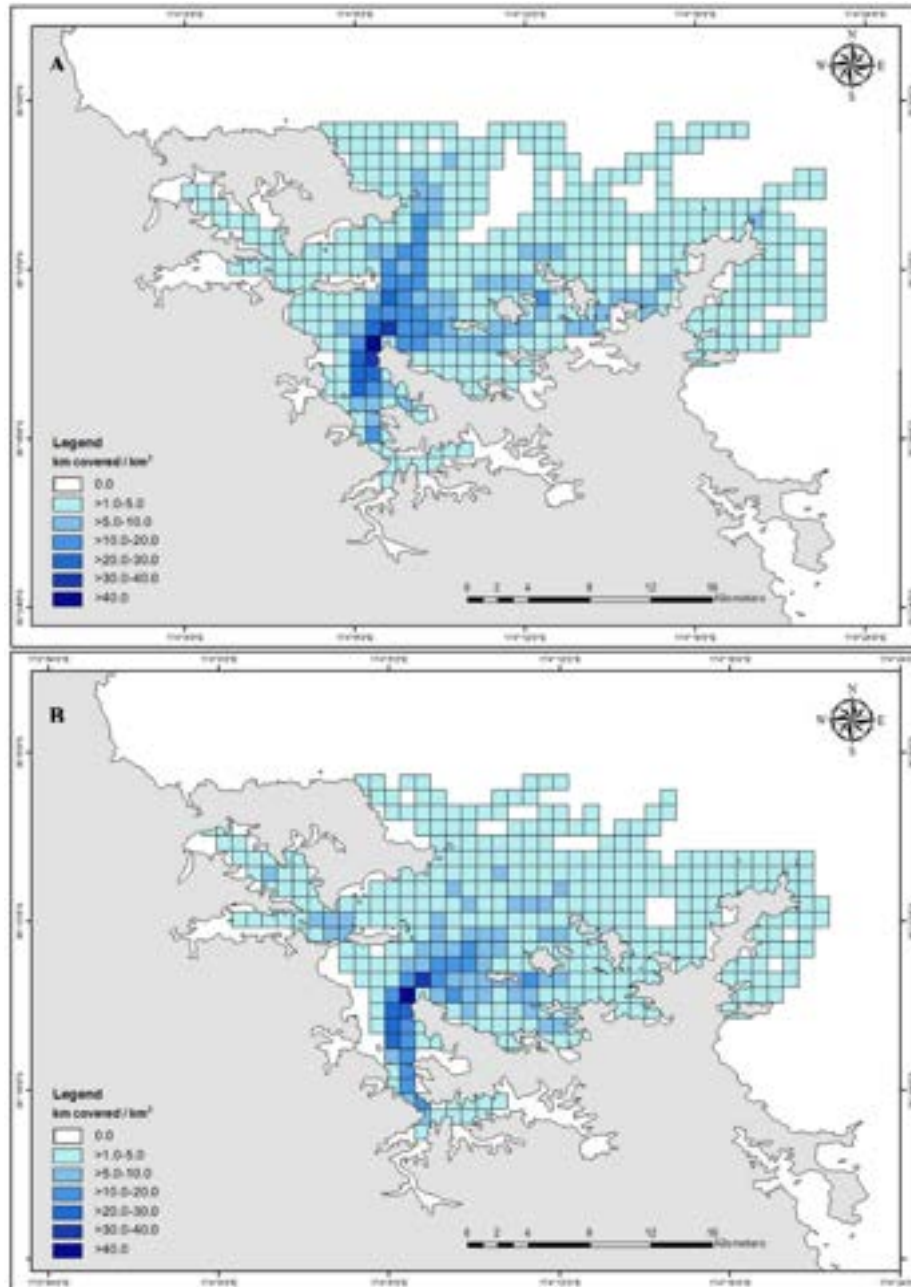
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**Figure 8:** Research vessel effort per km between December 2012 and April 2015, in Bay of Islands waters, New Zealand with A) Spring and B) Summer gridded measures of effort, coloured according to the proportion of kilometres (km) travelled within each grid cell (1km x 1km).

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**Figure 9:** Research vessel effort per km between December 2012 and April 2015, in Bay of Islands waters, New Zealand with A) Autumn and B) Winter gridded measures of effort, coloured according to the proportion of kilometres (km) travelled within each grid cell (1km x 1km).

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### 5.2. Overall sightings from combined platforms types

Out of a total of 2,290 marine mammal encounters, bottlenose dolphins were the most recorded marine mammal species within the study area (88.2%, n=2,019, Table 5), with almost all sightings being of the coastal ecotype (99.8%, n=2,015) and the remaining 0.2% (n=4) being oceanic *Tursiops*.

Other marine mammals observed occasionally in the BoI included common dolphins (*Delphinus sp.*) (6.4%, n=146), killer whales (*Orcinus orca*) (2.7%, n=62), and Bryde's whales (*Balaenoptera edeni*) (1.6%, n=37). Five other cetacean species were sighted less than 1% of the time: humpback whale (*Megaptera novaeangliae*) (0.5%, n=12), false killer whale (*Pseudorca crassidens*) (0.1%, n=3), pilot whales (*Globicephala* spp) (0.1%, n=2), blue whales (*Balaenoptera musculus*) (0.2%, n=5) and fin whales (0.2%, n=4) (Table 5). New Zealand fur seals (*Arctocephalus forsteri*) were additionally observed on 389 occasions.

**Table 5:** Seasonal summary of marine mammal encounters, between December 2012 and April 2015, in Bay of Islands waters, New Zealand. NOTE: False killer whales have only been observed in association with bottlenose dolphins and on one occasion with both pilot whales and bottlenose dolphins. Those encounters are referred to collectively as *TtPc*, *TtPcGm* and *TtGm* respectively.

	bottlenose dolphins	common dolphins	killer whales	Bryde's whales	humpback whales	blue whales	fin whales	false killer whales	pilot whales	Total
Spring	510	56	19	25	6	1	4	0	0	621
Summer	626	27	16	2	0	1	0	0	0	672
Autumn	620	6	24	1	2	1	0	2TtPc	1TtPcGm 1TtGm	663
Winter	259	57	3	9	4	2	0	0	0	334
Total	2,015 (+4)	146	62	37	12	5	4	2	2	2,290

### 5.3. Bottlenose dolphin sightings from combined platform types

Of the 2,019 independent bottlenose dolphin encounters recorded, 88.9% (n=1,795) were made from the other platforms and 11.1% (n=224) were made from the research vessel (Table 6-7).

A mean of 2.82 bottlenose dolphin groups encountered per day were observed across the study period (range 0-5, SE=0.03, n=2,015, 692 days). Bottlenose dolphin distribution occurred throughout the study area, though initial spatial mapping infers higher density use areas in BoI zones D and E (Figures 11-14).

Permit conditions dictate that vessels must maintain a minimum distance of 60m from the shore when interacting with marine mammals. Sightings were recorded with an overall mean distance of 997.9m (range=3.8m-6913.7, SE=56.24, n=2,019). Throughout the study period, 2.1% (n=42) of observations occurred within 60m of the shore, with dolphins located between the vessel and shore. In total, 78.6% (n=33) of such encounters involved permitted vessels.



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Seasonal variation was noted; the greatest distance from shore was observed in summer and autumn (Mean=1,098.9), and closest to shore in winter and spring (Mean=865.2).

**Table 6:** Seasonal summary of bottlenose dolphin encounters, between December 2012 and April 2015, in Bay of Islands waters, New Zealand. Numbers are inclusive of all *Tursiops* sightings; the number of confirmed pelagic ecotype sightings within this total is shown in parentheses.

	Te Epiwhania	DIII	DIV	DV	Tutunui	Tangaroa	Dolphin Seeker	Carino	Total
Spring	30 (1)	103	78	0	100	3	95	101	510 (1)
Summer	104	243	0	0	163	0	0	116	626
Autumn	66 (1)	174	51	30 (1)	140 (1)	7	59	99	624 (3)
Winter	24	0	85	0	0	32	118	0	259
Total	224 (2)	520	214	30 (1)	403 (1)	42	272	314	2,019 (4)

**Table 7:** Seasonal summary of bottlenose dolphin encounters as a function of effort (km and hours), between December 2012 and April 2015, in Bay of Islands waters, New Zealand. Numbers are inclusive of all *Tursiops* sightings.

	Te Epiwhania (sightings/km)	Te Epiwhania (sightings/hrs)	Permitted vessels (sightings/km)	Permitted vessels (sightings/hrs)	Combined vessels (sightings/km)	Combined vessels (sightings/hrs)
Spring	0.02	0.03	0.03	0.10	0.03	0.08
Summer	0.03	0.10	0.03	0.22	0.03	0.00
Autumn	0.02	0.06	0.02	0.15	0.02	0.04
Winter	0.02	0.03	0.01	0.00	0.01	0.11
All seasons	0.03	0.06	0.02	0.13	0.02	0.05

#### 5.4. Bottlenose dolphin sightings from research vessel only

All sightings were recorded within a SST range of 14.2-22.8°C (mean=17.9, Table 8). Sightings were made within a depth range of 2.3-140m (mean=41.1, Table 9). However, most sightings for bottlenose dolphins occurred closer inshore at depths below 20m (88.4%, n=198).

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**Table 8:** Mean sea surface temperature (SST) of bottlenose dolphin encounters, between December 2012 and April 2015, in Bay of Islands waters, New Zealand. (SE=Standard Error)

Species	Mean SST(°c)	SE	Range	N
Both ecotypes	18.9	0.2	14.2-22.8	224
coastal ecotype	18.9	0.2	14.2-22.8	222
pelagic ecotype	21.1	0.1	21.1-21.1	2

**Table 9:** Mean water depth (m) of bottlenose dolphin encounters, between December 2012 and April 2015, in Bay of Islands waters, New Zealand. (SE=Standard Error)

Species	Mean depth (m)	SE	Range	N
both ecotypes	21.7	0.9	2.3-140	224
coastal ecotype	20.9	0.7	2.3-56.3	222
pelagic ecotype	70.8	9.1	34-140	2

### 5.5. Spatial distribution

Between December 2012 and April 2015, broad-scale distribution patterns of dolphins remained constant across seasons and years relative to seasonal movements (Figure 10-13), as did the finer scale habitat-use patterns. Dolphins were observed by all platform types in high densities areas (50% contour) near Tapeka Point and Roberton Island (Figure 14).

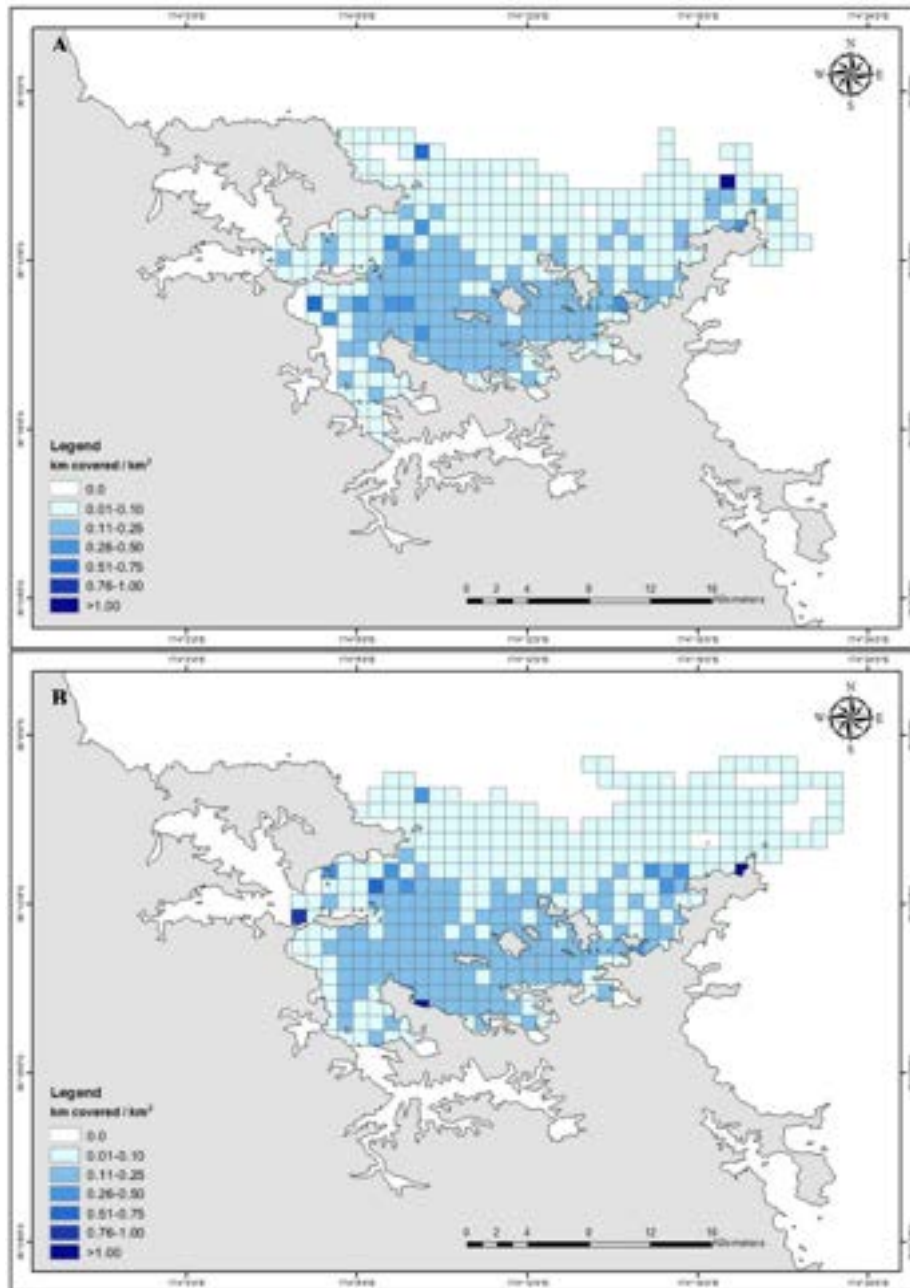
In only 7% of sightings recorded from the research vessel were dolphins observed in previously designated permitted exclusion zones (n=16, 13% effort, 0.01 sightings/km, figure 10-11).

The largest number of sightings occurred in summer and autumn with 0.03 sightings/km effort (31.0%, n=626 and 30.9%, n=624 of all sightings respectively) and least in spring and winter with 0.02 sightings/km effort (25.3%, n=510) and 0.01 sightings/km effort (12.8%, n=259) respectively (10-13).

Seasonal preference Kernel densities of dolphins was consistent across vessel types and therefore combined. Dolphins showed a strong fine-scale seasonal preference for the Inner Islands (Zone E) in Winter (58.4%, n=151) and Spring (59.6%, n=304) (Mantel  $r=0.167$ ,  $P=0.001$ ). In Summer and Autumn, sightings were more distributed utilising the Inner Islands (48.6%, n=304 and 44.2%, n=276, respectively) and Middle Grounds (42.8%, n=268 and 35.2%, n=220 respectively) (Mantel  $r=0.092$ ,  $P=0.001$ ).

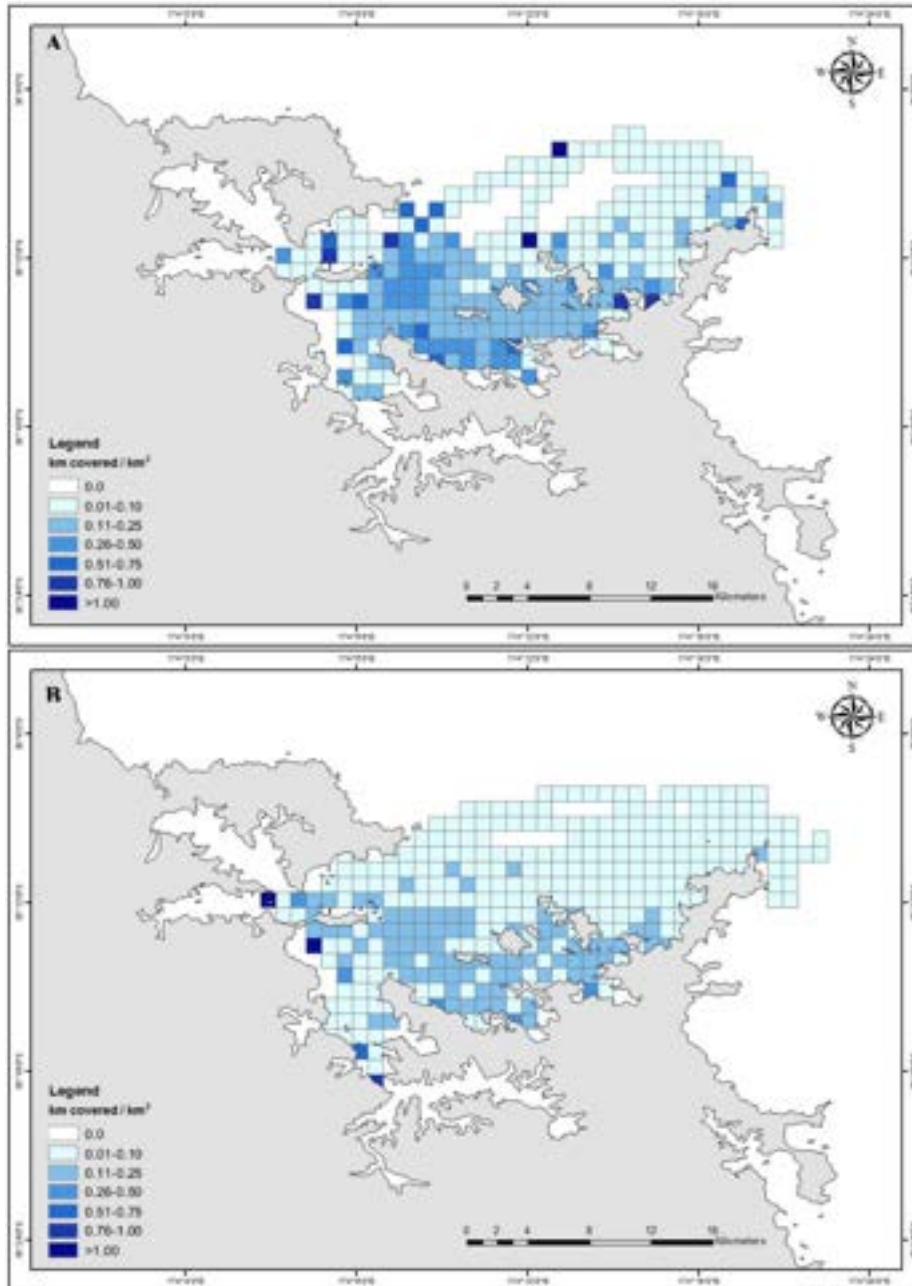
Tapeka Point and Roberton Island were high density areas year round across all years (figure 10-14) (Mantel  $r=0.112$ ,  $P=0.001$ ).

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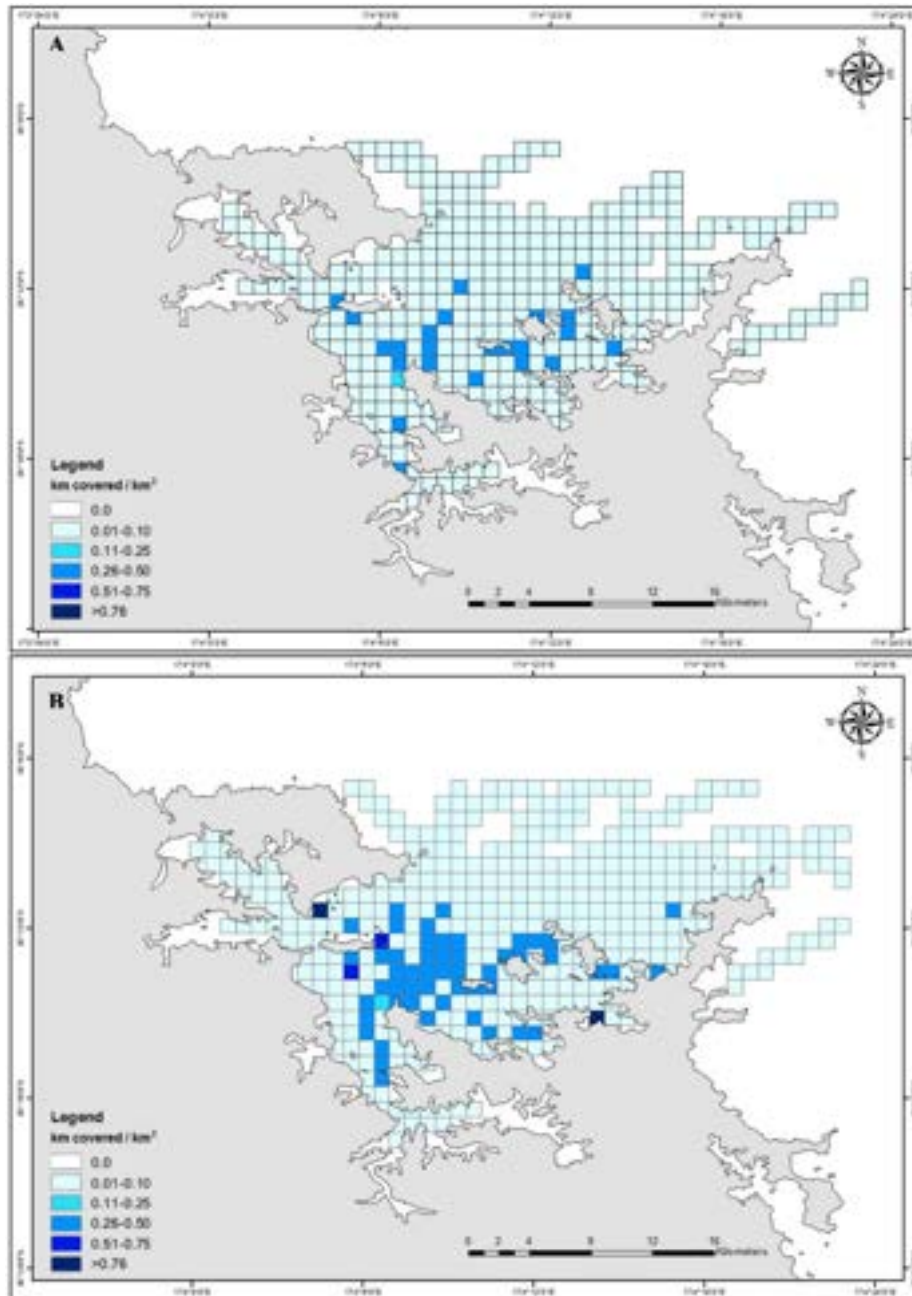
**Figure 10:** Permitted vessel sightings per km (mutually exclusive with only one vessel per day) effort between December 2012 and April 2015, in Bay of Islands waters, New Zealand with A) Spring and B) Summer gridded measures of effort (1km x 1km).

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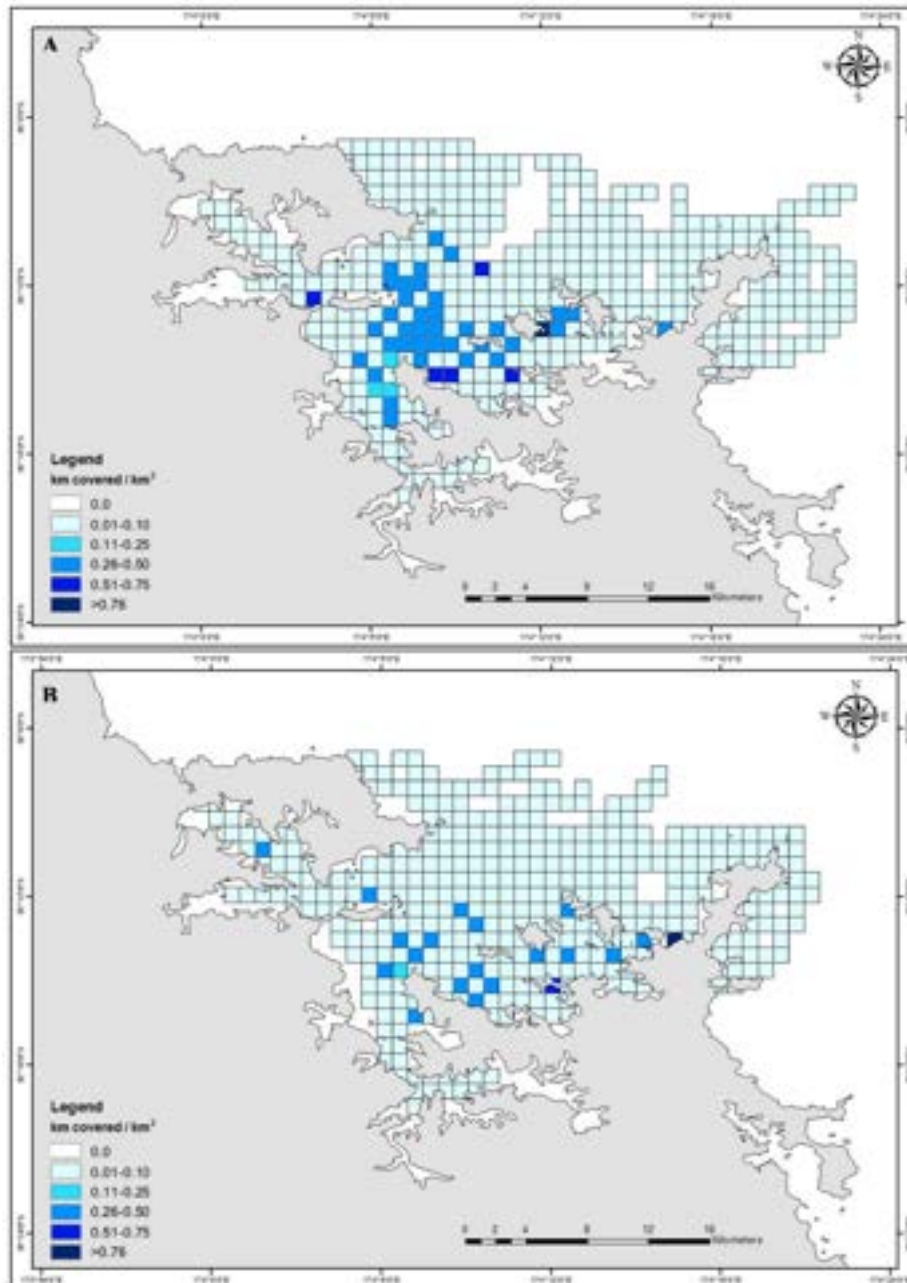
**Figure 11:** Permitted vessel sightings per km (mutually exclusive with only one vessel per day) effort between December 2012 and April 2015, in Bay of Islands waters, New Zealand with A) Autumn, and B) Winter gridded measures of effort (1km x 1km).

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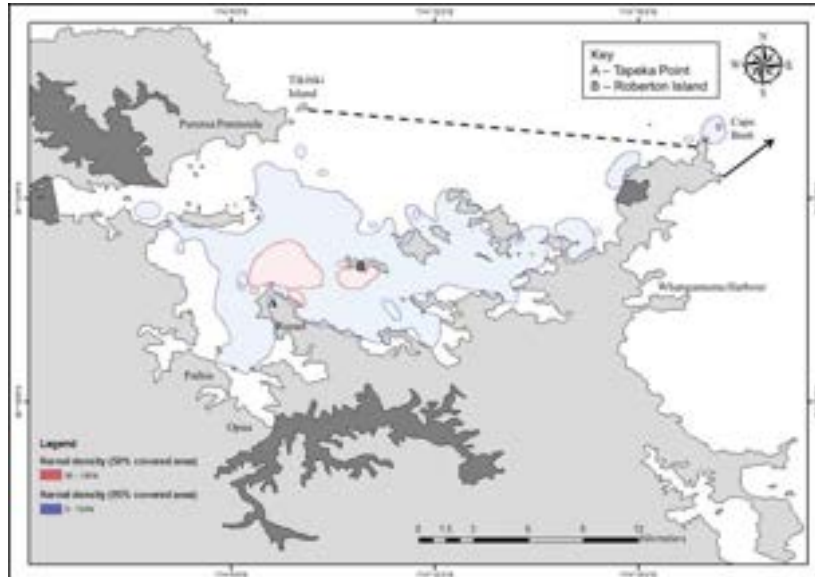
**Figure 12:** Research vessel sightings per km effort between December 2012 and April 2015, in Bay of Islands waters, New Zealand with A) Spring and B) Summer gridded measures of effort (1km x 1km).

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**Figure 13:** Research vessel sightings per km effort between December 2012 and April 2015, in Bay of Islands waters, New Zealand NZ with A) Autumn, and B) Winter gridded measures of effort (1km x 1km).

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**Figure 14:** Bottlenose dolphin range between December 2012 and April 2015, in Bay of Islands waters, New Zealand with 95% and 50% volume contours realised by generating effort corrected kernel densities of the dataset. Black dotted line represents harbour boundaries and permitted vessel exclusion zones are indicated as dark grey for the Bay of Islands.

### 5.6. Group size

Groups ranged in size from singletons to 48 individuals (mean=14.8 ± 3.6 SE, n=2,015). No significant annual, observation vessel or group size variation in distribution was observed. The frequency distribution of group size was skewed towards smaller groups, yet more than 68.0% (n=1,370) of groups were larger than 10 individuals, explaining the discrepancy between the mean and the mode group size. Mean group size between 2012 and 2015 was smaller than that reported from previous studies (Table 10).

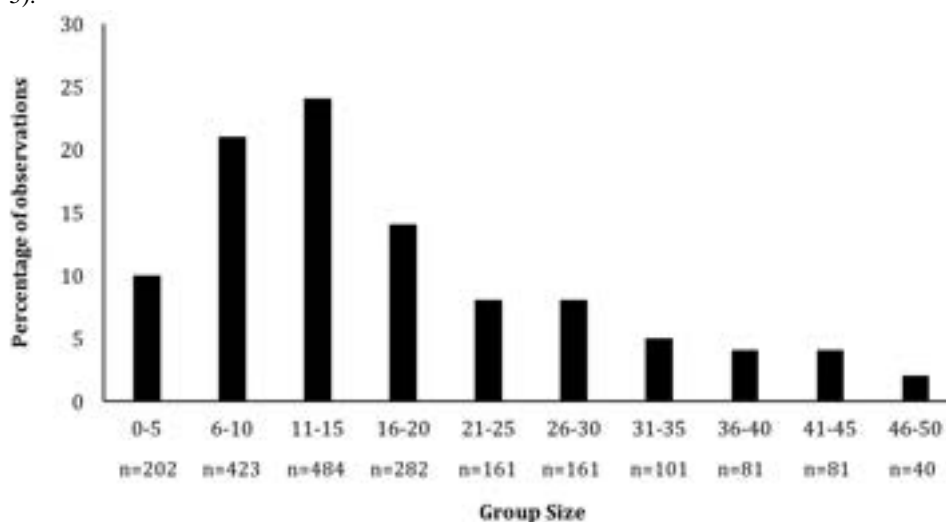
**Table 10:** Mean best group size and range of bottlenose dolphins across New Zealand (SE=Standard error, S.D.=Standard deviation).

Location	Range	Group Size	SE	Reference
BoI	3-40	15.3	8.3	1996-1997 (Constantine & Baker 1997)
BoI	2-50	17.1	1.24	1999 (Constantine 2002)
BoI	2-50	16.7	12.62	1997-99 (Tezanos-Pinto 2009)
BoI	2-45	19.1	10.7	2003-2005 (Tezanos-Pinto 2009)
BoI	2-50	17.9	11.72	1997-05 (Tezanos-Pinto 2009)
BoI	1-48	14.8	3.6	This study
Hauraki Gulf	1-82	35	23.36 S.D	Dwyer et al., 2014
Marlborough Sounds	3-172	12	38 S.D	Merriman et al., 2009
Doubtful Sound	1-65	17.2	N/A	Lusseau et al., 2003

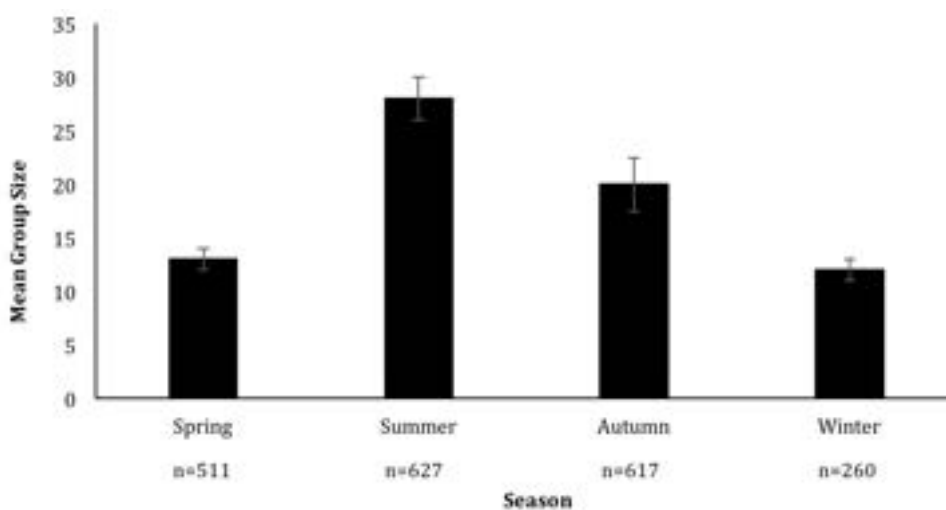


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Small groups (<20, 69%, n=1,390) were more commonly observed than larger groups (>20, 31%, n=625). When examining smaller group size categories, 11-15 individuals (24%, n=484) and 6-10 individuals (21%, n=423) were the most prevalent (Figure 15). Each category above 20 individuals represented 10% or less of the observations (e.g. 21-25: 8%, 26-30: 8%, 31-35: 5% and 36-40: 4%, (Figure 16)). Forty-eight instances of solitary dolphins were also recorded (overall 2%, 3% of group 1-5).



**Figure 15:** Mean group size of bottlenose dolphins categorised by percentage of observations between December 2012 and April 2015 within Bay of Islands waters, New Zealand.

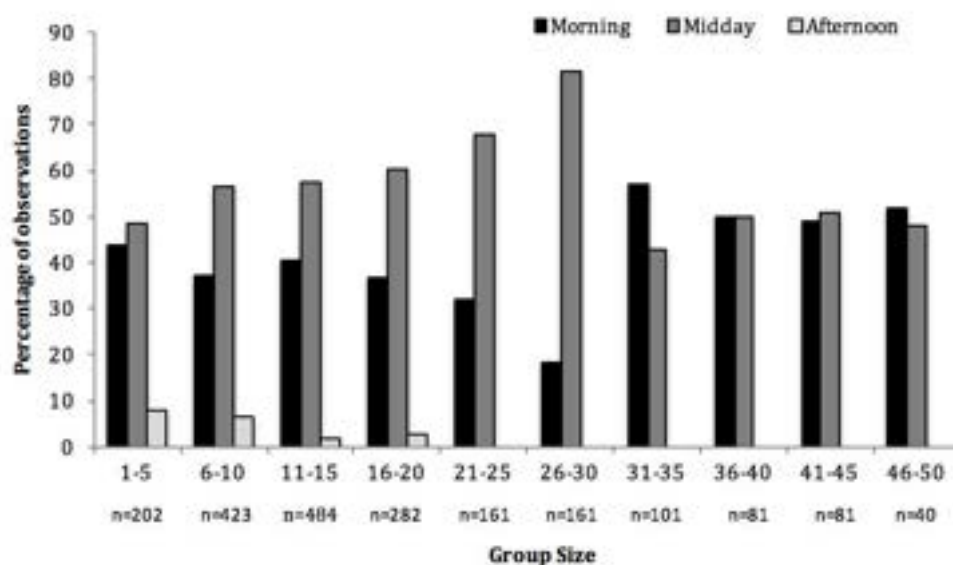


**Figure 16:** Mean group size of bottlenose dolphins categorised by season between December 2012 and April 2015 within Bay of Islands waters, New Zealand. Bars represent the standard error of the mean.

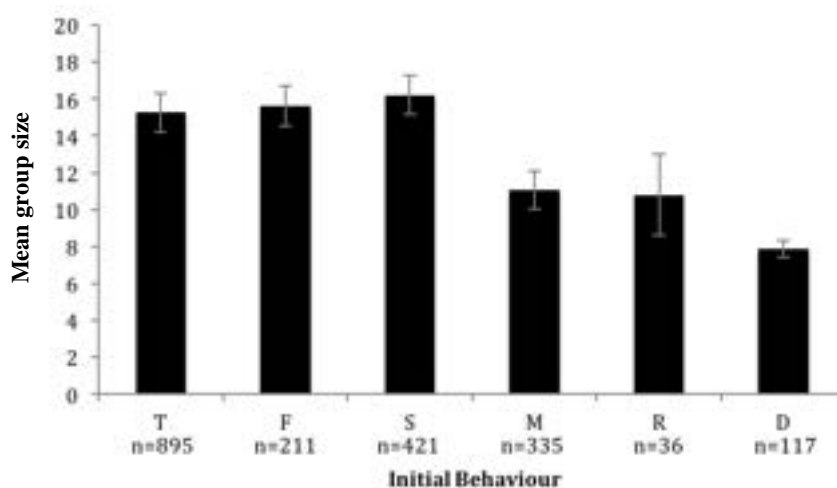


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Groups were larger in summer and autumn than spring and winter (Kruskal-Wallis:  $h=37.14$ ,  $df=3$ ,  $p=0.005$ , Figure 16) and larger at midday (Kruskal-Wallis:  $h=41.11$ ,  $df=2$ ,  $p<0.001$ , Figure 17). Finally, groups generally were larger when socialising, foraging and travelling, (Figure 18) and the smallest when diving (Kruskal-Wallis:  $h=31.82$ ,  $df=5$ ,  $p=0.031$ ).



**Figure 17:** Group size of bottlenose dolphins during different time periods between December 2012 and April 2015 within Bay of Islands waters, New Zealand. Bars represent the standard error of the mean.



**Figure 18:** Mean group size of bottlenose dolphins engaging in different behavioural activities on first sighting by observation vessels between December 2012 and April 2015 within Bay of Islands waters, New Zealand. Bars represent the standard error of the mean.

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### 5.7. Site fidelity

Bottlenose dolphin were encountered in every survey season (Table 11, Figure 19) and month between December 2012 and April 2015 by all platform types.

The discovery curve (Figure 20) indicated a steep ascent during early surveys before reaching a plateau in February 2014, with only two new individuals identified for the remainder of the study.

Out of a total of 134 identifiable individuals, a large proportion (71.6%, n=96) were sighted on more than three occasions. The remaining thirty-eight dolphins (28.4% of total) were recorded on less than three occasions, and were therefore excluded from analysis. Almost all resighted individuals (97.9%, n=94) were observed over at least two different years and 54.2% (n=52) across all years.

**Table 11:** Summary of the number of surveys conducted and individual bottlenose dolphins identified per season between December 2012 and April 2015, within Bay of Islands waters, New Zealand.

	Spring	Summer	Autumn	Winter
<b>Number of surveys</b>	364	409	411	288
<b>Km on survey effort</b>	18,089	22,545	21,832	19,426
<b>Number of hours on encounter effort</b>	370	545	461	157
<b>Number of encounters</b>	511	627	617	260
<b>Number of individually identifiable dolphins</b>	85	83	77	87

#### 5.7.1. User type

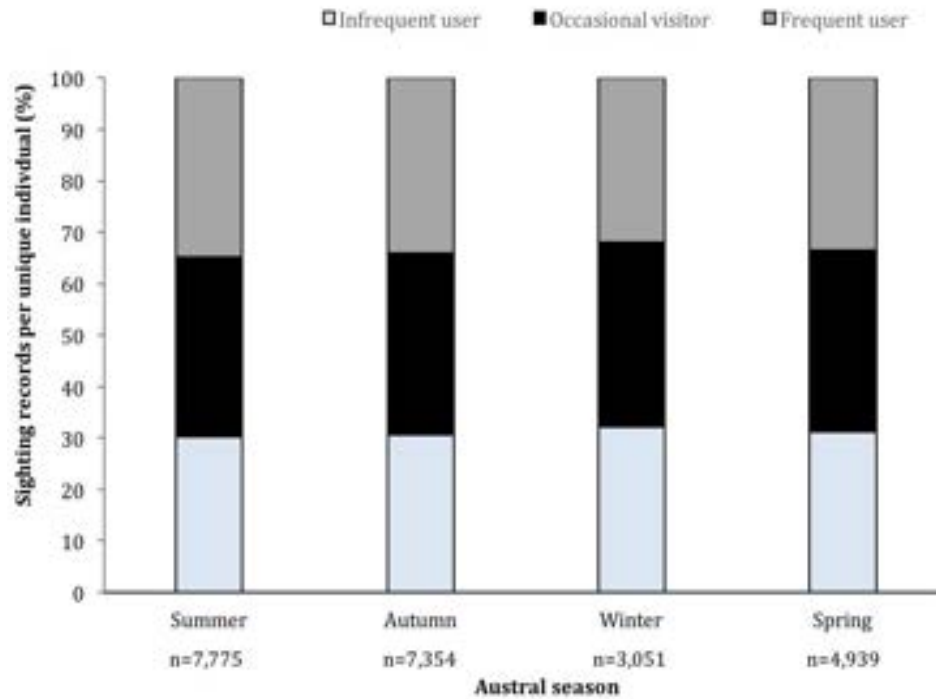
Between December 2012 and April 2015, the 96 individuals categorised as distinctive and sighted on more than three occasions were added to a temporary BoI catalogue. The highest number of individually identified dolphins per encounter for December 2012-April 2015 was 41 dolphins (range=1-41; mean=14; SE=8.89).

The resighting rate of those 96 individuals varied considerably during the study period. To examine patterns of use, sightings were categorised into lunar months and seasons to avoid bias due to pseudo-replication (refer to methods section 4.7.0) (Figure 19-22).

Resight rate ranged from 0 - 12 sightings per lunar month (median=3.50, interquartile range=1-3.8). A Poisson distribution was calculated to test the null hypothesis that individuals were sighted randomly (Zar 1996) (Figure 21), which was rejected ( $\chi^2=38.37$ , df=6,  $p<0.001$ ). The point at which the frequency of observed sightings exceeded expectation (i.e.,  $\geq 8$  sightings/lunar month) was considered to indicate frequent users of the BoI. Infrequent and occasional visitors were arbitrarily defined as the individuals with  $\leq 1$  and 2-7 sightings/lunar month, respectively.

Infrequent visitors formed the majority group (60.4%, n=58), while occasional visitors represented another 19.8% (n=19). The remaining 19.8% (n=19) of dolphins may be considered core frequent users, where the BoI represent an integral part of their home range. Finally, an unexpectedly large number of individuals were observed only once per lunar month (n=58,  $\chi^2=25.27$ , df=1,  $p<0.001$ ).

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**Figure 19:** Seasonal effort (km) weighted ratio (expressed as a percentage) of the total number of sighting records per unique identified individual bottlenose dolphin between December 2012 and April 2015 within Bay of Islands waters, New Zealand. The proportion of different user types (infrequent, occasional, and frequent) are also indicated.

All 19 core users were observed in all four seasons. Further to this, 68.4% (n=13) of these core users were sighted in every lunar month while the remaining 31.6% (n=6) in half or more of all lunar months. Occasional visitors were observed on an average of 4.8 months/year (range=2-7, n=19) and infrequent users on an average of 1 months/year (range=0-1, n=58).

At least one frequent user was present in 86.7% of encounters (n=1,747 encounters) and the maximum interaction occurred with two identified individuals whom were each present in 55.3% of encounters (n=1,114 encounters).

No significant difference in seasonality was detected ( $\chi^2=13.81$ ,  $df=3$ ,  $p=2.610$ ) between user types, when a weighted ratio of the total number of sighting records per individual was analysed (Figures 19 & 22).

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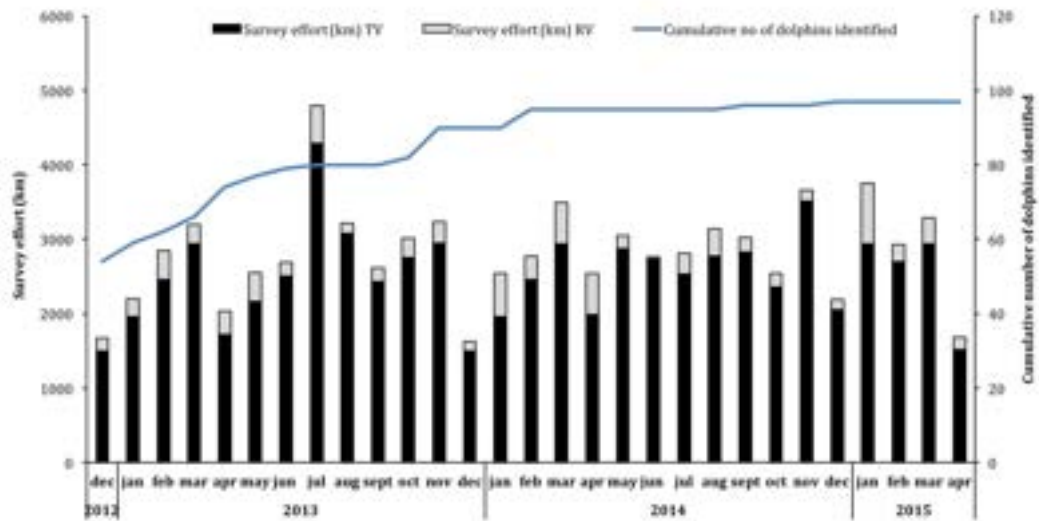
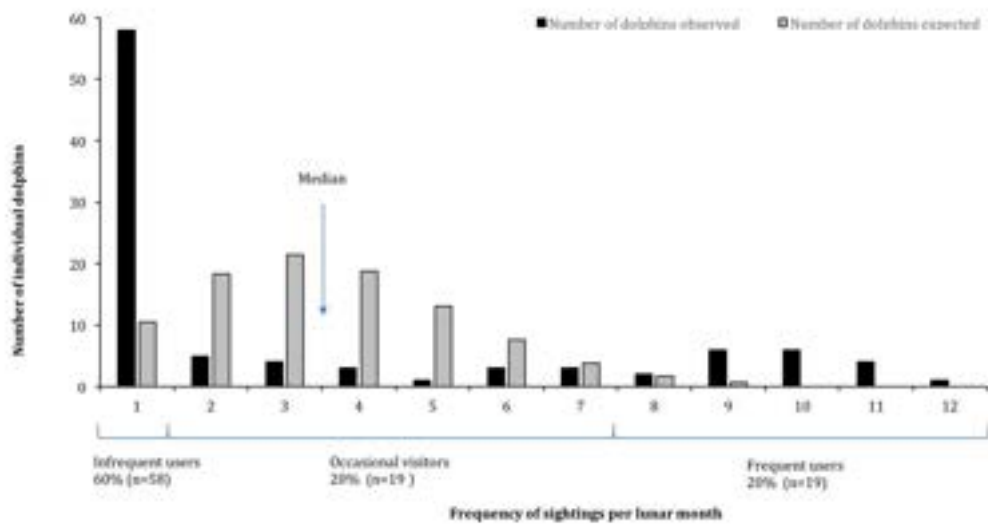


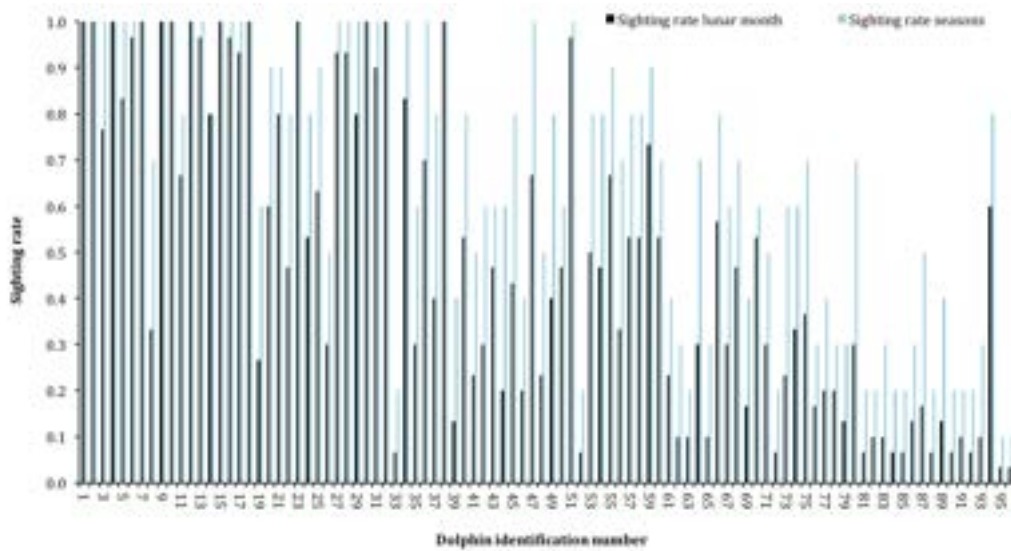
Figure 20: Discovery curve of bottlenose dolphins between December 2012 and April 2015 within Bay of Islands waters, New Zealand, with cumulative number of individuals' photo-identified per survey month. Bars represent the number of kilometres (km) spent on effort.

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**Figure 21:** Observed (black) vs. expected (grey) Poisson distribution of number of times individual bottlenose dolphins were identified by lunar months between December 2012 and April 2015 within Bay of Islands waters, New Zealand. The proportion of different user types (infrequent, occasional, and frequent) are also indicated.

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**Figure 22:** Monthly and seasonal sighting rates of identifiable bottlenose dolphins between December 2012 and April 2015, within Bay of Islands waters, New Zealand.

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## 5.8. Group composition

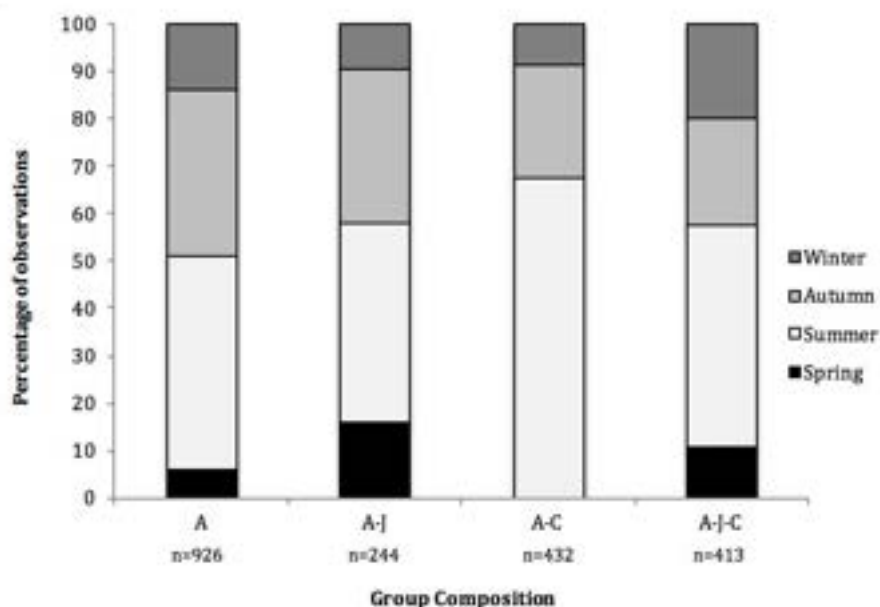
### 5.8.1. Adult-calf groups and mixed groups

Out of the 2,015 initial sightings of dolphin groups, 46.0% (n=926) involved adult-only groups, while 41.9% (n=845) comprised at least one calf (nursery group). The remaining 12.1% occurred with lone animals (n=244).

A total of 10 identifiable adult females were observed with 12 young of the year calves whose fate could be documented over 1 or 2 years. Suspected 1<sup>st</sup> year mortality was observed for 0.67 (CI=0.48-0.71, n=8). Of the surviving 33% of calves (n=4) a further 0.25 of calves did not survive to over 2 years of age (CI=0.11-0.49, n=1). Only 3 individual survived to over 2 years of age (75.0% mortality, CI=0.57-0.89).

The income breeder nature of dolphins dictates that a short temporal scale of investment prior to conception/birth needs to be considered in conjunction with confounding variables, thus further analysis of these data is required to provide full calf mortality assessment.

Mean group size of nursery groups was 18.0 ( $\pm 0.9$  SE, n=845), with no apparent distribution variation by group size (Appendices 1 and 2). Calves were observed in every summer month, with 55.2% (n=466) of all calves sighted during December-February (a further 23.6%, n=199, in Spring) (Figure 23).



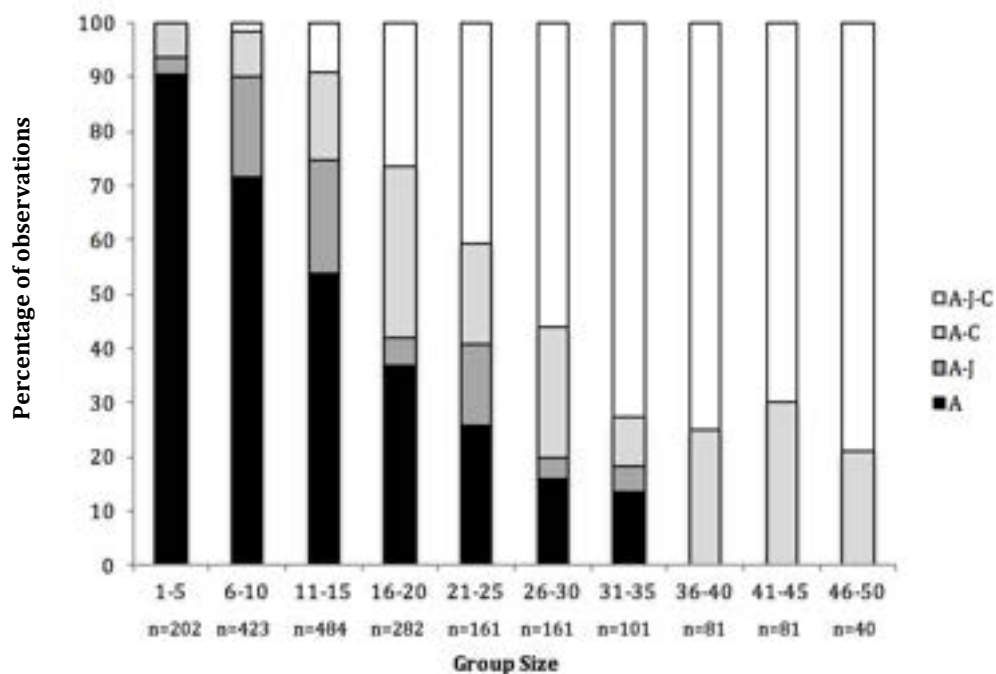
**Figure 23:** Percentage of observations of each group composition in different seasons, between December 2012 and April 2015, within Bay of Islands waters, New Zealand. A represents adults, A-J represents adults and juveniles, A-C represents adults and calves and A-J-C represents adults, juveniles and calves.

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Mixed group mean size (including groups with calves) was the largest with a mean of 35.6 ( $\pm 0.06$  SE,  $n=845$ ) and varied between three and forty individuals. In contrast, adult-only groups were smaller with a mean of 11.3 ( $\pm 0.09$  SE,  $n=926$ ). The majority of mixed groups ranged between thirty-one and thirty-five individuals (86.6%,  $n=732$ , Figure 24).

### 5.8.2. Adult only groups

Bottlenose dolphin adults only groups (46.0%), had a mean group size of 7.8 ( $\pm 0.20$  SE,  $n=926$ ), below the overall mean size of 14.8 ( $\pm 0.35$  SE,  $n=2,015$ ). No significant annual variation was observed. Groups ranged from singletons up to forty-eight individuals (Figure 24).



**Figure 24:** Percentage of observations of each group size vs group composition, between December 2012 and April 2015, within Bay of Islands waters, New Zealand. A represents adults, A-J represents adults and juveniles, A-C represents adults and calves and A-J-C represents adults, juveniles and calves.

### 5.9. Spatial distribution of behaviour

Overall, a clear pattern in the distribution of behaviours was detected for resting and travelling (Figure 25-27) but not other behaviours (foraging, socialising and milling).

Resting primarily occurred in significantly shallower waters (mean=17.3, 67% >20m,  $n=36$ ) (Kruskal-Wallis:  $h=11.76$ ,  $df=4$ ,  $p<0.001$ ) and closer to land (Mean=98.3, range=3.8-394.7m,



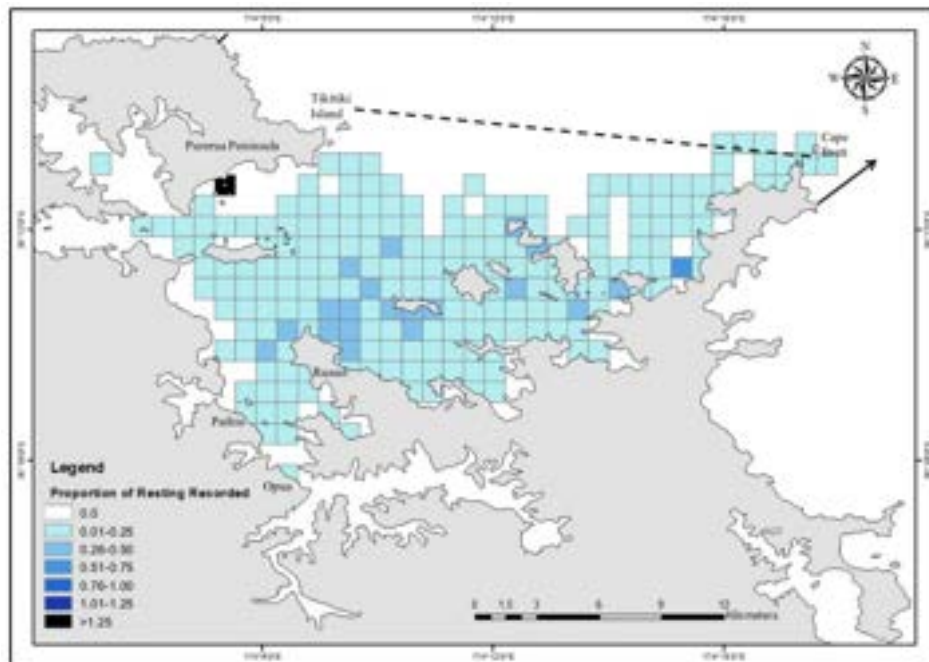
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SE=56.24, n=2,019) (Kruskal-Wallis:  $h=12.39$ ,  $df=4$ ,  $p=0.008$ ) than other behaviours. Dolphins selected inner islands zones for resting (Figure 25). Contrary to this, travelling was the primarily observed behaviour in significantly deeper waters (mean=69.3, 58% <20m, n=895) (Kruskal-Wallis:  $h=14.43$ ,  $df=4$ ,  $p<0.001$ ) and in outer bays areas further from land (mean=3482.4m, range=112.1-6913.7m, SE=1.3m, n=895) (Kruskal-Wallis:  $h=17.12$ ,  $df=4$ ,  $p=0.003$ ).

Dolphins were rarely observed travelling in inner bays and inner islands when compared to outer bays (Kruskal-Wallis:  $h=9.64$ ,  $df=2$ ,  $p<0.001$ ) (Figure 27B).

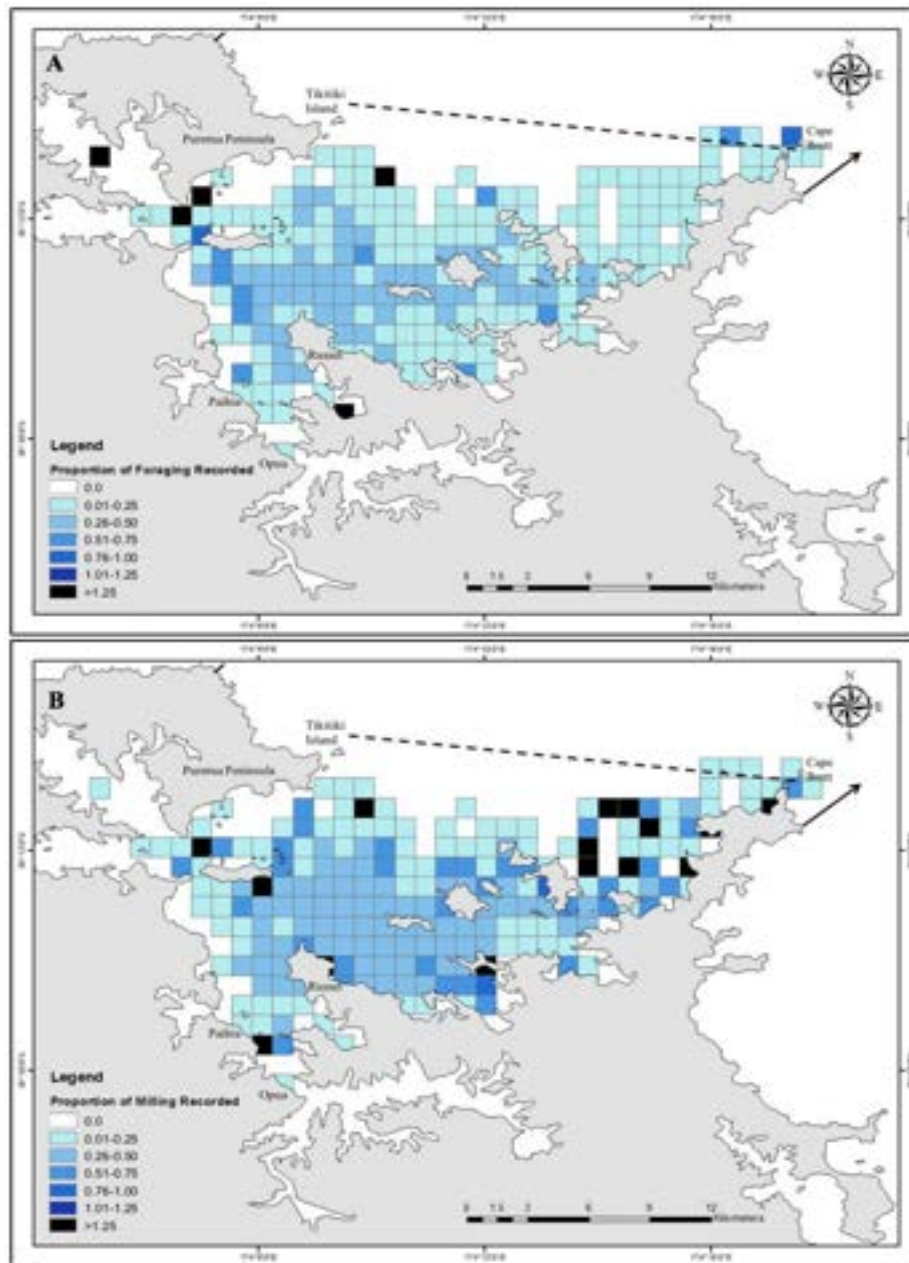
Foraging, socialising and milling exhibited more even distribution across the BoI with no significant differences observed in depth (Kruskal-Wallis:  $h=31.82$ ,  $df=4$ ,  $p>0.05$ ; Kruskal-Wallis:  $h=22.31$ ,  $df=4$ ,  $p>0.05$ ; Kruskal-Wallis:  $h=25.08$ ,  $df=4$ ,  $p>0.05$ ) (Figure 26, 27A).

Similarly, distance to coast (range=6.7-5381.2m, SE=72.19, n=967) did not vary according to behavioural state of foraging (Kruskal-Wallis:  $h=9.14$ ,  $df=4$ ,  $p>0.05$ ), socialising (Kruskal-Wallis:  $h=17.21$ ,  $df=4$ ,  $p>0.05$ ) or milling (Kruskal-Wallis:  $h=12.05$ ,  $df=4$ ,  $p>0.05$ ).



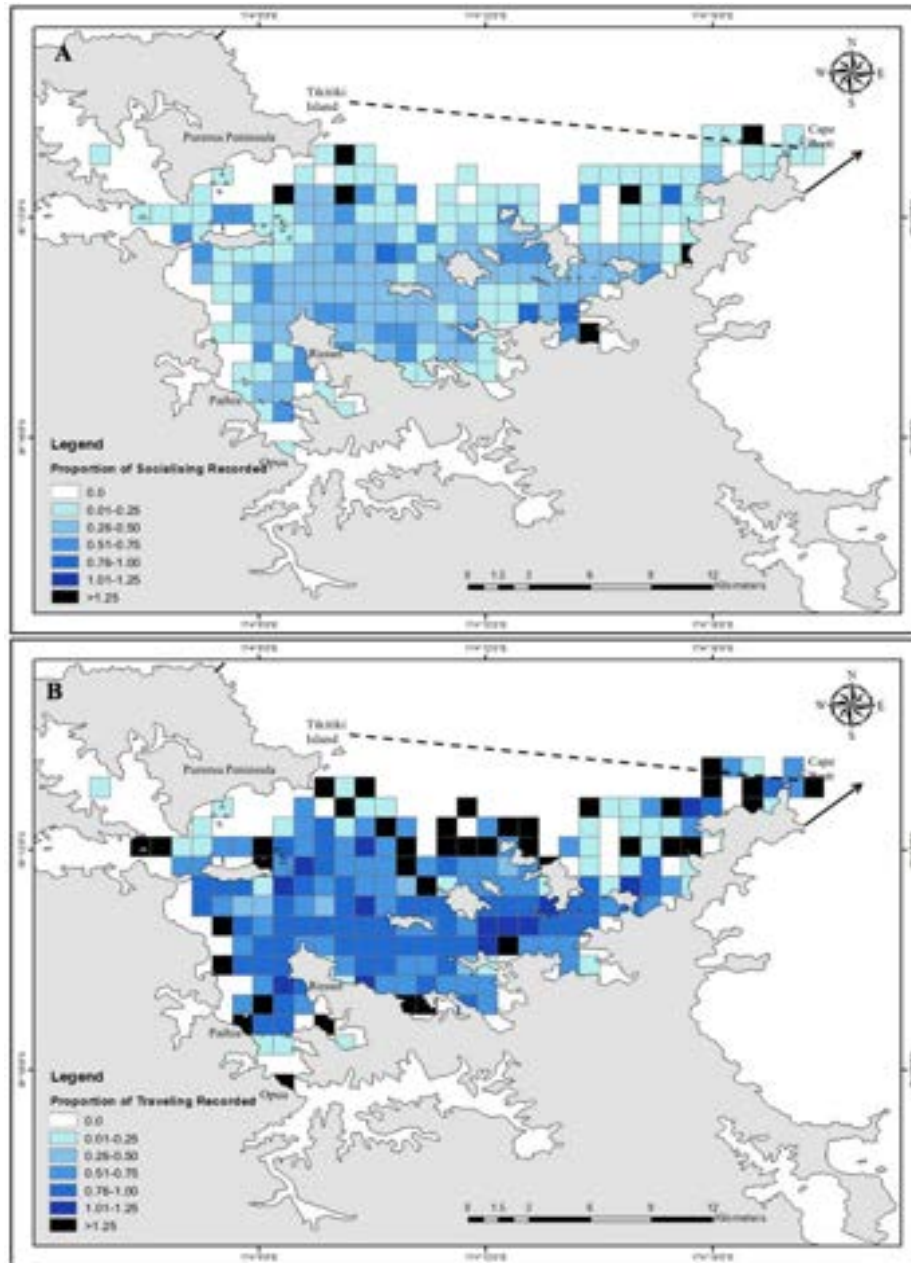
**Figure 25:** Combined platform initial sighting (mutually exclusive with one vessel per day) categorised by behaviour between December 2012 and April 2015, in Bay of Islands waters, New Zealand, with resting behaviour gridded as proportion of all behaviours, coloured according to the proportion per kilometre (km) within each grid cell (1km x 1km)

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**Figure 26:** Combined platform initial sighting (mutually exclusive with one vessel per day) categorised by behaviour between December 2012 and April 2015, in Bay of Islands waters, New Zealand, with A) foraging and B) milling behaviour gridded as proportion of all behaviours, coloured according to the proportion per kilometre (km) within each grid cell (1km x 1km).

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**Figure 27:** Combined platform initial sighting (mutually exclusive with one vessel per day) categorised by behaviour between December 2012 and April 2015, in Bay of Islands waters, New Zealand, with A) socialising and B) travelling behaviour gridded as proportion of all behaviours, coloured according to the proportion per kilometre (km) within each grid cell (1km x 1km).

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### 5.10. Behavioural transitions

A total of 4,062 (62.1%) observations of behaviour with vessels were recorded from the research vessel within BoI harbour limits between December 2012 and April 2015, which equates to 17,429 new vessels within 300m observations. A total of 2,416 behavioural transition counts were observed from the RV. The summary by time of day, season and vessel presence is detailed in Table 12.

**Table 12:** Count of observed behavioural state transitions for bottlenose dolphins by season, time of day and vessel presence between December 2012 and April 2015 within Bay of Islands waters, New Zealand.

	Morning		Midday		Afternoon		Total
	Present	Absent	Present	Absent	Present	Absent	
Spring	165	88	36	53	7	8	357
Summer	812	248	112	31	3	6	1,212
Autumn	292	91	90	56	12	8	549
Winter	78	126	35	61	12	7	319
<b>Total</b>	<b>1,347</b>	<b>553</b>	<b>273</b>	<b>201</b>	<b>34</b>	<b>29</b>	<b>2,437</b>

The number of counts were sufficient to conduct a full 5-way log-linear analysis of the effects of factors such as season, time of day and vessel presence on behavioural transitions (Table 13, Figure 28).

**Table 13:** Akaike Information Criterion values for the effects of time of day, season and vessel presence on the behavioural state transitions of bottlenose dolphins between December 2012 and April 2015, in Bay of Islands waters, New Zealand. Likelihood for a model given the data are approximated by  $e^{(-0.5 \cdot \Delta AIC_i)}$ , and the weight of evidence provided by each model is calculated by normalising the likelihoods to 1.

Model	AIC	$\Delta AIC$	Likelihood	Weight
Vessel Presence + (Season x Time of Day)	2196.33	0	1.000	0.346
Vessel Presence + Time of Day + Season	3103.61	1.033	0.632	0.206
Vessel Presence x Season	3104.19	1.663	0.052	0.155
Season + Vessel Presence	3107.27	2.816	0.009	0.085
Season + (Vessel Presence x Time of Day)	3107.68	3.732	3.765E-08	0.053
Season x Time of Day	3108.23	4.067	5.095E-08	0.045
Time of Day + (Vessel Presence x Season)	3128.25	4.691	6.218E-09	0.033
Time of Day + Season	3179.89	4.921	1.901E-10	0.029
Vessel Presence	3210.05	5.097	7.67E-11	0.027
Season	3210.38	5.701	1.539E-12	0.017
Vessel Presence x Season x Time of Day	3217.01	10.567	6.195E-21	0.002
Time of Day + Vessel Presence	3315.51	10.687	1.061E-28	0.002
Vessel Presence x Time of Day	3327.76	12.079	1.04E-40	<0.001
Time of Day	3418.23	12.349	5.595E-52	<0.001
Null model	3429.39	14.015	2.21E-56	<0.001

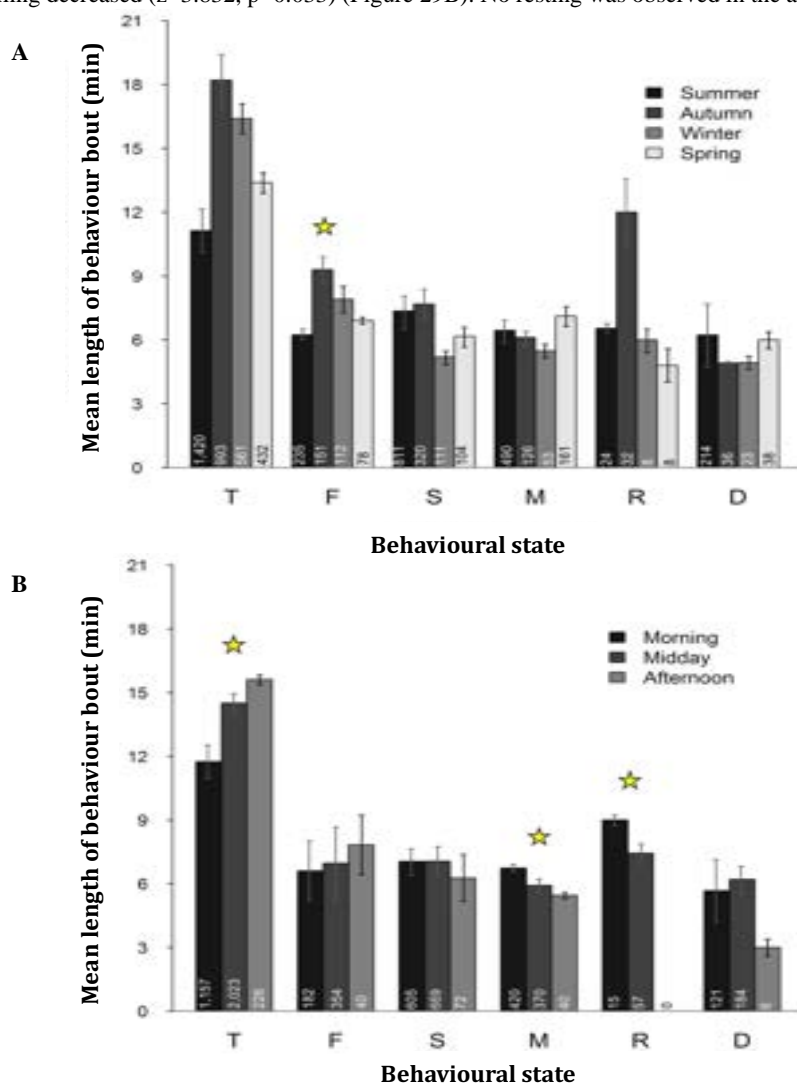


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## 5.11. Seasonal and diurnal variation in behaviour

### 5.11.1. Mean behavioural bout length

Behavioural bout length was shortest for foraging in summer ( $z=9.144$ ,  $p=0.041$ ) (Figure 29A). Bout length also significantly increased ( $z=10.279$ ,  $p=0.012$ ) for travelling throughout the day while milling decreased ( $z=3.832$ ,  $p=0.033$ ) (Figure 29B). No resting was observed in the afternoon.

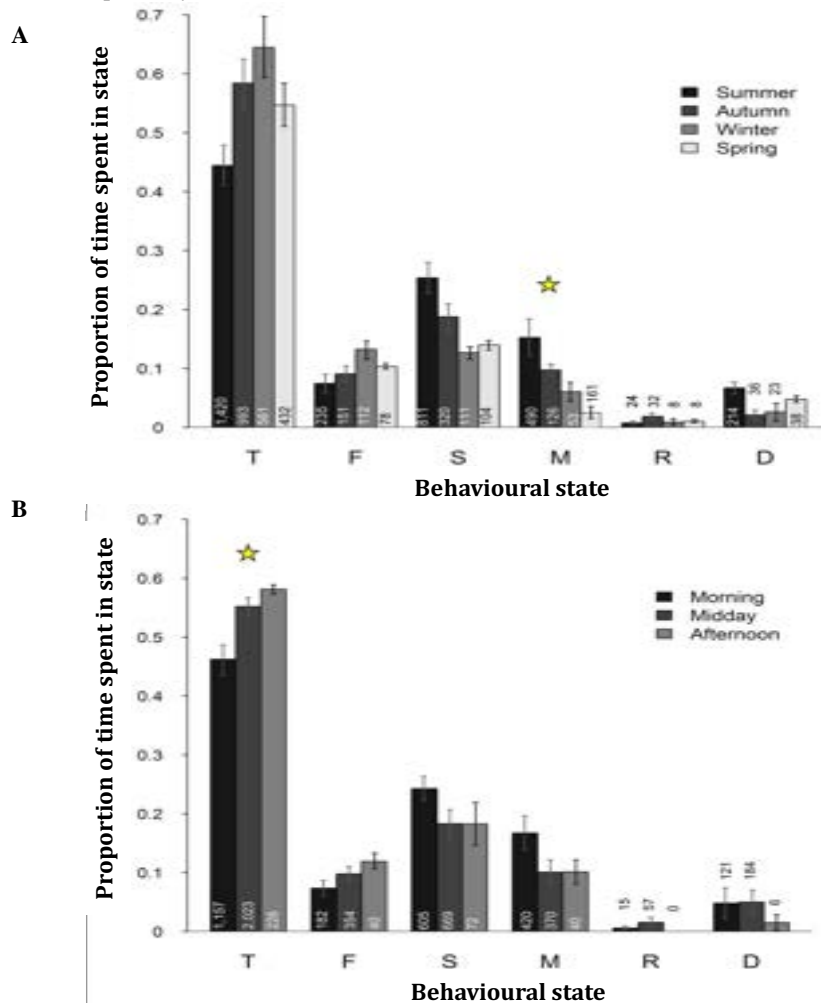


**Figure 29:** Mean bout length of each behavioural state for bottlenose dolphins observed from research vessel between December 2012 and April 2015 in Bay of Islands waters, New Zealand, by A) season, and B) time of day. Note: T=Travelling, F=Foraging, S=Socialising, M=Milling, R=Resting and D=Diving. Significant bout length difference ( $z$ -test  $p<0.05$ ) is marked with a yellow star. Bars represent standard error. N values for each category are displayed on the bars.

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### 5.11.2. Behavioural budget

Both season (Figure 30A) and time of day (Figure 30B) had a significant effect (z-test  $p < 0.05$ ) on the behavioural budget of bottlenose dolphins. Milling varied across all seasons. The highest proportion of milling was observed in Summer, with a 33.5% decrease in Autumn, 40.0% in Winter and 66.7% in Spring. Travelling and foraging varied consistently by time of day, with the highest proportion of travelling and foraging observed in the afternoon (28.3% and 71.4% increase from morning to afternoon, respectively).



**Figure 30:** Overall behavioural budget of each behavioural state for bottlenose dolphins observed from research vessel between December 2012 and April 2015 in Bay of Islands waters, New Zealand, by A) season and B) time of day. Note: T=travelling, F=foraging, S=socialising, M=milling, R=resting and D=diving. Significant bout length difference between all time categories (z-test  $p < 0.05$ ) is marked with a yellow star. Bars represent standard error. N values for each category are displayed on the bars.

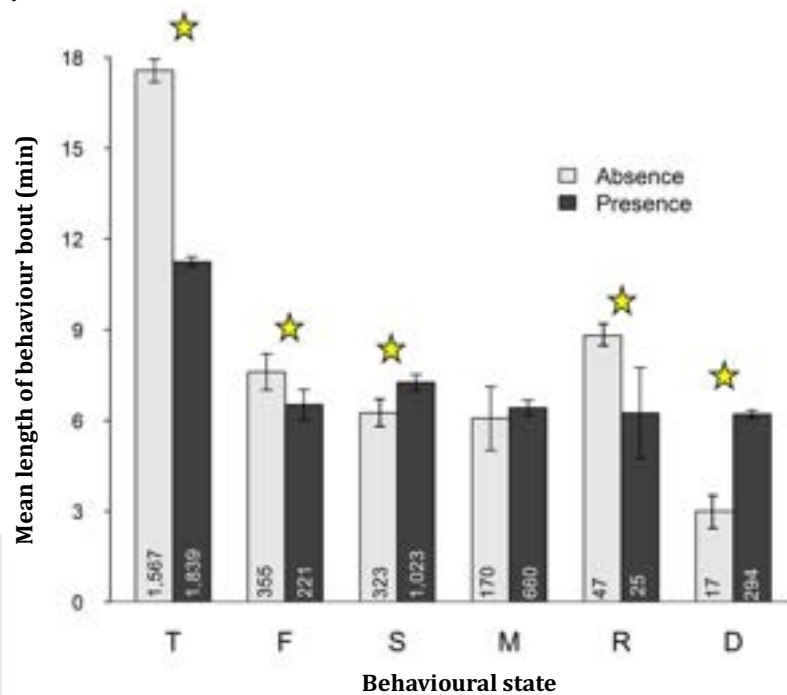


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## 5.12. Effects of vessel presence on behaviour

### 5.12.1. Mean behavioural bout length

The mean behavioural bout length varied significantly in presence of vessels for five states (Figure 31). In the absence of vessels, travelling ( $z=6.820$ ,  $p<0.001$ ), resting ( $z=1.060$ ,  $p<0.001$ ) and foraging ( $z=1.560$ ,  $p=0.036$ ) bouts were longer, while socialising ( $z=-2.060$ ,  $p=0.039$ ), and diving ( $z=-17.740$ ,  $p<0.001$ ) bouts were shorter. Milling bouts did not significantly change in the presence of vessels ( $z=-0.550$ ,  $p=0.119$ ). When vessels were present within 300m traveling decreased by 35.7%, resting by 22.9%, and foraging by 13.3%, whilst socialising and diving increased by 21.1% and 118.3% respectively.



**Figure 31:** Mean bout length (min) of each behavioural state for bottlenose dolphins observed from research vessel in absence and presence of vessels between December 2012 and April 2015 in Bay of Islands waters, New Zealand. Note: T=travelling, F=foraging, S=socialising, M=milling, R=resting and D=diving. Significant bout length difference between the presence and absence of vessels ( $z$ -test  $p<0.05$ ) are marked with a yellow star. Bars represent standard error. N values for each category are displayed on the bars.

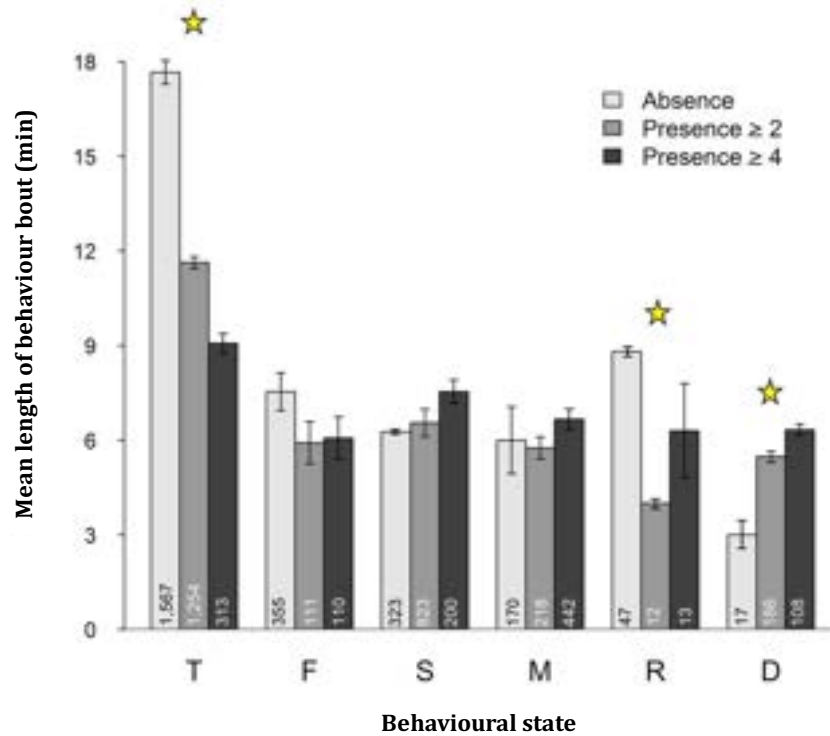
The number of vessels present had a significant effect on mean behavioural bout length (Figure 32). Travelling bout length differed significantly in the absence and presence of vessels ( $z=7.820$ ,  $p<0.001$ ) Figure 32); as the number of vessels increased from  $\geq 2$  to  $\geq 4$ , bout length decreased significantly further ( $z=9.311$ ,  $p=0.017$ ).

A similar significant but reversed trend was detected for diving bout length ( $z=-7.442$ ,  $p=0.032$ ). As vessel numbers increased, resting bout length showed a further decrease in length in the presence of



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$\geq 2$  vessels ( $z=-3.984$ ,  $p=0.021$ ), and a subsequent increase in the presence of  $\geq 4$ . Though the increase was significant ( $z=-6.220$ ,  $p=0.049$ ), resting bout length was still significantly lower than in the absence of vessels ( $z=-2.157$ ,  $p=0.026$ ).



**Figure 32:** Mean bout length (min) of each behavioural state for bottlenose dolphins observed from research vessel in absence, presence of up to three vessels plus research vessel and presence of four and more vessels between December 2012 and April 2015 in Bay of Islands waters, New Zealand. Note: T=travelling, F=foraging, S=socialising, M=milling, R=resting and D=diving. Significant bout length difference between all vessel categories ( $z$ -test  $p<0.05$ ) is marked with a yellow star. Error bars represent standard error. N values for each category are displayed on the bars.

The mean behavioural bout length varied in the presence of different vessel types when up to three vessels were present (Figure 33). Data were restricted to only three vessels in order to allow direct comparison between vessel types and control for vessel numbers.

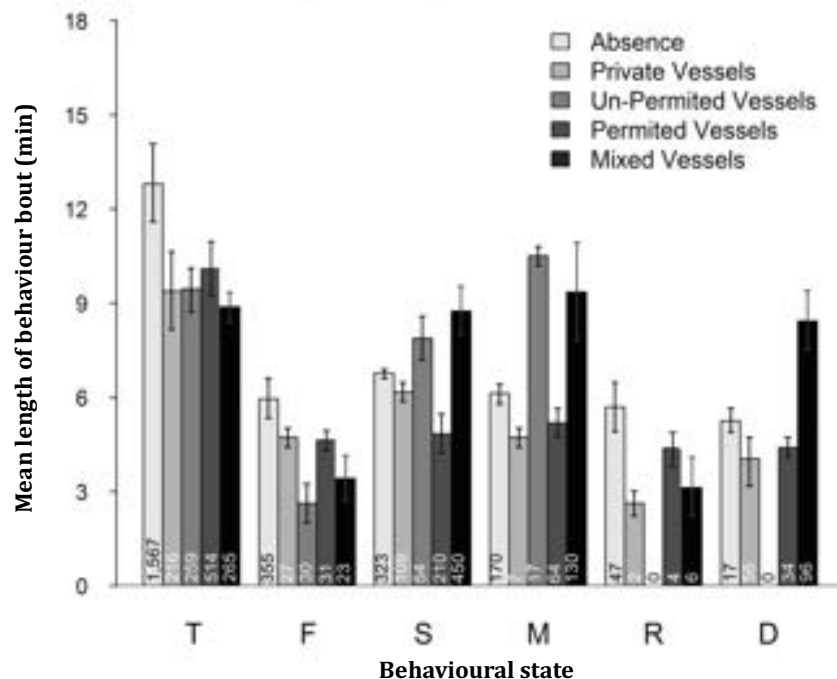
Mixed vessels presence had the largest effect on behavioural bout length ( $z$  test  $p<0.05$ ) apart from in milling ( $z=-7.306$ ,  $p=0.051$ ) and foraging ( $z=-4.192$ ,  $p=0.054$ ) situations when un-permitted vessels had the largest effect. Private and permitted vessels had a similar effect in contrast to un-permitted and mixed. For example, when compared to the absence of vessels, the mean milling bout length increased significantly in the presence of un-permitted ( $z=6.772$ ,  $p=0.024$ ) and mixed vessels ( $z=6.825$ ,  $p=0.019$ ) but decreased when private ( $z=-3.298$ ,  $p=0.057$ ) or permitted vessels ( $z=-3.282$ ,  $p=0.063$ ) were present.

Significant differences were also observed between vessel categories with the largest decrease in

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behavioural bout of foraging in the presence of un-permitted vessels when compared to absence situations ( $z=-9.120$ ,  $p=0.032$ ).

In the presence of un-permitted vessels, milling bout length significantly increased when compared to all other vessel categories ( $z=12.143$ ,  $p=0.038$ ). Overall, the presence of un-permitted vessels resulted in a decrease in travelling ( $z=-1.170$ ,  $p=0.042$ ) and foraging ( $z=-6.192$ ,  $p=0.032$ ) and an increase in socialising ( $z=6.334$ ,  $p=0.014$ ) and milling ( $z=9.120$ ,  $p=0.021$ ). Diving and resting were not observed in the presence of un-permitted vessels.



**Figure 33:** Mean bout length (min) of each behavioural state for bottlenose dolphins observed from research vessel in absence, presence of private vessels, un-permitted vessels, permitted and mixed up to three vessels between December 2012 and April 2015 in Bay of Islands waters, New Zealand. Note: T=travelling, F=foraging, S=socialising, M=milling, R=resting and D=diving. Error bars represent standard error. N values for each category are displayed on the bars.

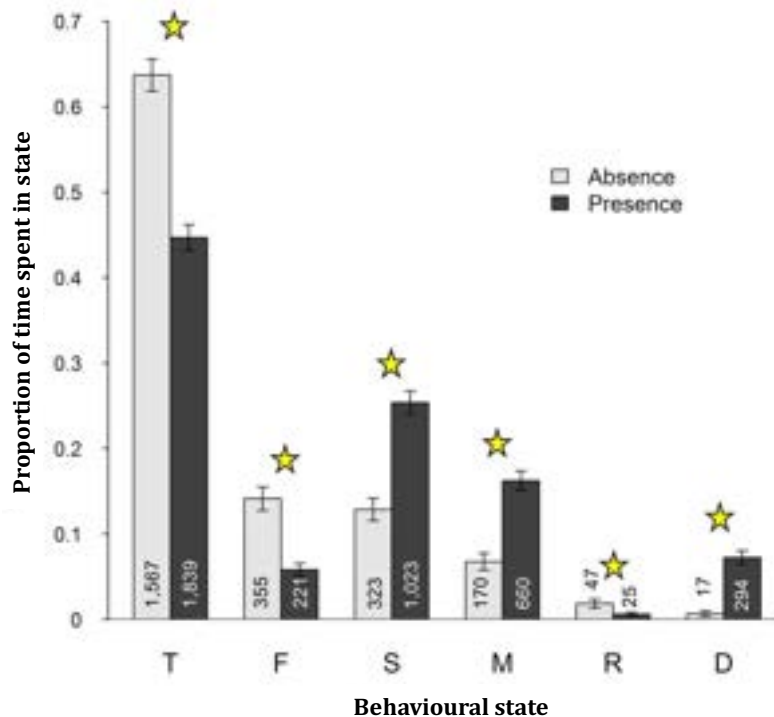
#### 5.12.2. Behavioural budget

Bottlenose dolphin behavioural budgets were significantly affected by the presence of vessels (Figure 34).

Overall, dolphins spent more time travelling, resting and foraging in absence of vessels within 300 m of the dolphin group, which in the presence of vessels decreased by 69.7%, 133.3% and 160.0%, respectively. However, dolphins generally spent more time socialising, diving and milling in presence of vessels, which increased by 126.3%, 300.0% and 247.6%, respectively.

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Bottlenose dolphin cumulative diurnal behavioural budget (control + impact) did vary significantly from the control behavioural budget (goodness-of-fit test,  $G^2_{adj}=0.37$ ,  $df=1$ ,  $p<0.001$ )

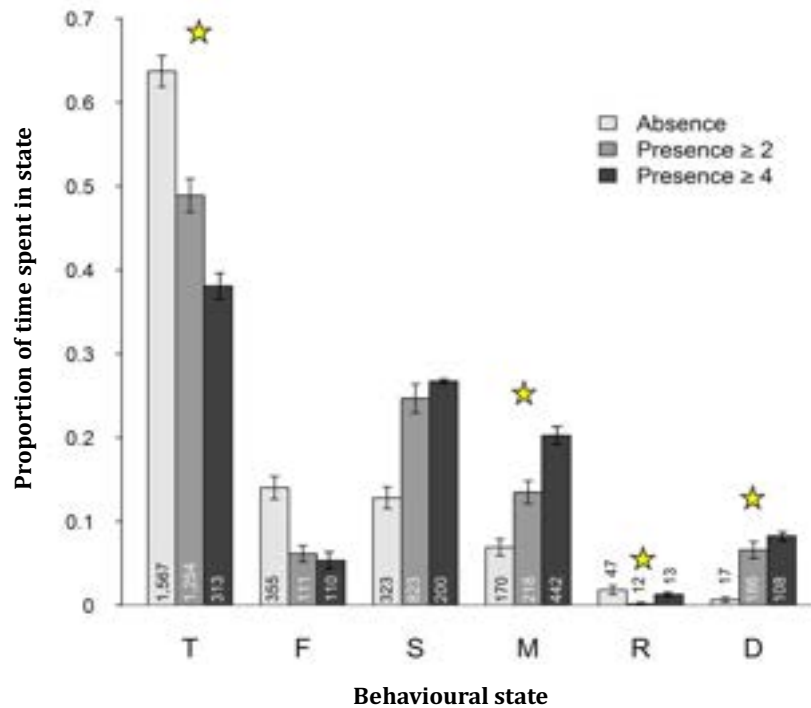


**Figure 34:** Overall behavioural budget of bottlenose dolphins observed from research vessel in absence and presence of vessels between December 2012 and April 2015 in Bay of Islands waters, New Zealand. Note: T=travelling, F=foraging, S=socialising, M=milling, R=resting and D=diving. Significant behaviour budget differences between categories (z-test  $p<0.05$ ) is marked with a yellow star. Error bars represent standard error. N values for each category are displayed on the bars.

As the number of vessels present with dolphins increased up to two vessels, the behavioural budget decreased for travelling (23.4%), resting (95%), foraging (57.1%) and increased for socialising (84.6%), milling (54.6%) and diving (1,100%) (figure 35).

As the number of vessels present within 300 m of the focal dolphin group increased from  $\geq 2$  to  $\geq 4$ , the magnitude of change increased. Particularly strong effects were noted during the presence of  $\geq 4$  vessels: the behavioural budget of travelling (40.6%) and foraging (64.3%) decreased whilst socialising (107.7%), milling (233.3%) and diving (93.8%) increased (figure 35).

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**Figure 35:** Overall behavioural budget of bottlenose dolphins observed from research vessel in absence of vessels, presence of up to three vessels plus research vessel and presence of four or more vessels between December 2012 and April 2015 in Bay of Islands waters, New Zealand. Note: T=travelling, F=foraging, S=socialising, M=milling, R=resting and D=diving. Significant behaviour budget differences between categories (z-test  $p < 0.05$ ) is marked with a yellow star. Error bars represent standard error. N values for each category are displayed on the bars.

Dolphins also responded differently depending on the type of vessel present.

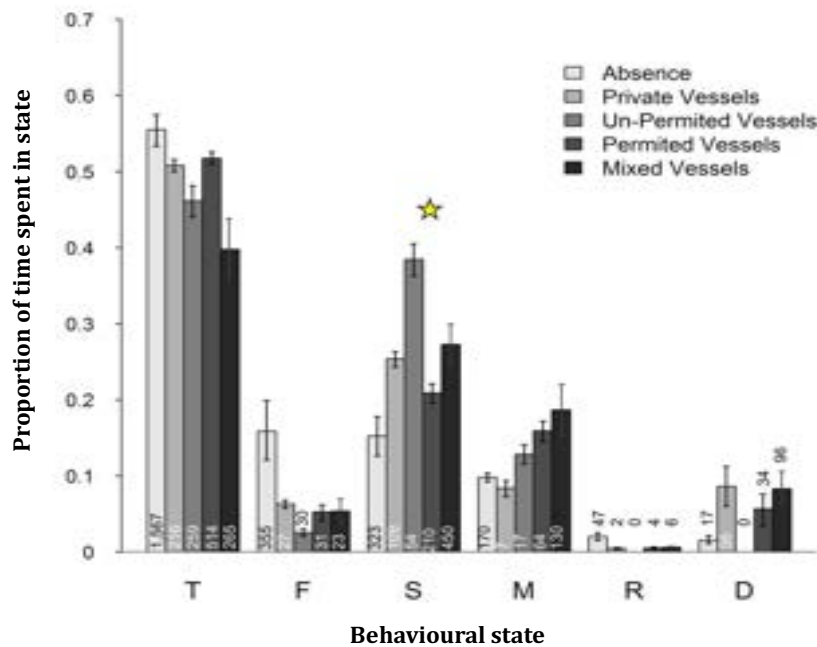
The behavioural budget of all behavioural states was affected between absence and presence of various vessel types (Figure 36).

Mixed vessels had the strongest effect on both diving (500.0%) and milling (111.1%). Un-permitted vessels had the strongest effects on socialising (192.3%) and foraging (87.5%). Resting and diving didn't occur in the presence of Un-permitted vessels.

Overall, private vessel presence resulted in a decrease in travelling (8.9%), foraging (62.5%), milling (18.2%) and resting (95.0%), while an increase in socialising (100.0%) and diving (500.0%).

Overall, permitted vessel presence resulted in a decrease in travelling (7.1%), foraging (68.8%), milling (27.3%) and resting (100.0%), while an increase in socialising (61.5%) and diving (300.0%). Permitted vessels had the largest magnitude change on resting and lowest on traveling, socialising and diving.

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**Figure 36:** Overall behavioural budget of bottlenose dolphins observed from research vessel in absence of vessels, presence of private, un-permitted, permitted and mixed up to three vessels between December 2012 and April 2015 in Bay of Islands waters, New Zealand. Note: T=travelling, F=foraging, S=socialising, M=milling, R=resting and D=diving. Significant behavioural budget difference between all vessel categories (z-test  $p < 0.05$ ) is marked with a yellow star. Error bars represent standard error. N values for each category are displayed on the bars.

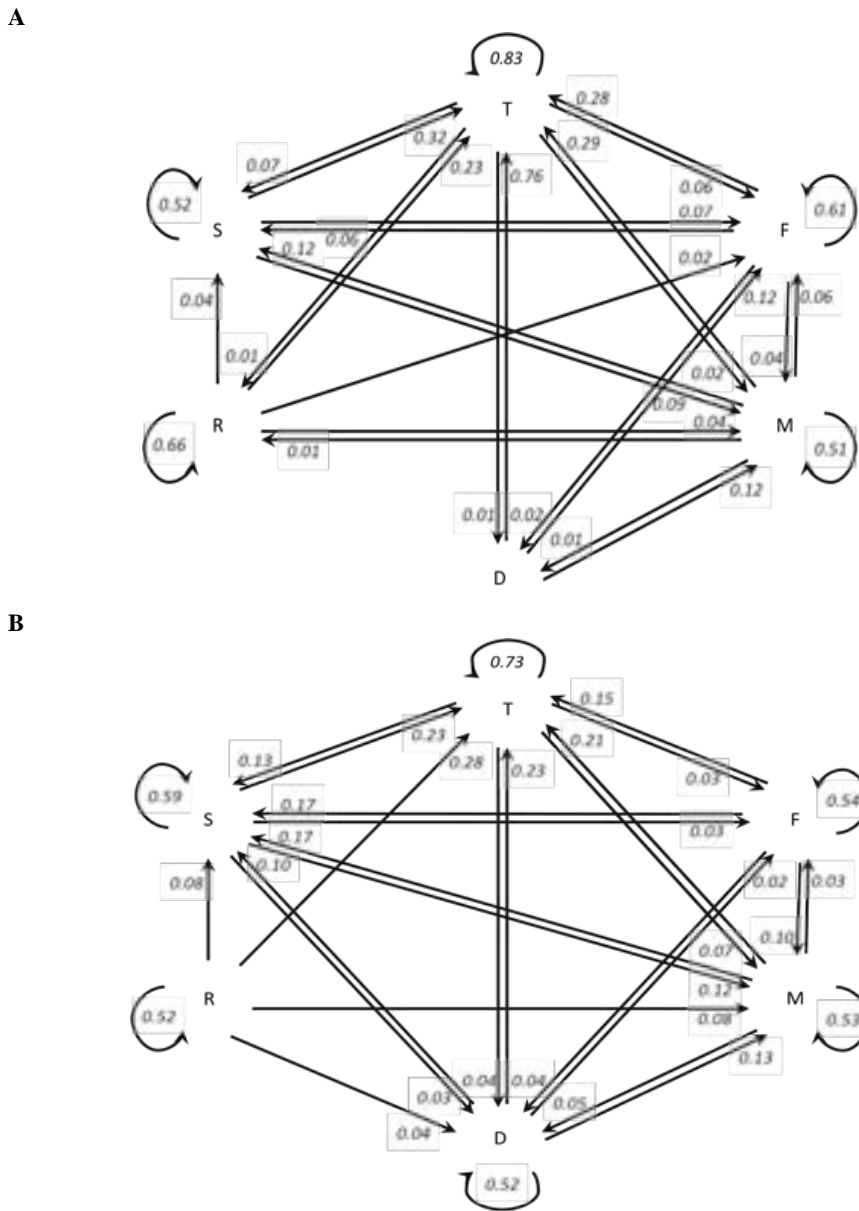
### 5.12.3. Transition probabilities

The summary of behaviour count values recorded and probabilities to shift from one state to another in presence and absence of vessels are shown in Table 14 and Figure 37, respectively.

**Table 14:** Count of each behavioural state of bottlenose dolphins observed from research vessel in absence and presence of vessels between December 2012 and April 2015 in Bay of Islands waters, New Zealand.

Behavioural state	Absence	Presence
Travelling	1,599	1,815
Foraging	355	237
Socialising	323	1,031
Milling	170	659
Resting	47	25
Diving	17	294
<b>Total</b>	<b>2,511</b>	<b>4,061</b>

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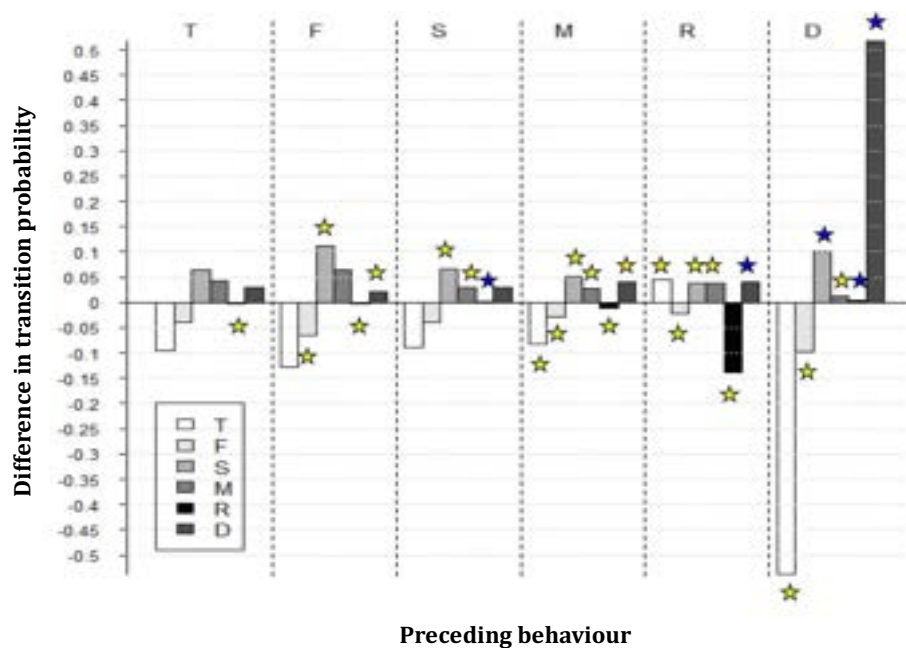


**Figure 37:** Probabilities of bottlenose dolphins observed from research vessel to shift from one behavioural state to another between December 2012 and April 2015 in Bay of Islands waters, New Zealand in A) absence, and B) presence of vessels. The absence of arrow between two states means there was no transition recorded between the two states. Note: T=travelling, F=foraging, S=socialising, M=milling, R=resting and D=diving.

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Fifty-eight percent of transitions were significantly affected by the presence of vessels (Figure 38).

The likelihood to stay in a given state in the presence of vessels was reduced for foraging and resting by 11.5% and 21.2%, respectively. In contrast, the probability to remain socialising and milling was significantly increased by 13.5% and 3.9%, respectively. Furthermore, a diving-diving transition was only observed in the presence of vessels. Therefore, the limited sample size of observation and transitions of this behavioural state in an absence situation (i.e. only research vessel present), may have affected the statistical power of analyses of these results. No resting bouts were initiated when a vessel was already interacting with dolphins.



**Figure 38:** Effect of vessel presence on transitions in behavioural states of bottlenose dolphins between December 2012 and April 2015 in Bay of Islands waters, New Zealand, based on differences in transition probabilities  $p_{ij}(\text{presence}) - p_{ij}(\text{absence})$ . A negative value on the Y-axis means that the probability of a behavioural transition in the presence chain is lower than the one in the absence chain. The five sections correspond to the five preceding behavioural states. Each bar represents a succeeding state. Note: T=travelling, F=foraging, S=socialising, M=milling, R=resting and D=diving. Transitions showing a significant difference (z-test  $p < 0.05$ ) are marked with a) a yellow star when data were sufficient to assess the presence, and b) a blue star indicates significance but compromised statistical accuracy based on small sample size.

In most cases where an increase in transition probability was detected, socialising was the succeeding behavioural state.

Overall, milling, resting and diving were the behavioural states primarily affected in presence of vessels, with all transitions to other states significantly affected (Figure 38). The probability of transitioning from milling to travelling and foraging decreased by 27.6% and 50.0%, respectively. In

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contrast, the probability of transitioning from milling to socialising and diving increased by 41.7% and 400.0%, respectively.

The probability to transition from socialising to milling, foraging to diving and foraging to socialising increased by 33.3%, 100.0% and 183.3%, respectively in the presence of vessels. Diving to travelling and diving to foraging significantly decreased by 69.7% and 83.3%, respectively in the presence of vessels.

The transition from foraging to resting did not occur. Resting to foraging, diving to resting, traveling to resting and diving to socialising were not observed in the presence of vessels. In addition, the transition from resting to diving did not occur in the absence of interacting vessels.

#### 5.12.4. Time to resume state

Time required to return to a given behavioural state prior to being disturbed was significantly affected by the presence of vessels for all 6 behaviours (Table 15). Primarily when travelling ( $z=5.00$ ,  $p<0.001$ ), foraging ( $z=4.732$ ,  $p=0.004$ ) or resting ( $z=4.447$ ,  $p<0.001$ ), bottlenose dolphins took significantly longer to return to these states in the presence of vessels, with time increasing by 132.3%, 262.0% and 725.6%, respectively. In contrast, the time required to return to socialising ( $z=-2.85$ ,  $p=0.004$ ) or milling ( $z=-4.95$ ,  $p<0.001$ ) decreased by 36.8% and 58.7%, respectively. Due to a small sample size, the 95.6% decrease in time needed to return to diving ( $z=-3.04$ ,  $p<0.001$ ) should be interpreted with caution (table 12).

**Table 15:** Probability of staying in a given state  $\pi_j$ , mean number of transitions  $T_j$  it took for bottlenose dolphins to return to that state, and time (min) required to return to the state when interrupted in absence of vessels (absence, exception of the research boat), and in presence of vessels in Bay of Islands waters, New Zealand, between December 2012 and April 2015. Note: sample size for diving is limited.

Behavioural state	$\pi_j$	$E(T_j)$	Behavioural state resumed (min)
<b>Absence</b>			
Travelling	0.6	1.0	3.1
Foraging	0.1	3.1	9.2
Socialising	0.1	8.2	24.7
Milling	0.1	11.5	34.4
Resting	<0.1	14.4	43.3
Diving	<0.1	43.2	129.6
<b>Presence</b>			
Travelling	0.5	2.4	7.2
Foraging	0.1	11.1	33.3
Socialising	0.3	5.2	15.6
Milling	0.2	4.7	14.2
Resting	<0.1	119.2	357.5
Diving	0.1	1.9	5.7



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### 5.12.5. Dolphin behavioural events

In addition to behavioural states, specific behavioural events were also documented (n=9,935). However, not all behavioural events could be recorded due to a large majority being subsurface, therefore this analysis is not exhaustive of all events during encounters. All occurrence sampling was effective for bow riding, jumps and copulation associated events.

The predominant behavioural event observed was bow riding (81.1%, n=8,057), followed by horizontal jump (6.3%, n=626), vertical jump (5.0%, n=497) and belly present (4.9%, n=487). All other events made up the rest of observations (2.7%, n=268) and were significantly effected by vessel type.

Bow riding events were predominantly observed with un-permitted vessels (56%, n=4,512, Kruskal-Wallis:  $h=17.43$ ,  $df=2$ ,  $p=0.014$ ), 27.0% with private vessels (n=2,175, Kruskal-Wallis:  $h=11.27$ ,  $df=2$ ,  $p<0.001$ ) and 15.0% with permitted vessels (n=1,246, Kruskal-Wallis:  $h=24.16$ ,  $df=2$ ,  $p=0.027$ ). Bow riding was observed with just the research vessel (absence) in 2.0% of observations (n=124, Kruskal-Wallis:  $h=24.16$ ,  $df=2$ ,  $p=0.027$ ).

The converse was observed for jump behaviour (horizontal and vertical combined, n=1,123). Jump events were predominantly recorded with permitted vessels (57.0% n=640, Kruskal-Wallis:  $h=38.21$ ,  $df=2$ ,  $p<0.001$ ), 20.2% with private vessels (n=228, Kruskal-Wallis:  $h=22.91$ ,  $df=2$ ,  $p<0.001$ ) and 12.0% with un-permitted vessels (n=135, Kruskal-Wallis:  $h=16.45$ ,  $df=2$ ,  $p=0.022$ ). Jump behaviour was observed with just the research vessel in 10.7% of observations (n=120, Kruskal-Wallis:  $h=24.16$ ,  $df=2$ ,  $p=0.027$ ).

Of the 8,057 occasions of recorded bow riding, 84.0% resulted in the split of the focal group due to <25% of the group engaging in the behavioural event (n=6,768), 26.0% of these resulted in a permanent split (n=1,760). In 10.2% of occasions mother-calf pairs were observed approaching vessels during a bow-riding event (n=822). Jump behaviour was not observed to split a focal group.

## 5.13. Vessels in the BoI

### 5.13.1. Vessel type

Research vessels effort was consistent across all encounters. The research vessel was also permitted to be positioned to view interacting vessels and not included as a vessel in the three boat rule at the onset of the study. In order to therefore, remove any vessel perception bias of commercial vessels, the research vessel was not included in the following analysis. All vessel numbers and percentages are additional to the research vessel. Whilst it is acknowledged the research vessel may have an unknown effect on dolphin behaviour, any such effect would be consistent and therefore appropriate to exclude.

While private vessels were the most prevalent type of vessels recorded in the BoI (36.0%, n=6,274 observations), both permitted and un-permitted commercial vessels also had a strong presence in the bay, accounting 33.0% (7 different vessels, n=5,752 observations) and 31.0% (~41 different vessels, n=5,403 observations) of the vessels observed, respectively.

The majority of private vessels were powered with engines (i.e. outboard or jet, 56.2%, n=3,779). Yachts and kayaks represented a further 29.4% (n=1845) and 7.8% (n=489) of private vessel traffic, respectively. Of the un-permitted vessels, commercial sailing vessels represented the majority

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(65.0%, n=3,512), of which 98.8% (n=5,338) were powered by engine rather than sail in presence of dolphins. All permitted vessels were powered with engines (inboard) (100.0%, n=5,752).

### 5.13.2. Vessel-dolphin interactions

Out of the 222 encounters with bottlenose dolphins, the research vessel arrived after (9.1%, n=20) and/or departed prior to the interacting vessels (3.6%, n=8), resulting in 12.7% (n=28) of the duration being underestimated. These encounters were removed from further analysis.

### 5.13.3. Vessel numbers

A mean number of 11 vessels were recorded interacting and actively positioned to view within 300m of dolphins (range=0-25, n=17,429) at the same time.

The effort of all vessel types with bottlenose dolphin, between sunrise and sunset, resulted in a mean of only 11.3 continuous minutes without the presence of vessels (other than the research vessel (range=0-34min, n=17,402)) and only 14.3% of daylight hours without vessels due to cumulative vessel presence (mean=102.6min, range=0-322min, n=17,402). This varied seasonally. The lowest mean time without vessels occurred in summer with only 8.1% of daylight hours (mean=69.7min, range=0-83.1min, n=10,161) and highest in winter with 30.3% of daylight hours (mean=174.1min, range=0-322min, n=1,116). Vessel effort in Spring and Autumn were similar with 16.2% (mean=113.9min, range=0-147min, n=1,777) and 14.3% respectively (mean=105.2min, range=0-142.8min, n=4,375).

The cumulative time a focal dolphin group was exposed to vessel interaction from permitted vessels across all operators exceeded the permitted maximum time of 50 min during 89.3% (mean=213, range=0-330min, n=5,752) of the observed encounters. The cumulative time a focal dolphin group was exposed to vessel interaction from un-permitted vessels resulted in a mean of 42 min (range=0-81min, n=5,403) and 403 min from private vessels (range=0-502min, n=6,274).

All vessel types exerted significantly more cumulative effort in summer/spring than autumn/winter. Permitted vessels effort in summer/spring resulted in a cumulate mean of 309 min (range=0-330min, n=4,084) compared to 106 min in autumn/winter (range=0-213min, n=1,668) (Kruskal-Wallis: h=16.22, df=1, p<0.001, n=5,752). Un-permitted vessels spent significantly less time with dolphin groups in spring/summer (mean=72, range=0-81min, Kruskal-Wallis: h=19.31, df=1, p=0.020, n=3,620) than autumn/winter (mean=35, range=0-40min, n=1,783). Cumulative effort of private vessels was significantly greater in spring/summer (mean=497, range=0-502min, Kruskal-Wallis: h=21.01, df=1, p=0.001, n=4,185) than autumn/winter (mean=281, range=0-296min, n=2,089).

Out of 1,472 mutually exclusive trips observed, a total of 2,015 bottlenose dolphin groups were encountered. Permitted vessels spent significantly more time with dolphin groups (range=0-138, median=62.5, n=5,752) than un-permitted commercial vessels (range=0-48, median=29, n=5,403) (Kruskal-Wallis: h=39.63, df=2, p<0.001). Private vessels spent significantly less time with dolphin groups (range=0-45, median=16, n=6,274) than permitted (Kruskal-Wallis: h=29.43, df=2, p=0.013) and un-permitted vessels (Kruskal-Wallis: h=27.04, df=2, p=0.018).

Permitted vessels spent a mean of 79.2min (range=0-138, SE=2.31, n=5,752) in the presence of bottlenose dolphins. The mean time permitted vessels spent with dolphins per trip was 113 continuous minutes in spring/summer (range=0-138, n=4,084) and 52 continuous minutes in

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autumn/winter (range=0-77, n=1,668). Permitted vessel spent more than 50 continuous minutes with dolphin in 44.5% of encounters (n=2,561).

Not all un-permitted vessels interacted with dolphins therefore only vessels interacting with dolphins are included in analysis. Un-permitted vessels interacted with dolphins for 37 continuous minutes in spring/summer (range=0-48, n=3,620) and 12 continuous minutes in autumn/winter (range=0-24, n=1,783). Private vessels spent the least time with dolphins in all seasons with 18 continuous minutes in spring/summer (range=0-45, n=4,185) and 9 continuous minutes in autumn/winter (range=0-14, n=2,089).

Permitted vessels also spent significantly more time with nursery groups (presence of calves and neonates) (range=9-78, median=64, n=2,301) than un-permitted commercial vessels (range=2-42, median=14, n=2,756) (Kruskal-Wallis:  $h=42.16$ ,  $df=2$ ,  $p<0.001$ ) and private vessels (range=1-31, median=13, n=2,823) (Kruskal-Wallis:  $h=38.11$ ,  $df=2$ ,  $p<0.001$ ). Permitted vessels exceeded 30 minutes with nursery groups in 78.0% of encounters (n=1,795).

Further to this, during the imposed 'cetacean lunch break' (1130-1300) under permit conditions, the mean time with only the research vessel present was 8.4 continuous minutes in summer/autumn (range=0-18, n=839) and 19.4 continuous minutes in winter/spring (range=0-26, n=1,909).

The longest recorded continuous presence of two or more vessels in addition to the research vessel was 6.8 hrs. This was recorded during summer (29<sup>th</sup> December 2014) and included all vessel types. The maximum number of vessels simultaneously observed interacting at any one point within 300 m of the focal group of dolphins was recorded as 86, at Tapeka Point (35°14'31.11'S, 174°7'10.82'E) on 3<sup>rd</sup> January 2015. This included 4 permitted vessels, 8 un-permitted and 74 private vessels, of which 70.9% (n=61) were stationary.

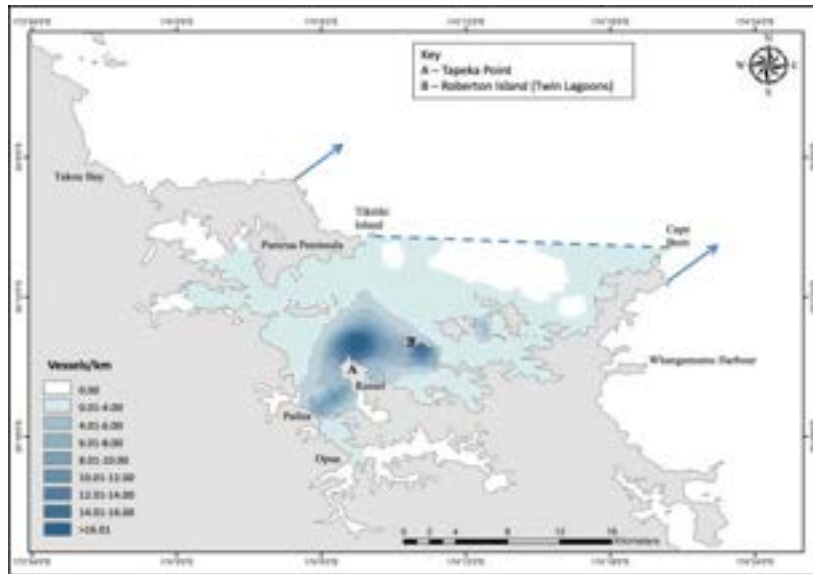
The maximum number of vessels to interact with one group, over the course of an hour, was 294 vessels (min=1, mean=118). The number of vessels present simultaneously within 300 m (whether interacting or not) was highest within Russell Harbour and totalled 181 vessels (min=1, mean=14). Of these, 65.7% (n=119) were stationary vessels and therefore not positioned to view, the rest were partaking in an organised race event and were positioned to view.

Vessel interactions were observed in high densities areas (>8.01 per km effort) near Tapeka Point, Robertson Island, and between Paihia and Russel harbours (Figure 39). The heavy vessel traffic areas of Tapeka Point and Robertson Island overlap with high density use areas for bottlenose dolphin.

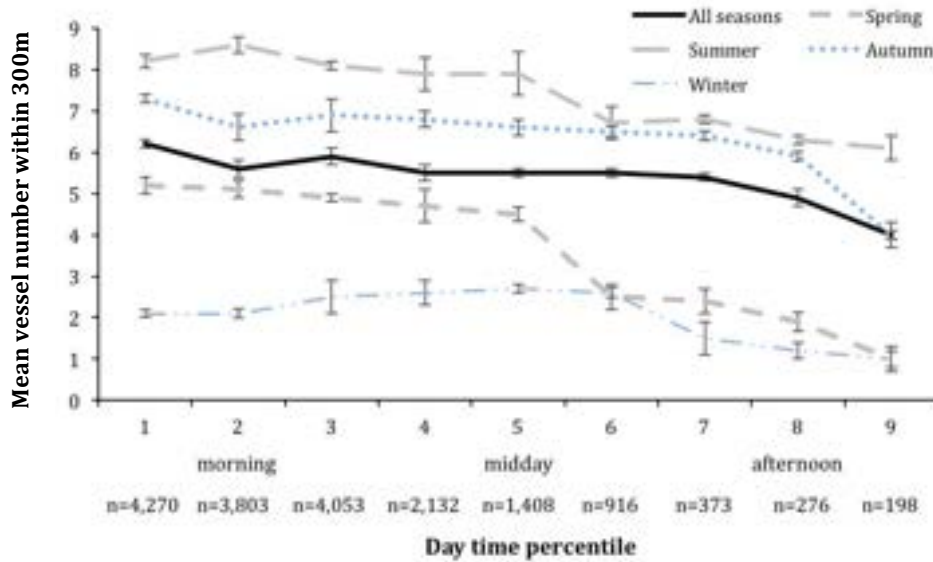
In 25.0% (n=55) of focal follows from the RV, four or more vessels were observed interacting with dolphins simultaneously and in 36.8% (n=81) of focal follows, two or three permitted vessels were observed. This included permitted vessels arriving after three un-permitted boats were already interacting with dolphins (20.9%, n=46).

Vessel traffic interacting with focal dolphin group was unevenly distributed throughout the day (Figure 40). Traffic was highest in the morning and steadily decreased across the rest of the day. Most of the traffic occurred in the first hour of daylight (24.5%, n=4,270). The mean number of vessels was always over three throughout the day (n=17,429).

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**Figure 39:** Vessel point density weighed by km effort on encounter between December 2012 and April 2015, in Bay of Islands waters, New Zealand. Contours realised by generating individual new vessel points during encounter corrected for *in encounter* effort. Blue dotted line represents harbour boundaries for the BoI.

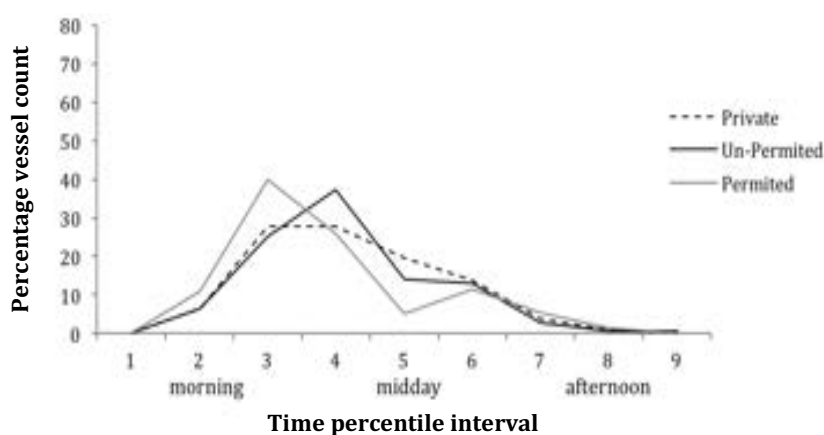


**Figure 40:** Vessel traffic in relation to percentile of daylight hours and season within 300m of dolphins between December 2012 and April 2015, in Bay of Islands waters, New Zealand. Error bars are standard error.

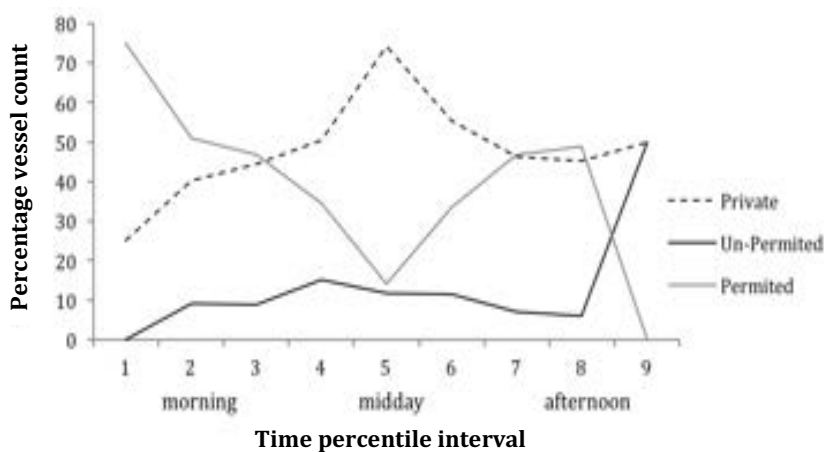
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There were differences in usage of the BoI throughout the day (Figures 41-43). The presence of private vessels peaked between the third and fourth percentile and was lower when light levels were lower (1<sup>st</sup> and 8<sup>th</sup> onward). The aforementioned peak corresponds with the busiest time for vessel traffic either leaving or returning to Port Opuia, Russell or Paihia. Private vessel owners whose primary activity is fishing tended to be out early in the morning heading out of the Inner Harbour and sit fishing in Middle Grounds and Outer Bays before returning later in the afternoon. The type of vessels more likely to remain within Inner Bays and Inner Islands were kayaks and yachts, as well as private craft used for biscuiting, water skiing, and jet skis.

A

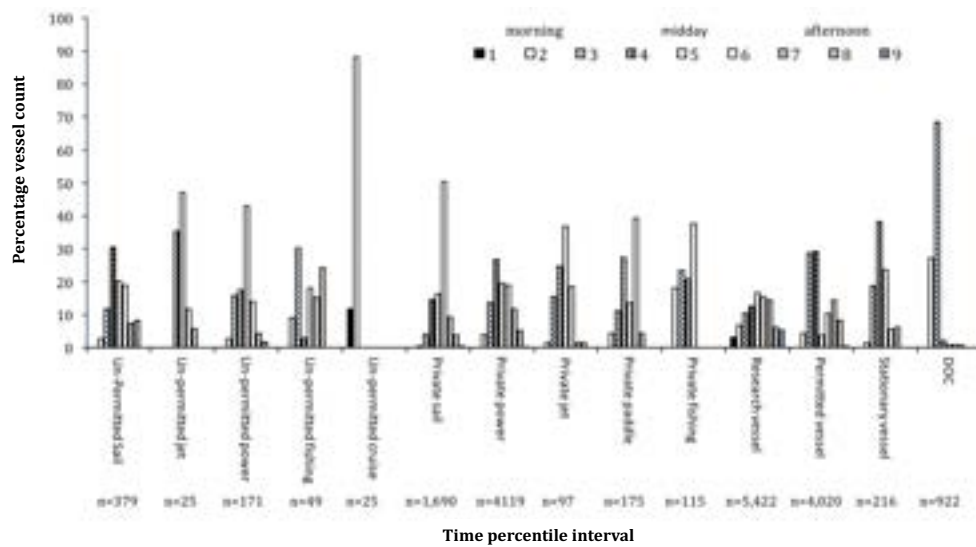


B



**Figure 41:** Diurnal variation in vessel traffic within 300m of dolphins between December 2012 and April 2015 in Bay of Islands waters, New Zealand. Daylight percentile is presented to account for seasonal variation in sunrise hour. A) Vessel category diurnal variation and B) Overall diurnal variation of vessels

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**Figure 42:** Vessel type diurnal variation in vessel traffic within 300m of dolphins between December 2012 and April 2015 in Bay of Islands waters, New Zealand. Daylight percentile is presented to account for seasonal variation in sunrise hour.

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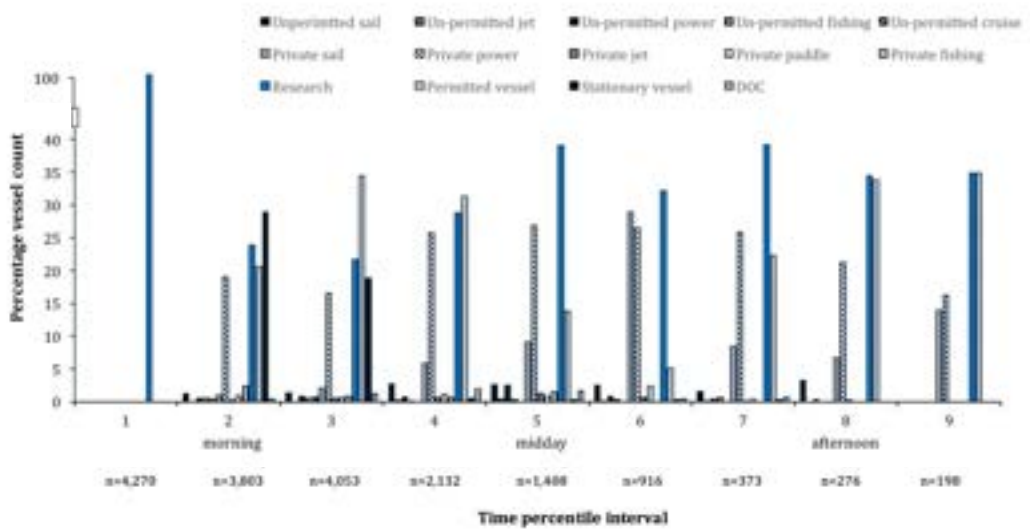
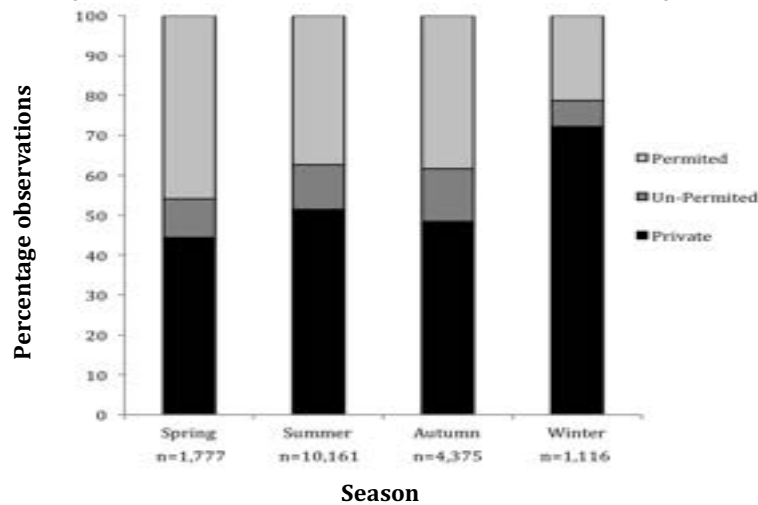


Figure 43: Overall diurnal variation of vessel traffic within 300m of dolphins between December 2012 and April 2015 in Bay of Islands waters, New Zealand. Daylight percentile is presented to account for seasonal variation in sunrise hour.

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Un-permitted vessels usage of the BoI showed a similar pattern to private vessels, peaking around the middle of the day (4<sup>th</sup> percentile) before declining throughout the rest of the day, with a plateau between the fifth and sixth percentile. The percentage of private vessels peaked in quartile five, which corresponded with a decrease in permitted vessels. For permitted boats, the peaks observed (3<sup>rd</sup> and 6<sup>th</sup> percentile) correspond to less than an hour after their tour departure times and when most operator vessels (n=5) were out on the water (both watching and swimming). The trough recorded (5<sup>th</sup> percentile) occurred within the ‘cetacean lunch break’, when most vessels were back at the wharf in Paihia before their next trip. When assessing vessel traffic across the seasons (Figure 44), differences in usage of the BoI were detected between the different vessel categories.



**Figure 44:** Percentage of vessel traffic within 300m of dolphins by season for various vessel categories in Bay of Islands waters, New Zealand, between December 2012 and April 2015.

Private vessels were the predominant vessel types across all seasons (>40.0%, Figure 45). Research vessel presence was uniform during all months and excluded from the vessel traffic analysis. Permitted vessels had the highest percentage of all vessel type in spring. Some of the dedicated swim-with-dolphin vessels from the summer season come off the water in April after the summer season, reducing the number of dedicated dolphin swim and view vessels from six to three in autumn.

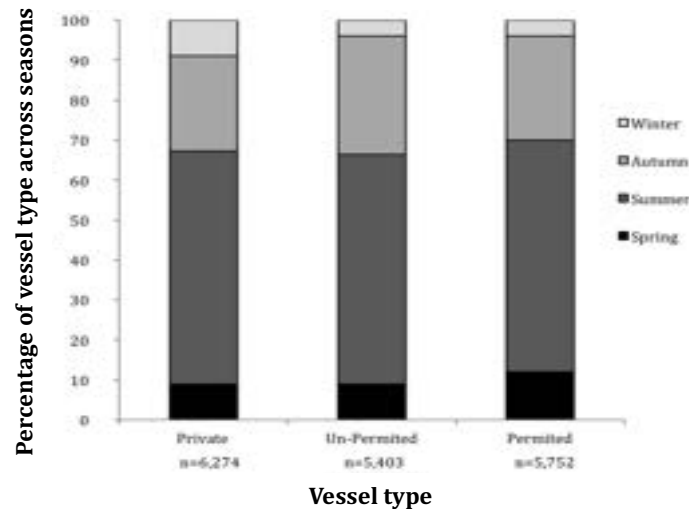
All vessels types were most common in summer. The majority of private vessels used the area in summer and autumn, coinciding with the school holidays (summer and Easter) for most New Zealanders. Unlike other types of private vessels, which were observed more often in summer, private sailboats were more prevalent in spring (Figure 45) (23.1%, n=185). Permitted tourism vessels were also most prevalent in summer and lowest in winter and spring. Un-permitted vessels were recorded least in winter (Figure 45).

Finally, vessel traffic differed between weekdays and weekends. There was no significant difference in the number of commercial and RVs between weekend and weekdays as their activity was dependent on weather and/or demand (Kruskal-Wallis:  $h=13.62$ ,  $df=1$ ,  $p<0.001$  and Kruskal-Wallis:



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$h=17.81$ ,  $df=1$ ,  $p<0.001$ ). Conversely, private vessels were observed more frequently during weekends (Kruskal-Wallis:  $h=52.81$ ,  $df=1$ ,  $p<0.001$ ).



**Figure 45:** Seasonal vessel traffic by category within 300m of dolphins in Bay of Islands waters, New Zealand, between December 2012 and April 2015.

#### 5.13.4. Vessel manoeuvres

Permitted vessels (both swimming and viewing) were significantly more likely to reverse during encounters (93.1%,  $n=108$ ) than private and un-permitted vessels combined (6.9%,  $n=8$ ; Kruskal-Wallis:  $h=48.32$ ,  $df=1$ ,  $p<0.001$ ). In viewing only encounters, reversing was observed less by both permitted (9.3%,  $n=11$ ) and private and un-permitted vessels (5%,  $n=6$ ) reversing encounters respectively.

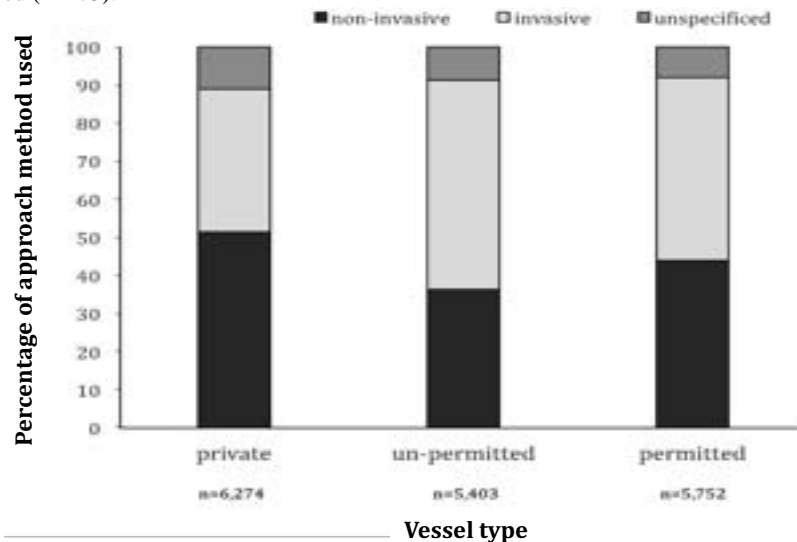
#### 5.13.5. Number and type of approaches per vessel

Permitted vessels primarily approached dolphins once (98.0%,  $n=5,637$ ) per trip. Occasionally permitted vessels were observed interacting twice with the same focal group (2.0%,  $n=115$ ) but were never observed interacting more than twice. Similarly, un-permitted and private vessels mainly approached dolphins once (72.0%,  $n=8,407$ ), although they were more likely to approach the same focal group twice (17.0%,  $n=1,985$ ) or more (11.0%,  $n=1,285$ ) with a maximum of four times (4.0%,  $n=467$ ) than permitted vessels.

When within 300m of the focal dolphin groups, vessel types utilised significantly different approach techniques (Kruskal-Wallis:  $h=08.24$ ,  $df=2$ ,  $p=0.022$ , figure 46). For the 9,445 vessel approaches recorded, private vessel favoured a non-invasive approach (as per MMPR's) in 51.4% of observations ( $n=3,225$ ), 86.2% of these approaches occurred when vessel passed through the area and did change path and engage the group ( $n=2,780$ ). Private vessels approached in an invasive manner in 37.4% ( $n=2,346$ ) and unspecified in 11.1% ( $n=1,138$ ). Commercial permitted vessels did not significantly favour invasive over non invasive with 48.1% and 44.0% respectively ( $n=2,767$  and  $n=2,531$  respectively). The vessels to show the highest proportion of invasive approach were un-

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permitted vessels, with 54.9% invasive (n=2,966), 36.3% non-invasive (n=1,961) and only 8.8% unspecified (n=475).



**Figure 46:** Approach technique utilised by vessel category between December 2012 and April 2015, in Bay of Islands waters, New Zealand.

#### 5.13.6. Vessel speed within 300 m of the focal dolphin group

When within 300m of the focal dolphin groups, vessel types travelled at significantly different speeds (Kruskal-Wallis:  $h=32.11$ ,  $df=2$ ,  $p<0.001$ ).

For the 9,445 vessel speed approaches recorded, non-motorised vessels (e.g. kayaks, stand-up paddleboards or rowing craft) were the slowest (mean=3.1 knt; 0.2 SE, range=0-5knt, n=486). These were followed by commercial un-permitted vessels (mean=8.3, 0.4 SE, range=1-12knt, n=1,403), within this sail driven vessels (with motor assist and non motor assist) were slower than motorised vessels (mean=5.1, 0.2 SE, range=1-12 min, n=1,021 and mean=7.4, 0.6 SE, range=5-11 min, n=382 respectively). The fastest vessels were personal craft/ jet skis (mean=14.7, max=20+, n=650), inboard motor powered launches (mean=15.6, SE, range=1-20+, n=1,293) and outboard motor powered trailer boats (mean=16.2, SE, range=1-20+, n=1,850).

Permitted vessels generally travelled around the *no wake* speed (ca. 5 knts) on approach (mean=5.7 knts, SE, range=1-8.1, n=2,860), although the highest speed observed was 8.1 knts on approach. The *no wake* speed was more likely to be observed by both permitted (24.0%, n=903) and commercial un-permitted vessels (18.0%, n=253), than by inboard motor powered launches (79.1%, n=1,024), outboard motor powered trailer boats (86.3%, n=1,596), and by personal craft such as jet skis (90.0%, n=585). Non-motorised vessels always travelled under 5knts.

On departure, permitted vessels generally travelled above the *no wake* speed (mean=11.3knts, n=640), the highest speed observed was 23knts. The *no wake* speed (ca. 5knts) was observed when departing dolphins 17.3% of the time (n=651) by permitted vessels, 89.2% (n=1,252) by commercial un-permitted vessels, 9.5% (n=123) by inboard motor powered launches, 8.1% (n=150) by outboard

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motor powered trailer boats, and 3.2% (n=16) by personal craft (jet skis). Non-motorised vessels always travelled under 5knts.

#### 5.14. *Swimming with dolphins*

A total of 92.2% (n=868) and 7.8% (n=73) swim encounters were monitored from permitted vessel platforms and the RV, corresponding to 90.4% (n=2,491) and 9.6% (n=264) of swim attempts, respectively. Swimmers were primarily deployed from permitted vessels (62.5%, n=1,721 attempts), followed by private vessels (28.5%, n=758). An additional 5.9% (n=165) and 5.7% (n=157) swim attempts were recorded from un-permitted vessels and the beach, respectively.

Of the 2,500 permitted swim attempts monitored from permitted vessels, 43.3% (n=1,083) were classified as normal, 34.5% as light (n=863), 14% (n=350) swapped swimmers on board and 8.2% (n=205) had double-loads.

Under their permit conditions, operators must restrict the number of swim attempts to a maximum of 3 per encounter and the number of swimmers to a maximum of 18 per attempt (including *repeat swimmers*). Multiple swim groups occurred when there were more than 18 swimmers on board the vessel (swap). Swimmers would rotate during the same swim attempt on occasion (i.e. one or several swimmers would get back on the vessel, allowing others to enter the water, while other swimmers remained in the water throughout).

A mean of 2.4 (SE=0.002, range=0-6, n=1,721) repeat swimmers per attempt was noted from permitted vessels. While these cannot be listed as separate swim situations, they are, however, worth noting as these involved 25,378 swimmers.

During the 73 swim encounters with bottlenose dolphins monitored from the RV, a maximum number of 20 swimmers were placed in the water at the same time from one permitted vessel (min=1, mean=16, SE=0.003, range 1-20, n=73), with more than 18 swimmers in 28.8% of swims (n=21). A maximum number of 7 swim attempts occurred per swim encounter (mean=2.0, SE=0.001, range 1-7, n=73). A large number of observations included only 1 swim attempt per encounter (n=31, 42.4%, Table 16). Overall, more than 3 swim attempts per operator was observed in 11% of swim encounters (n=93).

**Table 16:** Swim attempt characteristics with bottlenose dolphins by vessel type between December 2012 and April 2015 in Bay of Islands waters, New Zealand. Standard error=Standard error of the mean.

Vessel Category	Mean number of swim attempts /swim encounter	Range of swim attempts /swim encounter	Maximum swimmers / swim attempt	Maximum swimmers / swim attempt (including repeat swimmers)
Permitted Op1	2.12 (SE 0.03, n=62)	1-3	18 (n=203)	20
Permitted Op2	2.74 (SE 0.07, n=408)	1-4	20 (n=1,158)	21
Permitted Op3	2.61 (SE 0.04, n=376)	1-4	20 (n=1,139)	22
Un-Permitted	1.52 (SE 0.22, n=18)	1-2	3 (n=165)	6
Private	5.13 (SE 0.35, n=50)	1-7	20 (n=758)	29
Shore	2.52 (SE 0.08, n=27)	1-4	8 (n=157)	12

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#### 5.14.1. Swim technique and approach

The majority of swim attempts monitored from both research vessel and permitted vessel platforms consisted of free swims (92.8%, n=245 and 93.0%, n=2,316, respectively), while the remaining used a boom net (7.2%, n=19 and 7.0%, n=175). Note, only one permitted vessel uses nets, which explains the difference.

Reversing before and during a swim attempt was a technique used during 43.2% (n=114) and 37.2% (n=927) of the swim attempts observed from the research vessel and permitted vessel platforms, respectively. From both observation platforms, this technique was performed primarily by permitted operators, 42.8% (n=113) and 35.8% (n=892), respectively (Table 17). Dolphins were recorded as approaching during 93.2% of reversing *head-on/in-path* manoeuvres (n=970).

**Table 17:** Swim placement characteristics with bottlenose dolphins by vessel type between December 2012 and April 2015 in Bay of Islands waters, New Zealand.

Vessel Category	% Swim placement using <i>line abreast</i>	% Swim placement through reversing <i>head-on/in-path</i>
Permitted Op1	48.1 (n=98)	3.1(n=6)
Permitted Op2	14.2 (n=164)	84.2 (n=975)
Permitted Op3	16.6 (n=189)	76.2 (n=868)
Un-Permitted	75.3 (n=124)	0 (n=0)
Private	50.3 (n=381)	4.4 (n=33)
Shore	N/A	N/A

#### 5.14.2. Duration

For all permitted swim encounters swim attempt duration was calculated from observations taken on-board permitted vessels only to improve accuracy (n=868 min). Under current permit conditions, permitted vessels are restricted to a maximum of 50 min interaction time with bottlenose dolphins per trip. There is no separate additional time limit on swim attempt duration.

Mean swim duration lasted 9.5 min (SE=0.91 min, range=3.38-18.64, n=2,491). The majority of individuals swim attempts (65.0%, n=1,619) lasted less <5 min, while a small percentage (18.0%, n=324) lasted >10 min. Overall, the length of swim encounters ranged from 5-77 min (mean=47.7 ± 11.5 SE) min per encounter. For all other vessel types excluding permitted vessels (n=776 min), mean swim attempt duration lasted 10.6 min (SE=0.23 min, range=0.57-16.31, n=264). Similar to permitted vessels, the majority of swim attempts (37.4%, n=99) lasted <5 min, while a larger percentage (29.1%, n=77) lasted >10 min.

The longest duration recorded for a continuous swim was 43.9 min, and involved a private vessel. The length of swim encounters ranged from 2-104 min, with a higher mean than permitted vessels of 53.2 min per encounter (± 14.4 SE).

#### 5.14.3. Presence of other vessels in the vicinity of swimmers

In 89.0% (n=65) of swim encounters observed from the research vessel, there was another vessel within 300m at some point, equating to 69.2% of the time (n=449 observations, n=1,346 minutes).

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Out of the 2,491 swim attempts monitored aboard permitted vessels, 76.0% (n=1,893) were recorded in the presence of other vessels within 300 m. This included one additional and two additional permitted swim vessels 57.3% (n=1,427) and 11.1% (n=277) of the time, respectively.

#### **5.14.4. Group size and composition**

Bottlenose dolphin group size recorded aboard the permitted vessels indicated that the majority (76.0%, n=1,894) of swims occurred with small groups ( $\leq 10$  individuals) and groups containing only adults (40.7%, n=1,014). Swims were documented with larger groups (11-30 and  $>30$  individuals) 17.2% (n=428) and 9.3% (n=232) of the time, respectively (Figure 45). Groups containing adults and juveniles represented only 3.7%, (n=93) of observed swims. On 18.0% (n=449) occasions, calves or neonates were present, which is in contradiction to the MMPR (1992). A very similar trend was recorded aboard the research vessel during all swim attempts with bottlenose dolphins. The majority (56.1%, n=148) of swims occurred with small groups ( $\leq 10$  individuals), followed by groups containing 11-30 individuals (43.3%, n=144) (Figure 47).

In the majority of swims, only adult dolphins were recorded (64.8%, n=171). Juveniles were present an additional 12.5% (n=33) of the swims, 27.3% of those involving a permitted vessel. The number of swims with calves observed from the research vessel was slightly higher than those recorded aboard permitted vessels (23.1%, n=61). No swim attempt with calves from a permitted vessel was observed. Calves or neonates were sighted, however, in focal dolphin groups prior or post a swim encounter 18.9% of the time (n=50).

#### **5.14.5. Solitary dolphins**

For all swims observed from both platforms, 17.3% (n=477) occurred with lone dolphins. In 97.1% of occasions solitary dolphins exhibited initial avoidance (n=463), while in 62.3% of these events, the singleton returned to approach and interact with swimmers (n=289). The aforementioned 62.3% (n=289) occurred with a single identifiable individual. During those swim attempts the mean number of swimmers was 50.4, (SE=0.9, range=8-58) which consisted of swimmers from multiple boats.

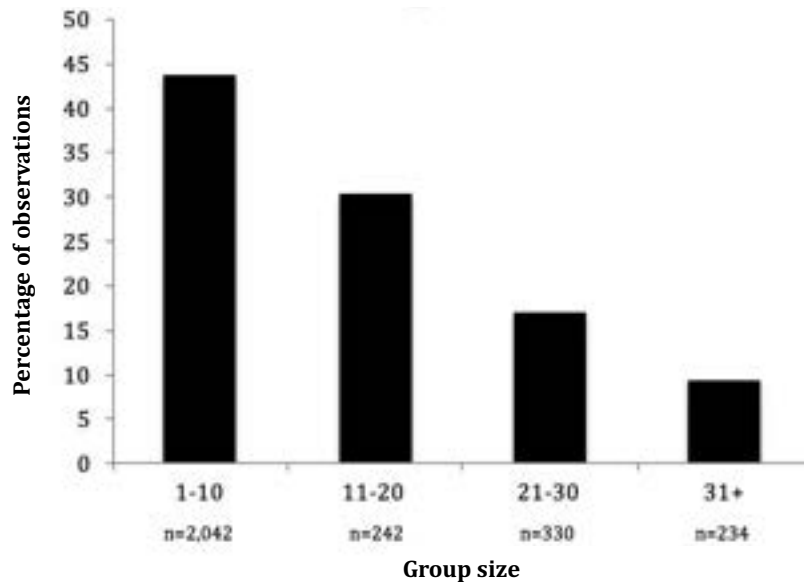
#### **5.14.6. Dolphin reaction to swimmers**

Behaviour of bottlenose dolphins in the presence of swimmers was monitored from both aboard the permitted vessels (n=2,491 attempts) and the research vessel (n=264), with similar trends observed.

In 31.1% of swim attempts (n=774 and n=82), dolphins approached the swimmers upon entering the water. In 79.0% of observed approaches the dolphins involved were identified as predominantly frequent users (n=676). Predominantly infrequent users (12.0%, n=103) and predominantly occasional visitors (9.0%, n=77) occurred on other occasions.

During 24.5% (n=610) and 23.5% (n=62), of swim attempts respectively, the dolphins avoided swimmers when entering the water. In 58.0% of such observed avoidance responses, the dolphins involved were identified as predominantly infrequent users (n=390), predominantly occasional visitors in 24.7% (n=166) and predominantly frequent users in 17.3% of observations (n=116). In most cases (44.4%, n=1,107, and 45.5%, n=120), no observable response was detected.

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**Figure 47:** Bottlenose dolphin group size during swim encounters monitored from on-board permitted vessels, between December 2012 and April 2015, in Bay of Islands waters, New Zealand.

#### 5.14.7. Response to vessels/swimmers according to time into an encounter

##### a) Approach

Dolphin group response was observed during 73 swim encounters. A summary of orientation is presented in Table 18.

**Table 18:** Orientation of bottlenose dolphin *approach* swimmers and/or vessel(s) relative to time into swim encounters (3 minute-intervals) between December 2012 and April 2015, in Bay of Islands waters, New Zealand.

Time into encounter (min)	Total number of orientations (n)	Total approach orientations	Proportion approach orientation
0-3	815	576	0.707
>3-6	642	431	0.671
>6-9	565	389	0.688
>9-12	144	108	0.750
>12-15	94	74	0.787
>15-18	64	53	0.828
>18-21	54	47	0.870
>21-24	47	41	0.872
>24-27	34	29	0.853
>27-30	10	8	0.800

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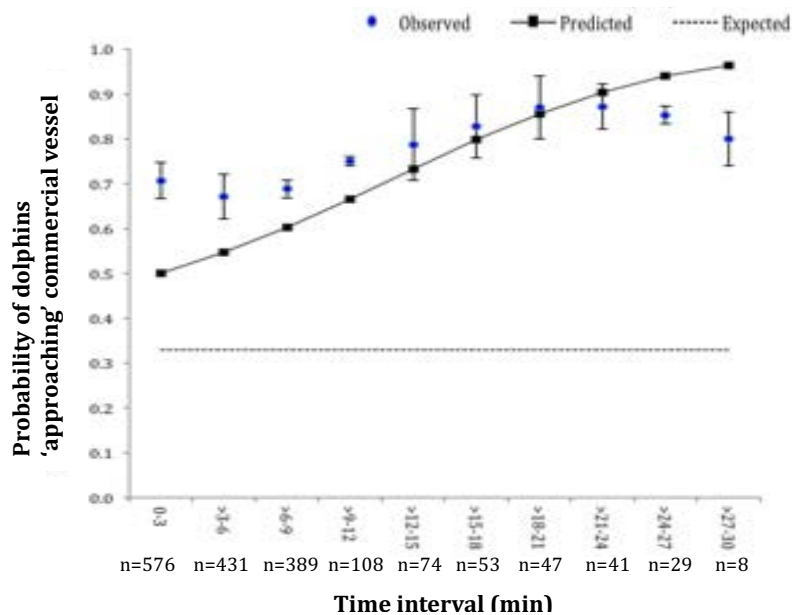
The best fitting model to explore response to swimmers when dolphin approached was model 3 (Table 19). The goodness-of-fit test of model 3 showed no evidence of lack of fit ( $p < 0.05$ ), thereby confirming that this model was a good predictor of the probability of a group of dolphins approaching swimmers and/or vessel(s) as a function of time into an encounter.

Dolphin groups exhibited significant attraction towards swimmers and/or vessel(s) for the duration of a swim encounter ( $p < 0.05$ , Figure 48). However, after the initial 24 min, less than predicted orientation towards swimmers and/or vessel was evident (Figure 48).

**Table 19:** Analysis of deviance for assessing goodness-of-fit of models performed using logistic regression to predict bottlenose dolphin movement towards swimmers/vessels as a function of time into a swim encounter between December 2012 and April 2015, in Bay of Islands waters, New Zealand. Note: d.f. refers to statistical degrees of freedom.

Model	AIC	Deviance	d.f.	Deviance difference	d.f.	Estimates for fitted equation
Constant	209.87	161.43	9			0.444
Constant + T	87.107	36.664	8	124.760	1	-0.267
Constant + T + T <sup>2</sup>	85.641	33.198	7	3.466 (*)	1	-0.093
Constant + T + T <sup>2</sup> + T <sup>3</sup>	63.147	8.704	6	24.494 (ns)	1	0.527

(ns)=not significant at  $p < 0.05$ . \*=significant at  $p < 0.05$ .



**Figure 48:** Probability of a dolphin group heading towards swimmers and/or vessel(s) as a function of time (min) into the swim encounter, between December 2012 and April 2015, in Bay of Islands waters, New Zealand. Error bars indicate 95% confidence intervals of predicted probabilities. Note: n=number of observed group orientations in relation to a vessel in a given time interval.

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b) Avoid

Responses of bottlenose dolphin groups away from swimmers and/or vessel(s) are presented in Table 20.

There was no evidence that the addition of T, T<sup>2</sup>, and/or T<sup>3</sup>, further improved the fit (Table 21). As a result, model 1 (constant) was selected. The goodness-of-fit test of model 1 showed no evidence of lack of fit ( $p < 0.05$ ), thereby confirming that this model was a good predictor of the probability of a group of dolphins heading away from swimmers and/or vessel(s) as a function of time into an encounter.

**Table 20:** Orientation of bottlenose dolphin *avoid* response to swimmers and/or vessel(s) relative to time into swim encounters (3 minute-intervals) between December 2012 and April 2015, in Bay of Islands waters, New Zealand.

Time into encounter (min)	Total number of orientations (n)	Total number away orientations	Proportion away orientation
0-3	815	239	0.293
>3-6	642	211	0.329
>6-9	565	176	0.312
>9-12	144	36	0.250
>12-15	94	20	0.213
>15-18	64	11	0.172
>18-21	54	7	0.130
>21-24	47	6	0.128
>24-27	34	5	0.147
>27-30	10	2	0.200

**Table 21:** Analysis of deviance for assessing goodness-of-fit of models performed using logistic regression to predict bottlenose dolphin movement away swimmers/vessels as a function of time into a swim encounter between December 2012 and April 2015, in Bay of Islands waters, New Zealand. Note: d.f. refers to statistical degrees of freedom.

Model	AIC	Deviance	d.f.	Deviance difference	d.f.	Estimates for fitted equation
Constant	209.87	3.385	9			3.291
Constant + T	87.107	3.386	8	0.0001 (ns)	1	n/a
Constant + T + T <sup>2</sup>	85.641	3.371	7	0.0025 (ns)	1	n/a
Constant + T + T <sup>2</sup> + T <sup>3</sup>	63.147	2.947	6	0.4762 (ns)	1	n/a

(ns)=not significant at  $p < 0.05$ .

Dolphin groups moved away from swimmers and/or vessel(s) as expected at the beginning of a swim encounter (0-6 minutes) and then significantly less often than expected for the remaining duration of an encounter (Figure 49).

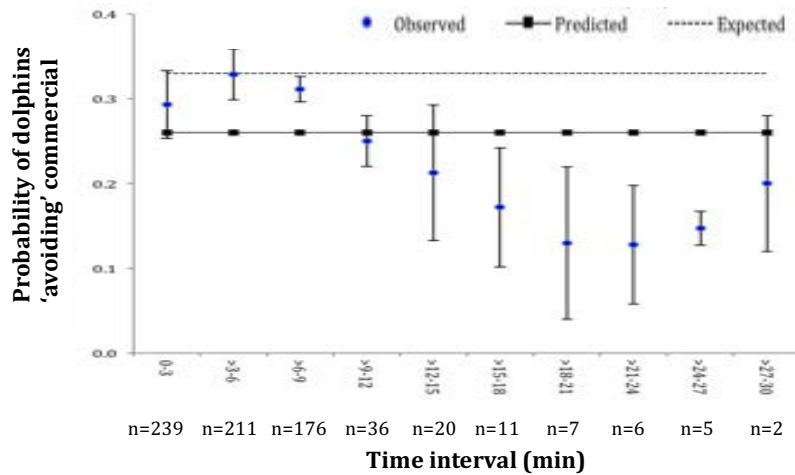
The predicted level of avoidance, while constant, remained low at 0.261 (Figure 49).

In order to explore response to swimmers further, the proportion of the group engaging in swim encounter over time was analysed by user type. Frequent users showed increased attraction to swimmers/vessels over time before a rapid decline after 24 minutes. Infrequent users decreased

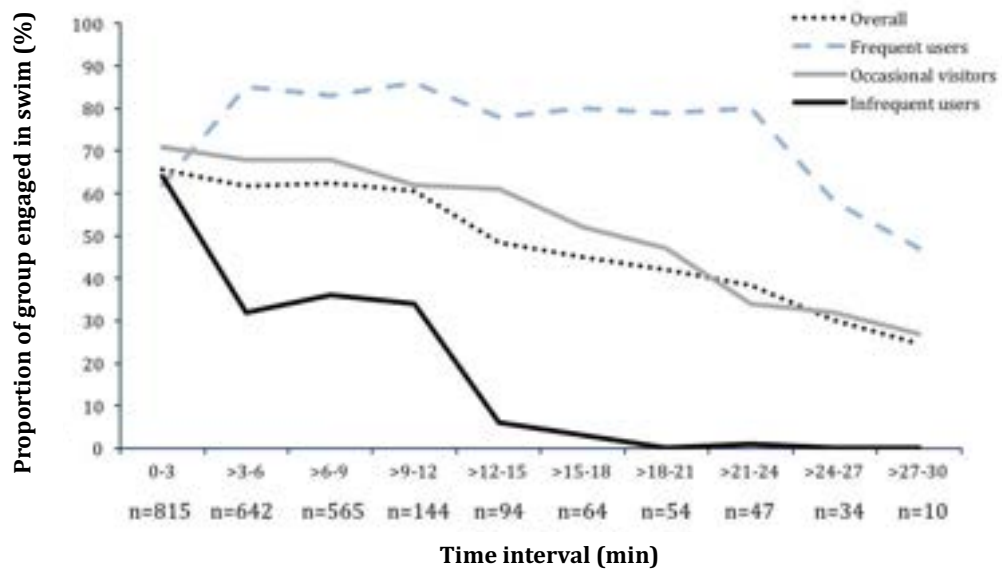


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quickly and then stabilised between >3-12 minutes before declining further after 12 minutes. Occasional visitors showed a steady decline over time (Figure 50).



**Figure 49:** Probability of a dolphin group heading away from swimmers and/or vessel(s) as a function of time into the swim encounter (min), between December 2012 and April 2015, in Bay of Islands waters, New Zealand. Error bars indicate 95% confidence intervals of predicted probabilities. Note: n=number of observed group orientations in relation to a vessel in a given time interval.



**Figure 50:** Proportion of a dolphin group engaging with swimmers and/or vessel(s) as a function of time into the swim encounter (min), between December 2012 and April 2015, in Bay of Islands waters, New Zealand. Note: n=number of observed number of animals engaging in a swim in a given time interval.

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#### 5.14.8. Swim attempts in relation to season, number of vessels present and type of swim tour

The number of swim attempts varied significantly by season ( $F=8.56$ ,  $p<0.001$ ), number of boats present ( $F=10.41$ ,  $p<0.001$ ) and type of swim tour ( $F=12.68$ ,  $p=0.002$ ). Swim drops were observed significantly ( $F=7.83$ ,  $p<0.000$ ) more in summer and autumn, when SST was higher, compared to spring and winter (Table 22). As the number of permitted swim boats increased, so did the number of observed attempts (Table 22). Since the presence of other vessels than permitted vessels was not included in the analysis, the number of vessels actually interacting with focal dolphin groups is underestimated. In addition, when there were more than 18 swim passengers on-board (double-swap loads) these trips had a significantly ( $F=13.22$ ,  $p=0.031$ ) greater number of drops than light or normal trips (Table 22).

Mean length of swim drops varied significantly by season ( $F=7.94$ ,  $p<0.001$ ) and type of swim tour ( $F=2.68$ ,  $p<0.001$ ), although the number of boats present had no effect on duration ( $F=2.93$ ,  $p=0.31$ ). Swim drops were significantly shorter in summer and autumn than in spring or winter (Table 22).

When the tour type (swimmer numbers) was light or normal, swim attempts were significantly longer than swap or double-load (Table 22).

Swim encounter duration also varied significantly across all tour types ( $F=19.82$ ,  $p<0.001$ ), with the longest swim encounter duration observed in swap and double-load tours. Overall, no significant variation was detected across season ( $F=1.52$ ,  $p=0.15$ ), except between summer and all other seasons ( $F=2.93$ ,  $p=0.031$ ). In the presence of three permitted boats, swim period was significantly higher than when one or two permitted boats were within 300 m ( $F=4.71$ ,  $p<0.001$ ).

**Table 22:** Swim attempt characteristics with bottlenose dolphins by season, number of tour boats present, and type of swim tour between December 2012 and April 2015, in Bay of Islands waters, New Zealand. Significant differences ( $p<0.05$ ) are denoted by superscripts after the values in the same section.

Season	n	#Swim attempts	Mean Length (min)	Swim Period (min)
Summer	277	4.2 (SE 0.23) <sup>2,3,4</sup>	5.2 (SE 0.72) <sup>2,3,4</sup>	42.5 (SE 3.16) <sup>2,3,4</sup>
Autumn	331	4.1 (SE 0.26) <sup>1,3,4</sup>	7.2 (SE 0.39) <sup>1,3,4</sup>	36.4 (SE 2.23)
Winter	70	2.7 (SE 0.52) <sup>1,2</sup>	8.4 (SE 0.48) <sup>1,2,4</sup>	34.2 (SE 2.94)
Spring	190	2.6 (SE 0.54) <sup>1,2</sup>	10.2 (SE 0.41) <sup>1,2,3</sup>	36.1 (SE 2.57)
#Boats				
1	208	3.5 (SE 0.24) <sup>2,3</sup>	8.5 (SE 0.63)	32.1 (SE 1.01) <sup>3</sup>
2	495	4.8 (SE 0.25) <sup>1</sup>	8.2 (SE 0.37)	34.3 (SE 1.23) <sup>3</sup>
3	95	4.2 (SE 0.31) <sup>1</sup>	8.4 (SE 0.54)	41.5 (SE 1.26) <sup>2,3</sup>
Tour type				
Light	300	3.0 (SE 0.55) <sup>3,4</sup>	10.2 (SE 0.91) <sup>3,4</sup>	26.4 (SE 3.06) <sup>2,3,4</sup>
Normal	376	3.5 (SE 0.54) <sup>3,4</sup>	10.2 (SE 0.73) <sup>3,4</sup>	41.6 (SE 2.38) <sup>1,3,4</sup>
Swap	121	4.3 (SE 0.43) <sup>1,2,4</sup>	8.0 (SE 0.72) <sup>1,2</sup>	57.3 (SE 2.22) <sup>1,2,4</sup>
Double-load	71	5.3 (SE 0.53) <sup>1,2,3</sup>	8.5 (SE 0.65) <sup>1,2</sup>	68.0 (SE 2.07) <sup>1,2,3</sup>

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#### 5.14.9. Distance to shore

Permit conditions dictate that vessels and/or swimmers must maintain a minimum distance of 60 m from the shore.

Swims occurred at a mean distance of 884.4m (SE=0.4, range=5.7-913.1, n=2,491), with the large majority recorded at >60 m (97.3%, n=2,423). The remaining 2.7% (n=68) of observations occurred within <60 m of the shore, with dolphins between the vessel and shore. Close to shore observations were primarily recorded in spring and summer (77.9%, n=53) and in the presence of permitted vessel (72.1%, n=49). Similar trends were recorded for the 264 swim attempts monitored from aboard the RV. The mean distance of swims was 898.9m (SE=0.7, range=32.5-3,029.1, n=264). Over 95% of the swim attempts (n=255) occurred >60 m of the shore. The remaining 3.4% (n=9) were observed <60 m from shore, with dolphins between the vessel and shore. Close to shore observations were primarily recorded in spring and summer (77.8%, n=7) and in the presence of permitted vessel (66.7%, n=6).

### 6. Summary of deliverables

A summary of results is provided for each contractual objective, including discussion of how results presented differ from previous findings presented by Constantine, 2002; Constantine et al., 2004; Hamilton 2013; Hartel et al., 2014; Tezanos-Pinto 2009 and Tezanos-Pinto et al., 2009.

#### 6.1. Determine season-specific extent of bottlenose dolphin range use within BoI waters.

- A total of 96 uniquely identifiable individuals were documented between December 2012-April 2015, demonstrating varying re-sight rates. Frequent users and occasional visitors were observed in the same proportion (both n=19, 19.8%), while the majority group were defined as infrequent users, accounting for 60.4% (n=58) of all individuals observed (Figure 21).
- All 19 *frequent users* were recorded during all months between December 2012-April 2015 (Figure 22).
- Ten identifiable adult females were observed with 12 young of the year calves, whose fates were documented during the study period. However, only 25.0% (n=3) of those calves are suspected to have survived for over two years to perceived independence, with 75.0% mortality observed in the first two years of life (n=9).
- Bottlenose dolphin distribution occurred throughout the study area, though spatial mapping infers higher density use areas in BoI middle ground (Zone D) and inner islands (Zone E) (Figure 14).
- While broad scale distribution is consistent with previous studies (Hartel et al., 2014), fine-scale habitat use has shifted to a small area around Tapeka Point and the eastern end of Robertson Island. Indeed, fine scale distribution patterns of bottlenose dolphins indicate high-density use is focused around Tapeka Point and Robertson Island, while the outer islands areas (Zones H & G) are no longer characterised as high use (Figure 14).
- The largest number of sightings occurred in summer and autumn with 0.03 sightings/km effort (31.0%, n=626 and 30.9%, n=624 of all sightings, respectively) and least in winter with 0.01 sightings/km effort (12.8%, n=259). Dolphins showed a strong seasonal preference for the Inner Islands (Zone E) in winter (58.4%, n=151) and spring (59.6%, n=304). In summer and autumn, sightings were more distributed utilising the Inner Islands (48.6%, n=304 and 44.2%, n=276, respectively) and Middle Grounds (42.8%, n=268 and 35.2%, n=220, respectively). Tapeka Point and Robertson Island were high-density areas year round.

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**6.2. Quantify and document the type, level and operational effort of existing bottlenose dolphin tourism activity within the BoI waters.**

**6.2.1. What is the current level of effort (swimming and viewing, private and commercial, permitted and un-permitted)?**

- Private vessels were the most prevalent type of vessels recorded within 300m of dolphins in the BoI (36.0%, n=6,274). However, both permitted and un-permitted commercial vessels also demonstrated a strong presence, accounting 33.0% (n=5,752) and 31.0% (n=5,403) of the vessels observed in the BoI, respectively.
- The cumulative viewing effort of all vessel types, within daylight hours, resulted in a mean of 11.3 continuous min per day without the presence of vessels (other than the research vessel n=17,402).
- The cumulative effort of all vessel types with bottlenose dolphin equates to 14.3% of daylight hours without vessels (n=17,402).
- Effort varied seasonally. The lowest mean time without vessels occurred in summer with 8.1% of daylight hours (n=10,161) and highest in winter with 30.3% of daylight hours (n=1,116). Vessel effort in Spring and Autumn were similar with 16.2% (n=1,777) and 14.3% respectively (n=4,375).
- All vessel types exerted significantly more cumulative viewing effort in summer/spring than autumn/winter.
- Cumulatively, permitted vessels spent significantly more time viewing dolphin groups (n=5,752) than un-permitted commercial vessels (n=5,403). Private vessels spent significantly less time with dolphin groups (n=6,274) than permitted and un-permitted vessels.
- Viewing effort of permitted vessels in summer/spring resulted in a cumulate mean of 309 min (n=4,084) compared to 106 min in autumn/winter (n=1,668).
- The mean continuous time permitted vessels spent viewing dolphins per trip was 113 min in spring/summer (n=4,084) *versus* 52 min in autumn/winter (n=1,668).
- Un-permitted vessels spent significantly less time viewing dolphin groups in spring/summer (n=3,620) than autumn/winter (n=1,783).
- Un-permitted vessels viewed dolphins continuously for a mean of 37 min in spring/summer (n=3,620) *versus* 12 min in autumn/winter (n=1,783).
- Cumulative effort of viewing by private vessels was significantly greater in spring/summer (n=4,185) than autumn/winter (n=2,089).
- Private vessels spent the least time viewing dolphins in all seasons, with a mean of 18 min in spring/summer (n=4,185) *versus* 9 min in autumn/winter (n=2,089).
- A total of 941 swim encounters were monitored, 92.2% (n=868) and 7.8% (n=73) swim encounters from permitted vessel platforms and the research vessel, corresponding to 90.4% (n=2,491) and 9.6% (n=264) of swim attempts, respectively.
- Swimmers were primarily deployed from permitted vessels (62.5%, n=1,721), followed by private vessels (28.5%, n=758). An additional 5.9% (n=165) and 5.7% (n=157) swim attempts were recorded from un-permitted vessels and the beach, respectively.
- Of the 2,500 permitted swim attempts monitored from permitted vessels, 43.3% (n=1,083) were classified as normal, 34.5% as light (n=863), 14% (n=350) swapped swimmers on board and 8.2% (n=205) utilized double-loads.
- Overall, the duration of swim encounters ranged from 5-77 min (mean=47.7 ± 11.5 SE, n=2,491) per encounter.
- When tour type was light or normal, swim attempts were significantly longer than swap or double loads.

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- The number of swim attempts varied significantly by season, number of boats present and type of swim tour. Swim drops were observed significantly more in summer and autumn, compared to spring and winter.
- Mean length of swims varied significantly by season and type of swim tour, although the number of boats present had no effect on duration. Swims were significantly shorter in summer and autumn than in spring or winter (Table 20). When the tour type was light or normal, swim attempts were significantly longer than swap or double-load.
- Significant variation in swim encounter duration was detected between summer and all other seasons.

**6.2.2. Does the actual current level of effort of swimming and viewing trips correlate with any significant effects on dolphin behaviour?**

- The current level of effort does have significant effects on dolphin behaviour.
- Significant effects were observed for behavioural budget, bout length, behavioural transitions and time required to return to a given behavioural state.
- Significant variation was observed as a result of:

**Time of day/Season:**

- Travelling and foraging budget varied by time of day, with the highest proportion observed in the afternoon when cumulative dolphin exposure to vessels was highest and direct effort was lowest, just after the second trip departure time for permitted vessels.
- Socialising and milling budget varied by time of day, with the highest proportion observed in the morning when cumulative dolphin exposure to vessels was lowest but direct effort of from all vessel type (particularly permitted vessels viewing and swimming) was highest.
- Despite permitted vessels observing the *cetacean lunch break*, true behavioural bout length and budget could not be assessed in the absence of vessels since both private and unpermitted vessels still continued to interact with dolphins during this time.
- Bout length significantly increased for travelling throughout the day, while milling decreased as cumulative exposure increased (Figure 29B). No resting was observed in the afternoon.
- Energetically important behaviours (foraging, travelling) remained lowest in summer when all vessel type effort was highest. Foraging and travelling was highest in winter when vessel exposure was lowest (Figure 29a).
- The proportion of socialising, milling and diving was highest in summer when all vessel type effort was highest (Figure 30).
- Behavioural bout length was shortest for foraging and travelling in summer when all vessel type effort was highest (Figure 29a).
- Behavioural bout length was longest for diving in summer when all vessel type effort was highest (Figure 29a).

**Vessel presence:**

- Bottlenose dolphins spent significantly less time travelling, foraging and resting and significantly more time socialising, diving and milling in the presence of any vessels within 300m (Figure 31).
- In the absence of vessels, travelling, resting and foraging bouts were longer, while socialising and diving bouts were shorter (Figure 31).

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- All behavioural transitions involving milling, resting and diving, as preceding or succeeding behavioural states, were significantly affected. Similar trends were detected for foraging transitions, as preceding or succeeding behavioural states, with the exception of travelling and milling. Socialising transitions (as both preceding and succeeding behaviour) were only significantly affected for milling and resting. Travelling transitions were the least likely to vary at a significant level as a result of interactions with vessels (Figure 38).
- When in the presence of vessels, dolphins were never observed changing their state from diving, milling, travelling or socialising to resting (Figure 37).
- In most cases where an increase in transition probability was detected, socialising was the succeeding behavioural state.
- The likelihood of dolphins staying in a given state in the presence of interacting vessels within 300m was significantly decreased by 11.5% and 21.2% for foraging and resting, respectively. Opposite trends were detected for both milling and socialising, which significantly increased by 13.5% and 3.9%, respectively (Figure 38).
- Time (min) required to return to a given behavioural state was significantly affected by the presence of vessels for all 6 behaviours. Primarily, when travelling, foraging or resting, dolphins took longer to return to these states when vessels were within 300 m. In contrast, the time needed to return to socialising or milling decreased (Table 15).

**Vessel number:**

- As the number of vessels present within 300 m of dolphins increased, the behavioural budget decreased for travelling, foraging and resting. The magnitude of change further increased as the number of vessels increased, with particularly strong effects noted in the presence of  $\geq 4$  vessels (Figure 35).
- Socialising, milling and diving increased with the largest magnitude of change in the presence of  $\geq 4$  vessels. In particular, dolphins spent significantly more time socialising in the presence of  $\geq 4$  vessels (Figure 35).
- The number of vessels present had a significant effect on mean behavioural bout length (Figure 32).
- As the number of vessels increased from  $\geq 2$  to  $\geq 4$ , bout length decreased significantly further (Figure 32).
- As vessel numbers increased, resting bout length exhibited a further decrease in length in the presence of  $\geq 2$  vessels, and a subsequent increase in the presence of  $\geq 4$ . Though the increase was significant, resting bout length was still significantly lower than in the absence of vessels (Figure 32).

**Vessel type:**

- The behavioural budget of all behavioural states was significantly affected between presence and absence of various vessel types. Mixed vessels had the strongest effect on both diving and milling. Un-permitted vessels had the strongest effects on socialising and foraging (Figure 36).
- Mixed vessel presence had the largest effect on behavioural bout length apart from in milling and foraging situations, when un-permitted vessels demonstrated the largest effect (Figure 33).
- Private and permitted vessels had a similar effect in contrast to un-permitted and mixed. For example, when compared to the absence of vessels, the mean milling bout length increased significantly in the presence of un-permitted and mixed vessels but decreased when private or permitted vessels were present (Figure 33).

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- The largest decrease in behavioural bout occurred for foraging in the presence of un-permitted vessels (Figure 33).
- In the presence of un-permitted vessels, milling bout length significantly increased when compared to all other vessel categories (Figure 33).
- Overall, the presence of un-permitted vessels resulted in a decrease in travelling and foraging and an increase in socialising and milling. Diving and resting was not observed in the presence of un-permitted vessels (Figure 33).

**Swimming:**

- Dolphins exhibited significant attraction towards swimmers and/or vessels for the duration of a swim encounter (Figure 48). Dolphins were observed exhibiting significantly less than expected avoidance, particularly frequent users. This could indicate sensitisation to swim encounters. Infrequent users showed avoidance from the start of a swim indicating avoiding dolphins left quickly and attracted dolphins were the only ones that were engaged in long encounters.
- After the initial 24 min, less than predicted orientation towards swimmers and/or vessel was evident, showing a behavioural change dependent on duration of swim encounter (Figure 48).
- In swims with solitary dolphins higher initial avoidance was observed (97.1%, n=463) compared to swims with groups (>2 dolphins) (24.4%, n=672).

**6.3. What further conditions (if any) could be considered in order to minimise any determined effects? These conditions should address the following questions:**

**6.3.1. What is the average time permitted operators spend with the dolphins? What is the amount of time permitted operators cumulatively spend with dolphins? What period/s during the day do permitted operators activities exert the greatest effort? What season does permitted operators activities exert the greatest effort?**

- Permitted vessels accounted for 33.0% (n=5,752) of dolphin vessel interactions observed.
- For cumulative effort of permitted vessels, please refer to section 6.2.1.
- For seasonal variation in cumulative effort of all permitted vessels, please refer to section 6.2.1.
- The mean continuous time permitted vessels spent with dolphins per trip was 113 minutes in spring/summer (range=0-138, n=4,084) and 52 min in autumn/winter (range=0-77, n=1,668).
- Dolphins in the BoI were exposed to the greatest number of permitted vessel interactions during the peak breeding season (December-February).
- The greatest permitted effort observed corresponds to less than an hour post tour departure times, when operator vessels were out on the water (both watching and swimming). The trough recorded occurred within the *cetacean lunch break*, when most permitted vessels were back at the wharf in Paihia before their next trip (Figure 41-43).

**6.3.2. What is the average time each un-permitted vessel spends with dolphins? What is the cumulative amount of time un-permitted vessels spend with dolphins? What period/s during the day does non-permitted vessel activity exerts the greatest effort?**

- Un-permitted vessels accounted for 31.0% (n=5,403) of vessel dolphin interactions observed.
- For cumulative effort of un-permitted vessels, please refer to section 6.2.1.
- For seasonal variation in cumulative effort of all un-permitted vessels, please refer to section 6.2.1.

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- Un-permitted vessels spent significantly less time viewing dolphin groups in spring/summer (n=3,620) than autumn/winter (n=1,783).
- Un-permitted vessels viewed dolphins continuously for a mean of 37 min in spring/summer (n=3,620) *versus* 12 min in autumn/winter (n=1,783).
- Dolphins in the BoI were exposed to the greatest number of un-permitted vessel interactions during the summer and early autumn, specifically between December and April.
- Usage of the BoI by un-permitted vessels showed a similar pattern to private vessels, peaking around midday (4<sup>th</sup> percentile) before declining throughout the rest of the day (Figure 41-43).

**6.3.3. *What is the average time each private vessel spends with dolphins? What is the cumulative amount of time private vessels spend with dolphins? What period/s during the day does private vessel activity exert the greatest effort?***

- Private vessels accounted for 36.0% (n=6,274) of vessels observed.
- For cumulative effort of private vessels, please refer to section 6.2.1.
- For seasonal variation in cumulative effort of all private vessels, please refer to section 6.2.1.
- Private vessels viewed dolphins the shortest time period of all vessel types, with a mean of 16.31 min (n=289min).
- Majority of private vessels used the area in summer and autumn, coinciding with school holidays (over summer and Easter). The exception was sailboats, which were more prevalent in spring (Figure 45, 23.1%, n=185).

**6.4. *What is the level of compliance with operator permit conditions and regulations?***

- Non-compliance was observed for 12 of 19 permit conditions and regulations, at varying levels, by all operators. Non-compliance was particularly high regarding conditions regulating dolphin swimming and interaction times.
- Logistical constraints may be a contributing factor to non-compliance, however one of the three tourism operators showed a comparatively high level of compliance whereas the other tourism operators did not.
- True representation of condition effectiveness (in mitigating disturbance levels on the dolphins) is compromised primarily by a lack of compliance.
- The seven conditions that were essentially complied with included: permitted departure and arrival time for both trips, revisiting of groups, no swimming with juveniles, maximum trips per day and no contact with marine mammals (trips observed the cetacean *lunch break* (11:30-13:00) and designated rest areas). However, a small number of interactions (n=16; 7.1%) occurred within designated rest areas and outside areas of operation.

The 12 conditions and regulations that were frequently breached included:

**Permit conditions**

- Maximum interaction time of 90min with marine mammals per trip – Permitted vessels spent a mean of 103 min (n=2,290) in the presence of marine mammals per trip.
- Maximum interaction time of 50min with bottlenose dolphins per trip – Permitted vessels spent a mean of 79.2min (n=5,752) in the presence of bottlenose dolphins, exceeding permitted time in 45.0% of encounters (n=2,561). Non-compliance of this condition was particularly high in spring/summer with a mean interaction time of 113 min (n=4,084) per trip.



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- Maximum interaction time of 30min with calves/juveniles per trip – Permitted vessels spent significantly more time with nursery groups (presence of calves and neonates) than allowed (n=2,301). Permitted vessels exceeded 30 minutes with nursery groups in 78.0% of encounters (n=1,795).
- Maximum number of three swim attempts – Two of the three permitted companies undertook up to a maximum of 4 swim attempts per swim encounter. The third permitted operator observed the regulations and did not breach this condition. Overall, more than 3 swim attempts per operator was observed in 11.0% of swim encounters (n=93).
- Maximum number of 18 swimmers per attempt (including repeat swimmers) – Two of the three permitted operator companies breached this condition by taking up to 20 swimmers per attempt, with more than 18 swimmers in 28.8% of swims (n=21). The third permitted operator did breach the maximum swimmer permit condition. When repeat swimmers were included, all three permitted operators exceeded the maximum of 18 swimmers per attempt condition (Table 16).
- Swim placement using *line abreast* placement and no reversing – Reversing before and during a swim attempt was a technique used during the majority of swim attempts for 84.2% (Operator 2, n=975) and 76.2% (Operator 3, n=868) of swim attempts observed, though rarely observed by Operator 1 (3.1%, n=6). This does not follow the *line abreast* swimmer placement regulations (Table 17). Dolphins often approached vessels reversing *head-on/in-path* (93.2%), indicating sensitisation to this manoeuvre.
- Minimum vessel distance of 60m from shore – Sightings were recorded with an overall mean distance of 997.9m (n=2,019). However, 2.1% (n=42) of observations occurred within 60m of the shore. Furthermore, dolphins were typically located between the vessel and shore. In total, 78.6% (n=33) of such encounters involved at least one permitted vessel.
- Minimum swimmer distance of 60 m from shore - 2.7% (n=68) of observed swims occurred within <60 m of the shore, with dolphins recorded between the vessel and shore. This occurred primarily in spring and summer (77.9%, n=53) and in the presence of at least one permitted vessel (72.1%, n=49). The greatest distance from shore was observed in summer and autumn (Mean=1,098.9), while the closest to shore occurred in winter and spring (Mean=865.2).

#### MMPR

- *No wake* speed within 300m - Permitted vessels generally travelled around the *no wake* speed (ca. 5 knts) on approach (n=2,860), although the highest speed observed was 8.1 knts on approach. However, this condition was violated on leaving, see below.
- Leave proximity of marine mammal at speeds no greater than 10 knots increasing speed gradually - On departure, permitted vessels generally travelled above the *no wake* speed (n=640), the highest speed observed was 23knts. The *no wake* speed (ca. 5knts) was observed when departing dolphins 17.3% of the time (n=651) by permitted vessels.
- *Three boat rule* – Permitted vessels arriving after three un-permitted boats were already within 300m of the dolphins (20.9%, n=46).

#### 6.5. What is the potential long-term significance of the current level of tourism activities on bottlenose dolphins in the BoI?

- The cumulative effort from all vessel types interacting with dolphins resulted in a mean of only 102.6 minutes without vessels within daylight hours per day in the BoI. While the volume of vessel traffic varied between December 2012-April 2015, it remained high in the BoI throughout the study. Further to this at least one frequent user was present in 86.7% of encounters (n=1,747 encounters). The potential long-term effects of such high boat numbers

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and interaction level is unknown but the behavioural changes reported here (which extend beyond just differences in activity budgets reported previously) warrant further consideration (refer to recommendations in section 7).

- While it is challenging to infer long-term consequences from detected short-term changes (Bejder et al., 2006; Lusseau 2003; Williams et al., 2002), results presented herein are cause for major concern. Reductions in foraging and resting behaviours in the presence of vessels are likely to impact on the overall energetic budget of individuals, which in conjunction with declining population and high calf mortality, necessitate management change. The results presented within this study illustrate conclusively that current management tools (MMPR's, permit conditions) do not sufficiently mitigate vessel impacts on the declining local population, this is in part due to poor compliance.
- In the presence of vessels within 300m, bottlenose dolphins were less likely to travel, forage and rest, while more likely to socialise, mill and/or dive. Milling may represent a chance to conserve energy in times when resting is less likely owing to need for vigilance as a consequence of high vessel traffic. Alternatively, milling could be a transitional behaviour, or reflect uncertainty in group cohesion and the need to maintain physical contact.
- Behavioural changes were significantly stronger for socialising, milling and diving as the number of vessel increased. Effects were more prevalent when the MMPR (1992) were breached (i.e. more than 3 vessels present). This could have significant impacts on the population. Disturbance that interrupts biologically significant behaviours (i.e., resting and feeding) may carry energetic costs that can affect individual fitness. A reduction in fitness may have long-term consequences for the population (Christiansen et al., 2010; Lundquist et al., 2012; Peters et al., 2013; Filby et al., 2014).
- All vessels breached the MMPR (1992) with respect to departing from the vicinity of marine mammals at less than 10knts speed. The potential for this to encourage energetically costly behaviours over a long time period via habituation is of concern (Lusseau & Bejder 2007; Steckenreuter et al., 2012; Filby et al., 2014). The lack of adherence with MMPR's indicates that more efficient regulatory tools may be required than a combination of MMPR's and permit conditions (refer to section 7 for management recommendations).
- Bow riding behaviour occurred frequently (n=8,057) with 84.0% resulting in the split of the focal group due to <25% of the group engaging in the behavioural event (n=6,768). The individuals that approach moving vessels become the main interaction group for both permitted and un-permitted interaction. As a result, these groups frequently transition their initial behaviour in the presence vessels and instigate alternate behaviours such as bow riding. Consequently, disruption of vital behaviours could potentially lead to long-term population level consequences, as reported elsewhere (Bejder et al., 2006; Higham et al., 2009; Lusseau & Bejder, 2007; Steckenreuter et al., 2012; Filby et al., 2014). When resting behaviour is disrupted, the survival of calves is put at risk, as nursing often takes place while animals are resting (Stensland & Berggren, 2007). Further, these *risk taker* groups are at risk of habituation (Filby et al., 2014; Stone & Yoshinaga, 2000) i.e., over time, they approach vessels more frequently, thereby increasing their risk of vessel strike.
- Mother-calf pairs were observed approaching vessels to bow-ride during 10.2% of events observed (n=822). The interaction of groups containing calves with moving vessels across time is of concern, as neonates and calves are particularly vulnerable to vessel collision (Dwyer et al., 2014; Laist et al., 2001; Martinez & Stockin, 2013; Stone & Yoshinaga, 2000). Dolphin tourism efforts in the BoI has been continuous and thus dolphins may be display long-term behavioural changes such as habituation (Hawkins & Gartside, 2008). Habituated dolphins may display reduced caution and let their calves interact with vessels more closely and frequently than non-habituated individuals (Bejder & Samuels, 2003). Equally important

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is the disruption of socialising behaviour when vessels that frequently get too close to dolphin, which in turn can affect nursing behaviour of young calves (Filby et al., 2014; Samuels et al., 2003).

- Concerns are particularly warranted for swims with calves or neonates, which are contrary to the MMPR (1992), and occurred during 18.5% (n=510) of the swim attempts monitored (although these were not conducted by permitted operators). This level of interaction could potentially be higher as calves or neonates were observed within the focal dolphin groups post or prior a swim, indicating calves in the vicinity of swims. This may have long-term significance on the population given a) the importance of mother-calf bond (Mann et al., 2000), b) the presence of frequent core individuals (Christiansen et al., 2010), and c) a high calf mortality rate within the local population (Tezanos-Pinto et al., 2009; 2013). Given the extent of non compliance with the MMPR's and the overall situation of the local BoI dolphin population efficient and increased advocacy is urgently needed to achieve better protection of mother calf pairs. The DOC has recently introduced a voluntary maximum approach distance to pods containing mother calf pairs in summer 2015 / 16 however it is unlikely that voluntary measures will be sufficient given the overall level of non-compliance even with mandatory regulations and permit conditions observed in this study.

**6.6. Integrate the recommendations of former historical research. Specific questions are addressed in order to better understand the effects of vessel traffic on bottlenose dolphins and develop clear measures and guidance. This includes describing behavioural responses of individuals (where possible), groups and specified age groups. This will be used to determine if such responses have population level consequences for seasonal and inter-seasonal range use. This is based on the above to i) avoid or minimise human impacts, and ii) to measure impacts that quantify thresholds over which further impacts must not occur.**

**6.6.1. What are the short-term behavioural responses of dolphins in relation to commercial and non-commercial viewing and swimming vessels? Do behavioural responses vary between what is currently and what was previously reported?**

- Short-term behavioural responses observed are detailed in full within section 5.12.

**In accordance with previous research:**

- Constantine (2002) indicated dolphins were found in deeper waters in summer when water temperature was highest, and in shallow waters in winter when the water temperature was lowest. Seasonal variation observed here was consistent with Constantine (2002); the greatest distance from shore was observed in summer and autumn (Mean=1098.9), and closest to shore in winter and spring (Mean=865.2) (Figure 14).
- Tezanos-Pinto (2009) inferred a 41.5% (n=17) and 22.2% (n=4) mortality rate prior to the first and second year of life, respectively, with 52.2% mortality overall in the first two years. The present study infers 75.0% (n=9) of calves observed within the present study period were suspected not to have survived past the first two years of life, while a 66.7% (n=8) 1<sup>st</sup> year mortality and a further 25.0% (n=1) 2<sup>nd</sup> year mortality was observed. This is an absolute percentage increase of 44.2% mortality in the first two years of life, with 61.4% increase in 1<sup>st</sup> year mortality and 12.6% increase in 2<sup>nd</sup> year mortality from Tezanos-Pinto (2009).
- Resting decreased while milling behaviour increased as vessel numbers interacting with bottlenose dolphins increased, concurring with Constantine et al., (2003) (Figure 32).
- In accordance with Constantine et al., (2003), a difference in dolphin resting and milling behaviours was observed in the presence of permitted vs. un-permitted vessels.
- Bouts of resting behaviour were rarely observed in the presence of permitted vessels,

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concurring with Constantine et al., (2003) (Figure 32).

- Resting behaviour in the present study occurred only during 0.5% (n=5) of occasions in the presence of permitted vessels. Overall, resting was only reflected 1.1% of all behaviours observed in the present study (n=72). This is comparable to resting which was observed during only 0.5% of the time in the presence of more than three boats (Constantine 2002). Constantine (2002) also only recorded bouts of resting in the presence of the permitted operators on 6 occasions (8.1%, n=74).
- Dolphins were rarely observed utilising current designated rest areas (Waikare Inlet, Te Puna Inlet, Deep Water Cove, and the area northeast of Waewaetorea Island) established as a consequence of Constantine et al., (2003). In accordance with Hartel (2010), the present study found these areas are no longer of significant importance to this population (Figure 14).

**In contrast to previous research:**

- In the BoI only 96 uniquely identifiable individuals were documented between December 2012 and April 2015. This represents a 65.5%, 39.6% and 13.1% less than the 278 identified reported in 1997-1999 (Constantine 2002), 159 identified in 2003-2005 (Tezanos-Pinto et al., 2009, 2013) and 112 identified in 2009-2010 (Hamilton 2013) respectively (Figure 20).
- Mean group size between 2012 and 2015 was 14.8 (n=2,015) which is smaller than that reported from previous studies in the BoI (Constantine & Baker 1997, Tezanos-Pinto 2009), though within a similar range. Constantine (2002) reported group size ranged from 2 – 50 dolphins, with 80% of groups (n=160) containing 2-20 dolphins. Group size in the present study was skewed towards smaller groups, yet more than 68.0% (n=1,370) of groups comprised more than 10 individuals (Figure 16-18).
- A mean of 2.8 bottlenose dolphin groups encountered per day were observed in the bay between 2012 and 2015 (n=2,019), compared to an average of only 1.2 groups of dolphins reported between 1997 and 1999 (Constantine 2002).
- Constantine (2002) reported the number of groups with calves' present increased from 32.1% (n=17) in 1997 to 62.7% (n=47) in 1999. Herein, 41.9% of groups (n=845) comprised at least one calf/neonate.
- In contrast to Constantine et al. (2003), a significant difference in dolphin behaviour was not detected between the presence of un-permitted and private vessels. This is likely due to a lower number of observations in previous study. A higher number of observations in the present study allowed for the effects of vessel types to be assessed independently.
- Constantine et al. (2003) indicated there was a difference in dolphin resting and milling behaviour in the presence of permitted vs. non-permitted boats. Overall, significantly more resting and less milling behaviour was observed in the presence of the non-permitted (private and un-permitted) boats. In the present study, un-permitted vessels had the strongest effects on socialising and foraging not resting and milling. Overall, significantly more foraging and socialising and less milling behaviour was observed in the presence of the un-permitted boats (Figure 33 & 36).

**In addition to previous research:**

- Constantine's study (2002), was compromised by a management change which effected swimmer number conditions part way through the study period. The current study was able to assess the effect of swimmer numbers as management had remained essentially constant since the moratorium declared in 2009 which prevented any increases in permitted operational effort or impacts on bottlenose dolphins. When tour type was light or normal, swim attempts were significantly longer than swap or double load indicating as number of swimmer increases so the length of time dolphins interact with swimmers decreases (Table

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17).

- The present study addressed behavioural transitions, time to return to behavioural state and behavioural bout length, in conjunction to the basic activity budgets previously presented by Constantine 2002. Furthermore, confounding variables such as vessel presence, type of vessel and number of vessels were addressed in more detail (refer to section 6.2.2).
- All behavioural transitions involving milling, resting and diving, as preceding or succeeding behavioural states, were significantly affected (Figure 37-38).
- In most cases where an increase in transition probability was detected, socialising was the succeeding behavioural state (Figure 37-38).
- The probability of remaining in a foraging or resting state after a vessel interaction decreased by 11.5 and 21.2%, respectively (Figure 38).
- The probability of remaining in a socialising or milling state increased by 13.5 and 3.9%, respectively (Figure 38).
- The transition probability from diving to travelling decreased in the presence of vessels by 69.7%. Contrary to this, the transition probability from foraging to socialising increased in the presence of vessels by 183.3% (Figure 38).
- No transition from resting to diving and diving to socialising were observed in the absence of vessels but were observed as 4.0% of resting transitions and 10.0% of diving transitions when interacting with a vessel (Figure 38).
- Time required to return to a given behavioural state post a vessel interaction was significantly affected by the presence of vessels for all 6 behaviours, with the overall mean return time increasing from 40.7min to 72.3min (77.5% increase) (Table 15).
- Travelling, foraging and resting bottlenose dolphins took 132.3%, 262.0% and 725.6%, more time to return to their initially behavioural state post a vessel interaction, respectively. In contrast, the time required to return to socialising, milling or diving decreased by 36.8%, 58.7% and 95.6%, respectively (Table 15).
- Average behavioural bout length (min) varied significantly in the presence of vessels for all behavioural states except milling (Figure 31).
- In the presence of vessels, travelling, resting and foraging bouts decreased by 35.7%, 22.9% and 13.3%, respectively. Meanwhile, socialising and diving bouts increased by 21.1% and 118.3%, respectively (Figure 31).
- No resting bouts were initiated when a vessel interacted with dolphins.

#### **6.7. Are these activities significant for the population of the BoI?**

- Significant behavioural response was detected for all behavioural states in the presence of vessels within 300m (refer to section 6.2.2. for details, Figure 31).
- Differences between historical and current research findings were observed, indicating further sensitisation and/or habituation to vessels interactions (refer to section 6.7.1. for details).
- Concerns are warranted given presented evidence of a further local population decline and increased calf mortality rate to that reported initially by Tezanos-Pinto et al., (2009, 2013) (refer to section 6.7.1 for details).
- Dolphins in the BoI spend on average 85.7% of daytime with at least one vessel. Therefore, for 85.7% of the time they follow a behavioural budget presence chain, and for the remaining 14.3% their behavioural budget is similar to the one of the control chain. Their cumulative diurnal behavioural budget (85.7% impact + 14.3% control) did vary significantly from the control behavioural budget.

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- The diurnal behavioural budget of dolphins significantly varies from the behavioural budget without vessels, due to spending only 14.3% of daylight hours without interaction. This means a reduction of 100.0% resting, 60.0% foraging and 37.5% travelling and an increase of 600.0% diving, 135.7% milling and 78.6% socialising. Results indicate that management change is required to protect bottlenose dolphins from undue disturbance and mitigate adverse effects at the population level.

**6.8. Produce statements and recommendations based on all of the above regarding existing and future tourism activity particularly in the BoI waters. Including any conditions that need review since previous study, whether areas should be excluded from the commercial operators' permit areas and / or tourism pressure in general, year round or season-specifically and implications on the level of effort permitted in the BoI for each activity?**

- For specific management recommendations refer to Section 7.

**7. Critical issues & management recommendations**

The local BoI bottlenose dolphin population is at high risk of a continued decline to localised extinction unless critical action is taken.

Management in the BoI must apply to all vessels utilising the area to address the trend of continued decline. Protection measures should be adaptive, extend beyond permit conditions and be supplemented with educational and enforcement programs (Keane et al., 2008) to promote compliance with regulations. Cumulative existing effort with dolphins needs to be down regulated. Clearly defined legislation which allows significant authority, including that of revoking operator permits (Bejder et al., 2006b; Higham & Bejder, 2008) and penalising any non-compliance (Scarpaci et al., 2003), regardless of vessel type is required, in a way that is fair and reasonable. This study demonstrates that 88% of all encounters between permitted vessels and marine mammals involve bottlenose dolphins. The localised loss of this species from the BoI would result in the regional marine mammal tourism industry losing its economic core and long-term viability.

This report evaluates multiple options for better managing vessel/dolphin encounters in the BoI, including simplifying the current permit conditions. Recommendations include establishing a minimum approach distance, prohibiting vessel activities of concern and creating applicable temporal and spatial closures. Management action would need to be comprehensive, adaptable, easy to understand and practical (considering local conditions and permitted operator expertise). Crucially, such actions need to be enforceable.

The following are suggested for consideration by DOC, permitted commercial operators and other stakeholders.

**Critical issue 1: Significant decline in nationally endangered bottlenose dolphin BoI population and potential risk of localised extinction**

A continuing decline in dolphin numbers (278 to 96 individually identifiable dolphins, representing a 65.5% decline since 1999) utilising the BoI has been documented. Results suggest frequent users were present during 86.7% of encounters (refer to section 6.5).

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dolphins in the BoI, urgent management action is required. It is recommended:

- For the current moratorium to remain in place until at least full population analyses are completed for *Tursiops* across their broader north-east, North Island range to prevent any increases in permitted activity. This would allow site fidelity and cumulative effects to be clearly determined. Datasets with respect to Hauraki Gulf (GBI) and BOP are currently available and could be used to address this issue.
- For the DOC to apply year round management (as opposed to limiting management measures to peak periods, refer to section 6.1). This is due to all 19 *frequent users* being observed during all four seasons.
- An integrated and adaptive management plan be implemented, as per Higham et al. (2009). This management model highlights the importance of integrating multiple stakeholder perspectives in a way that is both research-informed and adaptive. In the BoI, management should include the monitoring of the local population at regular intervals.
- For the DOC to review and/or potentially remove current designated rest areas (in their current form) within the BoI since dolphins no longer utilise these areas on a regular basis. General use of BoI waters by bottlenose dolphins is widespread and variable across seasons (refer to section 6.1). Consequently, newly imposed static area specific management zones (such as the current permit exclusion zones) would likely be redundant.
- For the DOC to replace current permit exclusion zones with improved efficient spatial tools. Spatial management has been demonstrated as effective in protecting cetaceans (Gormley et al, 2012). As part of an integrated adaptive management plan, larger spatial and temporal (e.g. seasonally specific) exclusions zones, which allow for observed spatial distribution, are recommended (refer to section 6.1). A clearly defined spatial or temporal refuge should allow monitoring of compliance and therefore, enforcement of all vessels to be easier for managers.
- For the DOC to engage with a NGO or community initiative in the BoI to provide education, on-water monitoring and hold enforcement powers (similar to Honorary Fisheries Officers <https://www.mpi.govt.nz>, DOC threatened species ambassadors and Soundwatch: on-the-water education and monitoring (<http://whalemuseum.org/pages/soundwatch-boater-education-program>)).
- For the DOC to make provision for compulsory, efficient and locally relevant training for all commercial permitted operator crew annually, preferably ahead of peak season. The aim being to minimise disturbance of tour boats, provide updated research information on the bottlenose population and known effects of tourism activities, as well as to reinforce a) the importance of regulations and operator obligations under the MMPR (1992) and b) existing commercial permits restrictions (refer to section 6.4 and appendix 2).
- For the DOC to engage in a significant public education campaign along the lines of “Saving the BoI dolphins” aimed at public engagement (e.g. via community initiatives) and ultimately, significant behaviour changes in private vessel owners (refer to sections 6.3 and 6.5).

#### **Critical issue 2: High and unsustainable calf mortality**

Over the study period, only 25.0% (n=3) of calves were estimated to have survived two years to perceived independence. This is a 61% and 13% increase from previously reported first and second year calf mortality, respectively (ref to section 6.1, 6.5 and 6.6.1).

Therefore, specific measures to protect dolphin calves are required. It is recommended:

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- A mandatory approach distance to mother calf pairs be applied. A precautionary distance of 150m is suggested due to the sensitisation/habituation observed (refer to section 6.5). The DOC has introduced a voluntary maximum approach distance to pods containing mother calf pairs in summer 2015/16. However, it is unlikely that such voluntary measures alone will be useful given the overall level of non-compliance with mandatory regulations and permit conditions reported herein (refer to section 6.4).
- Spatially and temporally appropriate no interaction zones be instigated. Given regular shifting observed, dolphin habitat use would need to be re-assessed at regular time periods to ensure that biologically important areas are protected appropriately. Season specific exclusion (or slow zones if areas cannot be excluded, refer to section 6.1) are suggested, with temporal adaptation to provide protection during calving season.
- For the DOC to improve information dissemination to the general public within BoI about the MMPR (1992), with a special emphasis on the prohibition of swimming with neonates and calves (refer to section 5.14.4). This could be achieved via improved advocacy, monitoring and compliance in conjunction with honorary wardens.
- For the DOC to mitigate the disturbance and/or potential injury to calves from vessel traffic. It is specifically recommended all racing events with high vessel speeds be excluded from the BoI during identified peak breeding season (refer to section 6.1).

**Critical issue 3: Vessels and swim-with activities disturb/disrupt behaviours critical to bottlenose dolphin survival**

The effect of vessel interactions on bottlenose dolphins in the BoI is significant and at a level that could lead to a reduction in fitness due to the disruption of foraging and resting behaviours. Transition to and from both behaviours was affected, while no resting was observed in the presence of permitted vessels (refer to section 6.2.2). In order to minimise this, it is recommended:

- The minimum approach distance be increased during foraging and resting events (refer to section 6.5 and 6.6.1). A precautionary distance of 100m is suggested to allow skipper and crew appropriate distance to accurately identify and react to dolphin behaviours observed. As indicator behaviours could be misinterpreted or missed, mandatory training on behavioural identification for all crew is recommended.
- For the DOC to implement aforementioned spatial or temporal exclusion zones. Whilst not providing full mitigation of effects observed on critical behaviours, this approach would simplify monitoring and enforcement. Compliance with current exclusion zones was satisfactory between 2012-2015 (refer to section 6.4) indicating this could be successfully instigated in the BoI. Ideally, such areas would be expansive enough to allow animals to engage in biologically important behaviours without being disturbed by vessels in multiple locations. The impact on the dolphin-watch permitted industry would be similar to that of establishing a greater viewing distance as opposed to precluding dolphin viewing activity all together. As vessels would have to sit on the boundary or move away, this would reduce encounter time and eliminate herding behaviour observed of skippers (refer to section 6.3.1).

**Critical issue 4: Higher than sustainable vessel effort exerted on local population**

Between 2012-2015, the entire diurnal behavioural budget and bout length of the local dolphin population was affected, with just ca 14% of daylight hours that dolphins spent without vessels (refer to section 6.7). To mitigate this, it is recommended all vessel types are addressed concurrently as



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listed below.

Permitted and un-permitted vessels have the greatest potential to affect dolphin behaviour based on duration of contact and volume of interactions with dolphins, respectively (refer to section 6.3.2 and 6.3.3). To achieve better mitigation of effects it is recommended:

- The DOC increase compliance monitoring and enforcement action. To do so, the department needs to be better informed of operator compliance on a daily basis via self-monitoring of the industry.
- An extension of the current moratorium be considered to guarantee no additional permitted effort (including any increase in the number of permits and daily trips). Data presented herein indicates any rise in effort (permits or daily trips) is contrary to the best interests of this dolphin population, regardless of compliance, due to the observed behavioural effects reported (refer to section 6.2).
- Full compliance by all permitted operators with all MMPRs and permit conditions be achieved and maintained (refer to appendix 2 and section 6.4).
- The DOC simplify and condense specific permit conditions (formerly put in place based on Constantine 2002, ref to appendix 2) to increase comprehension by permitted vessel staff and to facilitate enforcement (refer to section 6.4).
- A reduction in the times that permitted vessels may interact with dolphins be instigated (refer to section 6.3.1 and 6.4). The permitted time should be less than the mean time to return to a behaviour (40.7min) in the absence of vessel disturbance (refer to section 6.6.1).
- A potential change to permit conditions to include a maximum time of encounter per group (instead of per trip), with no repeats allowed is investigated. The permitted time should be less than the mean time to return to a behaviour (40.7 min) in the absence of vessel disturbance (refer to section 6.6.1). This would reduce cumulative interaction time per dolphin group without compromising operator trip success since more numerous yet smaller dolphin groups are frequenting the BoI than previously reported by Constantine 2002 (refer to section 6.2.1 and 6.6.1). This will also eliminate the possibility of extended encounters from all vessels on days when only one group of bottlenose dolphin is observed in the region.
- Full compliance with MMPR (1992) be observed (refer to appendix 2) and no interaction with a group if 3 or more vessels are already viewing and/or swimming with dolphins within 300 m be enforced (including private vessels) (Refer to section 6.4 and 5.13.3). Specifically, permitted vessels must stand off outside 300 metres until less than three vessels remain. This would reduce vessel pressure around dolphins, given that effects were greater when MMPR (1992) regulation 20 was breached (refer to section 6.2.2). Crucially, full compliance would further educate private boaters and patrons about the legal limitations on vessel numbers around cetaceans.
- Publically accessible communication systems that broadcast dolphin locations be avoided. A cease in the use of radio channels to publically discuss dolphin locations for both permitted and un-permitted commercial vessels is suggested. This will reduce active targeting of dolphins by un-permitted vessels (refer to section 6.2.1) and ensure opportunistic nature of interactions thereby reducing cumulative interaction times (refer to section 6.2.1).
- The DOC implement and enforce new local regulations preventing un-permitted commercial vessels approaching within 300m of dolphins within BoI waters (Refer to section 6.2.1 and 6.3.2). Currently unpermitted operators can legally (in accordance with the MMPR's) interact with marine mammals where they co-incidentally come across them but they must not target them. Based on the documented level of interaction between bottlenose dolphins and un-permitted operators, this distinction is unworkable in the BoI (refer to section 6.2.1 and

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6.3.2). The high encounter rate between unpermitted operators and bottlenose dolphins therefore undermines the permit system. With a moratorium on permits operational since 2009, issuing further permits is not considered an appropriate option to better mitigate the impact of unpermitted operators on bottlenose dolphins.

Private vessels are the most numerous and least regulated vessel type in the BoI. Private vessels were most likely to swim with calves and were shown to alter dolphin behaviour (refer to section 5.14.4). To achieve better mitigation (beyond already identified recommendations) it is recommended:

- The DOC encourage establishment of land based viewing stations adjacent to exclusion zones to advocate no disturbance / no impact viewing. This approach has been successfully implemented elsewhere (e.g. the Adelaide dolphin sanctuary <http://www.environment.sa.gov.au>). The level of private interest observed suggests exclusion with no alternative will be ineffective (refer to section 7.2.1 and 7.3.3). DOC would be able to regulate the information contact of commercial land based dolphin viewing through the permit system.
- The DOC to establish enforceable regulations for un-permitted and private vessels. In some areas voluntary codes of conduct (COC) have been employed; however, they are regularly ignored and ineffective in achieving their original purpose (Allen et al., 2007; Wiener et al., 2009). In the BoI, the lack of compliance with MMPR (1992) indicates voluntary COC are not appropriate tools for the area (refer to section 6.5) and regulation should be enforceable across all vessel types.

Swimming with dolphins is likely to be trivialised in the BoI, thus increasing swimming effort (Refer to section 5.14 and 6.5). To mitigate this, the following are recommended:

- No swim-with attempts from any vessel other than permitted vessels be allowed in BoI waters (refer to current levels of effort section 5.14 and 6.2).
- The DOC ensure permitted vessels comply with the no swim within 60m from shore rule. If 60m cannot be complied with due to difficulty in judging distance, a larger precautionary zone of 100m is suggested to mitigate effects observed (refer to section 5.14.9). Additionally, this will further simplify permit conditions by having a standard distance across all recommendations.
- The DOC ensure permitted operators do not swim with solitary dolphins as significantly higher behavioural effects were observed during swims with singletons (refer to section 5.14.5).
- The DOC ensure permitted vessels improve and reinforce education to their patrons during swim encounters. It is suggested this is achieved through assessment of all education content during compulsory workshops with permitted operators.

#### **Critical issue 5: Poor compliance across all vessel types utilising BoI waters**

Best practice management has demonstrated to be ineffective in this circumstance, with only one of three operators showing reasonable level of compliance (refer to section 6.5).

To mitigate issues of non compliance it is recommended:

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- The DOC review and improve current management tools. Revised management tools must be easily understood, be realistic/feasible in the field and be easily enforceable.
- The DOC improve compliance/acceptance of regulations. In order to achieve this a top-down remit for the production of new regulations should be instigated with a bottom-up involvement in their construction via an extensive consultation process.
- The DOC address the chronic lack of ability to enforce regulations and conditions. Enforcement must apply to all vessel types in the BoI.
- The DOC provision dedicated independent observers (similar to MMO's). MMO's should regularly board permitted vessels to monitor interactions with dolphin groups as well as collect standardised data (especially during swim encounters). The aim is to a) improve compliance with MMPR (1992) and reduce violations documented herein (refer to section 6.4), and b) increase data uniformity and availability to researchers and managers.

The cumulative time a focal dolphin group is exposed to vessel interaction from permitted vessels has exceeded the permitted maximum time of 50 min with bottlenose per trip (refer to section 6.4). The mean time of encounter was similar to the mean time to return to behavioural state (72.3 min) in the presence of vessels, suggesting non compliance of this condition is significantly affecting dolphin behaviour (refer to section 6.4, 6.5 and 6.6.1). To mitigate this, it is recommended:

- The DOC extend compliance monitoring and action on all commercial operations to improve and monitor compliance issues based on the overall mean time of encounter (79.2 min) (Refer to section 6.4).
- Real-time as opposed to retrospective data collection of encounter duration times to be employed by all operators. Operators are encouraged to establish a more efficient data collection system to facilitate timely monitoring of permitted maximum interaction times, thereby improving current compliance issues and supplying DOC with accurate data on a daily basis.

Reviews of permit conditions (instigated following Constantine 2002 recommendations, refer to appendix 2) indicate some conditions are no longer appropriate and/or respected by operators while viewing or swimming with bottlenose dolphins (refer to section 6.4). To address this issue, and in addition to previous recommendations (adaption of rest areas, penalty for non-compliance, compulsory training of commercial crew), it is recommended:

- All permit conditions in the BoI consider cumulative effort of all vessels rather than just permitted operators. This effect is observed regardless of vessel type (refer to section 6.2).
- All permit conditions which are subjective, complex, include infraction and/or grey areas are reviewed and simplified (refer to section 6.4).
- Swim placement permit conditions be amended to reflect a more practical solution than what is currently being utilised by permitted operators (refer to section 5.14.1). Whilst best-practice would be preferable, current data suggests the implementation of *line abreast* following previous research recommendations has been unsuccessful due to logistical constraints (i.e. impeded vessel vision and movement resulting in unsuccessful swims). It is therefore recommended that a compromise or change in vessel configuration be instigated in order to improve compliance while minimising impacts of dolphins swims as best as practically possible. If compliance cannot be achieved, it is recommended swimming with bottlenose dolphin in the BoI not be permitted (for any vessel).

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Non-compliance with the MMPR (1992) by all vessels (particularly unpermitted and private vessels) has been regularly documented while viewing and/or interacting with dolphins (e.g. speed and number of vessels, refer to section 6.5). In addition to the aforementioned recommendations regarding increased public awareness (including signage at boat ramps media campaign, mandatory exclusion zones) and to improve compliance, it is recommended:

- The DOC provide compulsory area specific annual training for all un-permitted vessel skippers and crew undergoing commercial operation in BoI waters.

#### 8. Future research

- Incorporation of restricted historical photo-identification and behavioural datasets in order to facilitate long-term temporal comparison of bottlenose dolphins in the Bay of Islands.
- Continuation of regular photo-identification, specifically along the full range of the North-East coast population. Comparisons of individual identification catalogues between regions will provide information on fine-scale movements. This information should be used to design a PVA analysis for the 'total' North Island population. Ideally, surveys should be conducted on a relevant temporal scale to allow for a multisite mark-recapture analysis.
- Undertaking of systematic post-mortem examinations on beach cast carcasses to assess life-history parameters and incidence of disease, and anthropogenic interaction (e.g. entanglements, boat strike, pollutants).
- Assessment of prey availability, diet and foraging strategies of bottlenose dolphins in the Bay of Islands.

#### 9. Conclusion & perspectives

Bottlenose dolphins are the most encountered cetaceans in the BoI. Consequently, they remain the primary target species of permitted commercial vessels. As such, bottlenose dolphins form the economic core of the marine mammal tourism industry in this region. Findings presented here indicate that the current high level of vessel interactions (permitted, un-permitted and private) with bottlenose dolphins in the BoI is not benign, and the magnitude of effects has increased significantly since previous studies. Five critical issues are identified.

Firstly, a continuing decline in identifiable individuals (278 to 96, representing a 65.5% decline since 1999) utilising the BoI. Results suggest 88% of encounters involve frequent users exposing them to high levels of vessel disruption. The local BoI bottlenose dolphin population is at legitimate risk of a continued decline resulting in localised extinction unless major action is taken. This is particularly pertinent given the warm season impacts on the cumulative behavioural budget during peak tourism season, which also represents the calving and breeding season for the *nationally endangered* bottlenose dolphin.

Secondly, the BoI local population has previously been reported as showing a high calf mortality rate (Tezanos-Pinto et al., 2009; Tezanos-Pinto et al., 2013). Here, this study demonstrated only 25% (n=3) of calves observed within BoI waters during the 2012-2015 study period were confirmed as having survived to independence, affecting the persistence of the local population (Tezanos-Pinto 2013). This suggests a marked increase in calf mortality since the previous study (44.2% survival (1994-2006) Tezanos-Pinto 2009).

Thirdly, in the BoI, vessel interactions (both permitted and un-permitted) levels are unsustainable

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with significant effects on critical bottlenose dolphin behaviours documented for nearly 20 years. Despite various management efforts, the present study indicates that such effects remain yet to be mitigated. Results of fine-scale habitat use presented here suggest bottlenose dolphins have shifted their distribution across the BoI to a smaller area around Tapeka Point and the eastern end of Robertson Island. This refined distribution exposes them to the highest density of vessel traffic in the BoI. Fourthly, between 2012-2015 the entire diurnal behavioural budget and bout length of the local dolphin population was effected, with dolphins spending only ca 14% of daylight hours without vessels. During such exposure, dolphins demonstrated increased engagement in energetically expensive behaviours of socialising and diving at the cost of foraging or resting. Furthermore, the substantial increase in transition probability from foraging to socialising may represent a response mitigating the effect of boat presence on foraging bouts and indicate sensitisation via increased socialising. Notably, the mean time to return to a behavioural state if disturbed by a vessel was longer than the mean time dolphins spent without vessels. As such, a return to initial state was not observed during daylight hours for any of the behaviours

Fifthly, such findings are further exacerbated by current compliance issues, which collectively indicate 9 of the 14 conditions are regularly breached by a number of permitted commercial operators within the region. All vessel types utilising the BoI did not comply with MMPR (1992), to varying extents. Collectively, these findings give rise to represent legitimate concern regarding the short- and potential long-term effects of intensive tourism activities, both at the individual and population level.

The dolphin tourism industry in the BoI is of notable economic and cultural importance to the local community. For this industry to become sustainable, on going monitoring of the broader population is vital to our understanding of tourism effects. The BoI is not in isolation, so effects reported here need to be understood across the entire population and allow for the recruitment of individuals into the local BoI population. Management in the BoI must address all vessels utilising the area. New and improved rules must be adaptive, extend beyond permit conditions and be supplemented with educational and enforcement programs (Keane et al., 2008) to help ensure compliance with regulations. Moreover, clearly defined regulatory tools must have significant authority (Bejder et al., 2006b; Higham & Bejder, 2008) and address un-permitted and private vessels. Without enforcement, management may fail to meet their goals and, ultimately, fail to protect the long-term viability of the sole economic core of the marine mammal tourism industry in this region.

### **9. Acknowledgements**

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### 11. Appendix 1

Definitions of observed behavioural events of bottlenose dolphin groups in BoI waters, NZ (Constantine 2002; Constantine et al., 2004).

Behavioural event	Definition
<b>Socialising</b>	
Horizontal jump	At least one dolphin engaged in horizontal airborne forward progression of at least one body length while in dorsal position
Vertical jump	At least one dolphin engaged in vertical airborne forward progression of at least one body length while in dorsal position with abrupt lunges out of water with only shallow submerges
Noisy jump	At least one dolphin engaged in airborne forward progression with Maximum/flat body contact with the surface of the water upon entry
Head Flop	At least one dolphin engages in partial breach above the surface of the water with side of head making sharp, noisy contact with surface upon entry
Top of body out	At least one dolphin orientated to hold top of body above the surface of the water
Tail Out	At least one dolphin orientated to present and hold tail and/or flukes above the surface of the water
Upside down Swim	At least one dolphin orientated to Swim with ventral side towards the water surface
Bite	Teeth of one dolphin makes contact with any other individual
Lobtail	At least one dolphin orientated in horizontal body position relative to the surface of the water. Dolphin makes contact with surface via a jerky whole body movement to flex tail. Individuals are likely to slap several times
Chase conspecific	Persistent following of one or more dolphin for a prolonged period
Pounce	At least one dolphin makes contact with one or more other individuals, with ventral to dorsal contact
Bubble blowing	At least one dolphin releases a large volume of air through its blowhole while submerged in one short burst
Surfing waves	At least one dolphin engaged forward progression in the direction of swell/waves
Bowriding/Wakeriding	At least one dolphin engaged in persistent approach of a vessel bow and/or oriented to swim in the vessels bow or wake wave
Playing with kelp	One dolphin picking up and carrying any naturally occurring object, often on the dorsal fin
Belly away	At least one dolphin orientated to not display ventral side to one or more other individuals
Penis out	Dolphin penis visible and protruding from body
Body contact	At least two dolphins make contact. One engages in touching of the body (Connor <i>et al.</i> 2000) and includes biting, pectoral touch, body touch, or rolling together at the surface
Belly present	At least one dolphin orientated to display ventral side to one or more other

Peters & Stockin 2016 – Responses of bottlenose dolphins to vessel activity in Northland, New Zealand

	individuals
Spyhop	Brief vertical or near vertical surfacing of the head, eye and rostrum above the water line followed by sinking return to water
Copulation	Two dolphin contact confirmed observation of sexual approach with ventral joining and intromission of conspecific
Possible copulation	Two dolphin contact between genital zone and intromission suspected but not observed
Nursing (rostro-genital contact)	confirmed observation of calf rostrum touching ventral surface of adult in area of mammary slits, with position held.
<b>Foraging</b>	
Chin out	At least one dolphin orientated with chin and rostrum present over the water line
Feeding	At least one dolphin observed feeding with confirmed visual of prey in mouth
Surface rushes	At least one dolphin engaged in fast and directional swimming on the surface with dorsal fin creating white-water splash
Synchronised swimming	Two or more dolphins matching speed and orientation in persistent forward movement
Horizontal flex	At least one dolphin orientated to perform Side flex or horizontal bending of the body for manoeuvring during feeding
Swimming on side	At least one dolphin orientated with lateral side towards the water surface
Fish toss	At least on dolphin tossing of fish using head, pectoral flipper or fluke where fish is thrown clear of the surface
<b>Resting</b>	
Logging	At least one dolphin observed stationary with no persistent movement at the surface for 5sec or more.



Peters & Stockin 2016 – Responses of bottlenose dolphins to vessel activity in Northland, New Zealand

## 12. Appendix 2

Regulatory and other tools for dolphin bottlenose dolphin protection in BoI waters, NZ and their applicability. Provided by E. Reufels, DOC.

Purpose	Item	Level of compliance required		
		Permitted operators	Unpermitted operators	Private vessels
Relevant MMPR 1992 (part 3, behaviour around marine mammals. For complete list refer <a href="http://www.legislation.govt.nz/regulation/public/1992/0322/latest/DLM168286.html">http://www.legislation.govt.nz/regulation/public/1992/0322/latest/DLM168286.html</a> )				
No commercial operation without permit allowed	Regulation 5	N/A	mandatory	N/A
No wake speed within 300 meters	Regulation 18 (l)	mandatory		
Leave proximity of marine mammal at speeds no greater than 10 knots increasing speed gradually	Regulation 18 (m)			
No vessel to proceed through a pod of dolphins	Regulation 20 (a)			
No swimming with juvenile dolphin	Regulation 20 (b)			
3 Boat rule	Regulation 20 (e)			
Approach of 3 <sup>rd</sup> boat	Regulation 20 (f)			
Permit conditions(in force since 2004, based on measures intended to mitigate tourism impacts which were recommended by and based on research by R Constantine (2002))				
Lunch break	Special condition 1	mandatory	Voluntary (local guideline)	
Interaction Time limits	Special condition 2		N/A	
# swim attempts	Special condition 3			
# swimmers	Special condition 4			
Line abreast swimmer placement	Special condition 5			
Distance to shore condition	Special condition 6			
No reversing except for safety reasons and swimmer retrieval	Special condition 7			
Re-approach of dolphin group	Special condition 8			
Provision of interaction data	Special condition 9 and 10			
Permit area / exclusion areas	Schedule 2 clause 2			
Guidelines(refer <a href="http://www.doc.govt.nz/parks-and-recreation/places-to-go/northland/bay-of-islands-marine-mammals-brochure/">http://www.doc.govt.nz/parks-and-recreation/places-to-go/northland/bay-of-islands-marine-mammals-brochure/</a> )				
Minimum 100 meter distance to mother calf pairs	Local guideline (since December 2015)	voluntary		

# WS-BOIMMS-130167: 3





# WS-BOIMMS-130167: 4

**From:** Pip Kempthorne [REDACTED]  
**Sent:** Tuesday, 18 May 2021 12:08 pm  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary  
**Subject:** Supplementary Submission  
**Attachments:** Dolphin Cruise Picture.jpg

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

My name is Pip Kempthorne. I have already made an extensive submission.

However, this morning I was in Paihia, and I took a photo of a sign that was an advertisement for sightseeing attractions in the Bay of Islands. The photo is attached to this submission.

When the sightseeing operators continue to advertise Dolphin Cruises, which by definition are designed to interact with the dolphins of the Bay of Islands, what use will a Marine Mammal Sanctuary be, when the only conclusive evidence is that dolphin population has declined when there has been increased human interaction with dolphins in the wild.

Any proposed solution must get to resolve the primary reason for the problem in the first place, and a really good place to start is outlawing dolphin cruises in the Bay of Islands and see what that does to resolve the issue.

Yours sincerely

Pip Kempthorne  
Telephone [REDACTED]  
Email: [REDACTED]

**WS-BOIMMS-130170**

I would like to add my voice to support this proposal

As a yachting in the Bay of Islands for many years I have had great pleasure from seeing dolphins in their natural habitat. The huge decline in their numbers and in the lack of young being born is a grave concern.

Anything that can be put in place to ensure these creatures are given the space and environment in which they can thrive is a very good move.

The proposal has my full support.

Rosemary Hathway

A grey rectangular box redacting the signature of Rosemary Hathway.

**WS-BOIMMS-130173**

**From:** Maria and Theo [REDACTED]  
**Sent:** Saturday, 8 May 2021 5:35 pm  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary  
**Subject:** Submission Pewhairangi MMS

**Follow Up Flag:** Follow up  
**Flag Status:** Completed

My name is Theo Klee.  
I live in Russell.

[REDACTED]

I support the proposed Marine Mammal Sanctuary for Te Pewhairangi/ Bay of Islands.

I believe, if implemented, this proposed MMS will bring a significant and necessary improvement in protecting the marine mammals in the Bay of Islands.  
Studies have shown, there have been drastic changes in the Bay of Islands' bottlenose dolphins both in their population and behaviour.  
There has been a 91% decline in bottle nose dolphins !  
Research focussed on the impacts of dolphin tourism, where people swim or view dolphins and general public boating contact has shown that there is too much harrassment and distraction, which has changed dolphin behaviour.

I believe, we cannot afford to lose this marine mammal population in the Bay of Islands forever.  
Please create a Marine Mammal Sanctuary in Te Pewhairangi/Bay of Islands.

Nga mihi

Theo Klee



**WS-BOIMMS-130179**

**Te Pēwhairangi (Bay of Islands) marine mammal sanctuary  
proposal submission form**

**Your details**

Your name:

James Kempthorne

Organisation (

Street address:

Suburb:

City:

Region:

Email address:

Phone number:

Are you whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area?

Yes

No

If you answered yes, please provide details (eg, which hapū and/or iwi do you affiliate to):

**Which group(s) best describes your interest:**

- Northland / Te Pēwhairangi Bay of Islands community member
- Whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area
- Recreational maritime vessel operator
- Commercial maritime vessel operator
- Local business owner
- Local community group
- Member of the New Zealand general public
- Science and research
- Environmental groups
- Other (please specify):

**Official Information Act 1982**

Please note that any submission you make will become public information and that anyone can ask for copies of all submissions under the Official Information Act 1982.

The Official Information Act states that we must make information available unless there is a good reason for withholding it and provides a list of such reasons in sections 6, 9 and 18. If you think there is a good reason to withhold specific information, please state this in your submission. A good reason may include commercial confidentiality or that it is personal information. Note that any decision that is made by DOC to withhold information can be reviewed by the Ombudsman, who may require the information to be released.

I would like specific information in my submission withheld.

Please state the reasons for wanting specific information in this submission withheld.

### Your submission

You can provide any feedback on the proposed marine mammal sanctuary you would like. However, answering the following questions may assist in making your submission:

1. Do you support or oppose the proposed marine mammal sanctuary?  
If so, why, or why not?
2. Do you believe the proposal should be changed or amended?  
If so, what changes would you propose, and why?
3. Do you agree with how we have characterised the problem, objectives, and impacts?  
If not, how would you change it?

D) I seek changes to the proposal, Based on the 5 knot speed limit on boat traffic.

This would impact my family's enjoyment of the bay of islands. Having spent my life on the water in front of our house in Jacks Bay. The 5 knot limit would place a large burden to turn a short journey into a 35 minute journey @ 5 knots to the edge of the speed zone.

Whilst I support efforts to keep boat traffic away from marine mammals I fail to see how imposing a 5 knot limit on a small section of the bay of islands will improve the situation. This is exacerbated by the fact that we could not use the water ski area that we have been using for over 40 years which has been used by many generations of my family.

I also fail to see how this can effectively be enforced. I would suggest that a greater effort be made to stop boats approaching marine mammals over peak summer periods would be more effective along with a look at the impact of commercial fishing.

**WS-BOIMMS-143191: 1**

**Te Pōwhairangi (Bay of Islands) marine mammal sanctuary  
proposal submission form**

**Your details**

Your name: JAMES HUDSON  
 Organisation (if applicable): \_\_\_\_\_  
 Street address: \_\_\_\_\_  
 Suburb: \_\_\_\_\_  
 City: \_\_\_\_\_  
 Region: \_\_\_\_\_  
 Email address: \_\_\_\_\_  
 Phone number: \_\_\_\_\_

Are you whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area?

Yes  No

If you answered yes, please provide details (eg. which hapū area/whānau do you affiliate to)

**Which group(s) best describes your interests**

- Whānau / Te Pōwhairangi Bay of Islands community member
- Whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area
- Recreational maritime vessel operator
- Commercial maritime vessel operator
- Local business owner
- Local community group
- Member of the New Zealand general public
- Science and research
- Environmental groups
- Other (please specify): \_\_\_\_\_

**Official Information Act 1982**

Please note that any submission you make will become public information and that anyone can ask for copies of all submissions under the Official Information Act 1982.

The Official Information Act states that we must make information available unless there is a good reason for withholding it and provides a list of such reasons in sections 6, 9 and 18. If you think there is a good reason to withhold specific information, please state this in your submission. A good reason may include commercial confidentiality or that it is personal information. Note that any decision that is made by DOC to withhold information can be reviewed by the Ombudsman, who may require the information to be released.

I would like specific information in my submission withheld.

Please state the reasons for wanting specific information in this submission withheld.

**WS-BOIMMS-143191: 2**

**Your submission**

You can provide any feedback on the proposed marine mammal sanctuary you would like. However, answering the following questions may assist in making your submission:

1. Do you support or oppose the proposed marine mammal sanctuary?  
If so, why, or why not?
2. Do you believe the proposal should be changed or amended?  
If so, what changes would you propose, and why?
3. Do you agree with how we have characterised the problem, objectives, and impacts?  
If not, how would you change it?

1. I do support the proposed marine mammal sanctuary because hopefully it will result in an increase in the numbers of dolphins in the Bay of Islands.

2. No I don't think the proposal should be changed, in any way. Some vessel operators will lose business but it is more important for the future to save the dolphins.

3. Totally agree with how you have characterized the problem, objects & impacts.

**WS-BOIMMS-143194: 1**



**To Pūwhairangi (Bay of Islands) marine mammal sanctuary proposal submission form**

**Your details**

Your name: MARGO HUDSON  
 Organisation (if applicable): \_\_\_\_\_  
 Street address: \_\_\_\_\_  
 Suburb: \_\_\_\_\_  
 City: \_\_\_\_\_  
 Region: \_\_\_\_\_  
 Email address: \_\_\_\_\_  
 Phone number: \_\_\_\_\_

Are you whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area?

Yes  No

If you answered yes, please provide details (eg, which hapū and/or iwi do you affiliate to):

**Which group(s) best describes your interest:**

- Northland / Te Pūwhairangi Bay of Islands community member
- Whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area
- Recreational maritime vessel operator
- Commercial maritime vessel operator
- Local business owner
- Local community group
- Member of the New Zealand general public
- Science and research
- Environmental groups
- Other (please specify): \_\_\_\_\_

**Official Information Act 1982**

Please note that any submission you make will become public information and that anyone can ask for copies of all submissions under the Official Information Act 1982.

The Official Information Act states that we must make information available unless there is a good reason for withholding it and provides a list of such reasons in sections 6, 9 and 18. If you think there is a good reason to withhold specific information, please state this in your submission. A good reason may include commercial confidentiality or that it is personal information. Note that any decision that is made by DOC to withhold information can be reviewed by the Ombudsman, who may require the information to be released.

I would like specific information in my submission withheld.

Please state the reasons for wanting specific information in this submission withheld:

**WS-BOIMMS-143194: 2**

**Your submission**

You can provide any feedback on the proposed marine mammal sanctuary you would like. However, answering the following questions may assist in making your submission:

1. Do you support or oppose the proposed marine mammal sanctuary?  
If so, why, or why not?
2. Do you believe the proposal should be changed or amended?  
If so, what changes would you propose, and why?
3. Do you agree with how we have characterised the problem, objectives, and impacts?  
If not, how would you change it?

1. I do support the proposed marine mammal sanctuary because hopefully it will result in an increase in the numbers of dolphins in the Bay of Islands

2. No I don't think the proposal should be changed in any way. Some vessel operators will lose business but it is more important for the future to save the dolphins

3. Totally agree with how you have characterized the problem, objectives & impacts.

**WS-BOIMMS-143197**

**Submission to the proposed marine mammal sanctuary in the Bay of Islands**

Name: Ian Kempthorne

Address:

Email

Phone:

I am:

- A Northlander
- Recreational marine vessel operator
- New Zealand citizen

**SUBMISSION:**

I, Ian Kempthorne, oppose the proposed Bay of Islands Marine Mammal Sanctuary in its entirety.

I am a resident of Jacks Bay, born there in 1950. My parents moved into the area in 1947. We have always used the waters of Manawaora Bay, for gathering food, pleasure boating and fishing. We have always undertaken these activities with respect for the environment and done our bit to protect and enhance the entire area of the proposed marine mammal safe zone.

In my 70 years , living in the proposed area, I have seen dolphins and orcas come and go, either frolicking or pursuing food but they have never been there on a regular or full time basis.

Dolphins and orcas are creatures of their own free will and I know of no evidence that suggests that creating such a large safe zone will attract these migratory creatures into the area.

The proposed speed limit would be a major imposition for local residents who use and enjoy this part of the Bay of Islands for recreation.

Residents of the area are not the people pursuing and potentially disrupting dolphins and orcas out of curiosity, I suggest that it is boaties from outside the area and commercial operators. Some of these can be controlled by the authorities but the vast majority of visiting boaties will be ignorant of any regulations, thus forcing authorities into expensive policing exercises.

I acknowledge that seeing dolphin and orca in their natural environment is an exciting and pleasant experience, however, commercial operators have created an expectation of sighting dolphins (by offering refunds/revisits if they don't seen any) and market their tours on this basis, where previously "the experience" was too view the bay of Islands, out to Cape Brett and outer islands.

It is the commercial operators who actively pursue these mammals, but they would be potentially excluded from some of the proposed restrictions the Dept. of Conservation want to impose on the recreational boater as myself.

I have a powerboat that cruises at 30 knots. My family operate jet skis and water ski in and about the designated ski lane in Dicks Bay. Over the years we have seen our water skiing activities restricted from operating off our immediate beach, to limited activities in Dicks Bay. Now, the proposed sanctuary, would ban all water skiing and associated activities from the area.

I consider that I am a responsible boat operator. Have due consideration for the safety and pleasure of others, the environment and creatures in the Bay of Islands, and object to my rights being eroded when we have not abused them.

The proposed safe zone, covers my route to my fishing ground at the back of Roberton Island, via the Roberton/Moturua passage, meaning 80% of the passage time will be at 5 knots.

Should the proposed Marine Mammal Safe zone, with a speed limit of 5 knots be draughted into law, its enforcement will be expensive, an expense on tax payers of the region and country with dubious benefits. Particularly with the number of vessels of all shapes and sizes visiting Manawaora Bay and its safe anchorage over the summer months.

I reiterate, my family has been in the bay for nearly 75 years.

I do not believe that dolphins and orcas have made the area of the proposed safe zone, their preferred home, or place of choice.

The speed restriction would cause a serious loss of enjoyment, inconvenience and a major imposition of my rights to use my boat and freedom of movement.

I have always had due respect for others, people and animals/mammals using the area.

A more effective approach would be to have a public information campaign to educate boat owners how to act around marine mammals rather than crushing the rights of NZ citizens the freedom to enjoy their surrounds.

**WS-BOIMMS-143200**

Name: Deb Bayens-Wright

Street: [REDACTED]

Email: [REDACTED]

Phone: [REDACTED]

Kaitiakitanga in proposed sanctuary area? No

Groups describe me best: Recreational maritime vessel operator

Northland community member

I don't require my submission to be withheld

**Do you support or oppose the proposed marine mammal sanctuary? If so, why, or why not?**

Yes, I support it

**2. Do you believe the proposal should be changed or amended? If so, what changes would you propose, and why?**

Yes:

Seals shouldn't be included in this proposal.

No more dolphin watching boats than there currently are.

Additional no-wake zone for all vessels see map below...



**3. Do you agree with how we have characterised the problem, objectives, and impacts? If not, how would you change it?**

Yes I agree

Deb



**WS-BOIMMS-143203**



14 May 2021

Department of Conservation  
34 Landing Road  
Kerikeri 0230  
Email: [boimms@doc.govt.nz](mailto:boimms@doc.govt.nz)

To Whom It May Concern:

**Submission on the proposed marine mammal sanctuary in Te Pewhairangi (Bay of Islands)**

**About Entrada Travel Group**

1. This submission is on behalf of Entrada Travel Group, a large transport and tourism business with land and marine operations throughout New Zealand and Australia.
2. Entrada Travel Group has a significant presence in the Bay of Islands region through its Fullers GreatSights business.
3. Entrada is one of the largest employers in the region, operating a range of land and marine based tourism experiences as well as passenger and vehicle ferry services in the Bay of Islands and Hokianga.
4. This submission covers the effects the proposed sanctuary would have on Entrada's ferry services and the local community that relies on the services. A separate submission has been made about the effects on Entrada's tourism operations.

**Entrada operates essential ferry services within the boundaries of the proposed marine mammal sanctuary**

5. The proposed marine mammal sanctuary extends into the Waikare Inlet including the port of Opuā. The Waikare Inlet is a very busy enclosed limits waterway that is in continual use by a vast array of commercial and recreational vessels.
6. Entrada operates the only vehicle ferry service across the Waikare Inlet between Opuā and Okiato, providing transport to hundreds of thousands of passengers and vehicles every year. The ferry service is an essential connection for residents and visitors who would otherwise face an hour-long trip by road.
7. Our vehicle ferries operate a continuous service with departures every 10-20 minutes from 6:00am to 10:00pm plus additional late services during peak periods.
8. Entrada operates one of just three passenger ferries between Paihia and Russell. Of the three operators, only Entrada operates 365 days per year. The ferry services are used by hundreds of thousands of passengers every year and provide an essential connection for residents, especially those without access to private vehicle transport.
9. Our passenger ferries operate a continuous service with departures every 30 minutes from 7:00am to 10:00pm. Additional vessels and departures are added during peak periods.
10. The passenger and ferry services are relied on by vulnerable members of the community as well as emergency services (fire, ambulance and police). Call-out services are operated after hours for emergency services.
11. The map below shows the vehicle and passenger ferry routes. It should be noted that both ferry

routes fall within the boundaries of the proposed marine mammal sanctuary.



Figure 1: Passenger and vehicle ferry routes in the Bay of Islands.

**Although Entrada believes the broad objectives of the marine mammal sanctuary are worthy, the rules as currently written will have unintended negative consequences for the local community**

12. The marine mammals of Te Pewhairangi are a taonga that must be protected for future generations.
13. Research highlighting the declining population of bottlenose dolphins is of significant concern and because of this, Entrada Travel Group supports the aspiration of the Department of Conservation to provide better protections by building on the existing restrictions in place.
14. Entrada's concern is that the proposed restrictions would have the unintended consequence of diminishing transport accessibility within the region.
15. Noting that Entrada's ferries would not be covered by the list of exempt vessels in sections 6.a-6.e and 7, pursuant to section 4.a. of the Notice of Intention, all passenger and ferry services could be suspended if a marine mammal was within 400 metres of the ferry route; and under section 4.b., any passenger or ferry service could be forced to come to a halt midway if a marine mammal was within 400 metres of our vessel.
16. It should be noted that the vehicle ferry route between Opua and Okiato is just 900 metres. The presence of a marine mammal on the route would usually render it impossible to operate an alternative route. The vehicle ferry service would be completely shut down while marine mammals were visiting.
17. The passenger ferry route is longer and hence provides more opportunity for route deviation

unless the marine mammals are in close proximity of the Russell or Paihia wharves thus preventing departure or coming alongside.

**Marine mammals are frequently sighted on ferry routes**

18. Marine mammals are frequently sighted along the ferry routes however Entrada understands from conversations with local Department of Conservation employees that formal observation records are not currently being kept.
19. Based on feedback from our crew, we have observed marine mammals – notably dolphins, seals and orca – in the ferry routes around twice every month. Some marine mammal visits, especially those by orca, can last for up to two hours.
20. The frequency and duration of marine mammal encounters within the ferry routes means that there would be regular disruptions to ferry operations. These disruptions, as explained below, would have serious consequences for the community.

**The proposed restrictions will have unintended but severe consequences on transport accessibility for residents of the Bay of Islands and Far North District**

21. As noted above, the restrictions as currently drafted would force Entrada and other ferry operators to suspend and halt ferry services while marine mammals are within 400 metres of the ferry routes.
22. Entrada’s concern is the significant impact that this would have on the users of our ferry services, especially vulnerable members of the community and economically disadvantaged individuals.
23. To illustrate our concerns, a snapshot of the types of travellers who would be impacted follows:
  - a. Ambulance, fire and police services responding to emergency call-outs.
  - b. Carriage of time-critical biological medical samples for Medlab on the passenger ferry.
  - c. Carriage of “meals on wheels” on the passenger ferry for the aged community.
  - d. School children travelling between their homes (Russell) and schools (Paihia and Kerikeri).
  - e. People seeking medical attention (example: pregnant women en route to hospital).
  - f. Workers who rely on the ferry services to reach their place of employment.
  - g. Jobseekers in search of employment.
  - h. People without access to private vehicle transport or without driver licences.
  - i. Elderly or physically impaired individuals for whom driving is no longer an option.
  - j. Time critical transport operators such as those carrying COVID vaccines, fresh food, water etc.
  - k. Over-dimensional permitted loads where travel times are mandated by the NZTA.

**The unintended consequences can be avoided while still meeting the objectives of the proposed marine mammal sanctuary**

24. Entrada has already raised its concerns directly with local Department of Conservation employees and stands ready to engage in further dialogue on ways to avoid the severe impacts to the community as described above.
25. It is critical that solutions are identified before the Minister for Conservation takes the decision to recommend the marine mammal sanctuary to Cabinet. Leaving the matter to be resolved at a later date will create uncertainty and present a risk that a workable solution cannot be found and implemented before the sanctuary becomes operative.
26. Entrada wishes to identify an enduring and workable solution that ensures the objectives of the proposed sanctuary are met. To this end, Entrada believes that mitigations for vehicle and passenger ferry operations can be implemented that are consistent with the objectives of the sanctuary.

**Proposed vehicle ferry mitigation**

27. Entrada respectfully submits the following suggested rule changes to mitigate the abovementioned risks to the community if vehicle ferries are cancelled or disrupted.
- a. Exempt any vessel from proposed restriction 5(4)(a) that is operating a vehicle ferry service that is registered with the Northland Regional Council, only if that vessel is operating along the ferry routes as noted above in Figure 1, or repositioning from its berthage to the ferry route.
  - b. If the vessel is within 300 metres of a marine mammal, the vessel must:
    - i. Reduce speed to a maximum of 5 knots.
    - ii. Take all reasonable precautions to avoid coming into closer proximity.

**Proposed passenger ferry mitigation**

28. Entrada respectfully submits the following suggested rule changes to mitigate the abovementioned risks to the community if passenger ferries are cancelled or disrupted.
- a. Exempt any vessel from proposed restriction 5(4)(a) that is operating a passenger ferry service that is registered with the Northland Regional Council, only if that vessel is operating along the ferry routes as noted above in Figure 1, or repositioning from its berthage to the ferry route.
  - b. If a marine mammal is within 400 metres of the vessel but more than 300 metres of the Paihia or Russell wharves, the vessel must first halt for at least 5 minutes to allow the marine mammal the opportunity to move away. Following this waiting period, the vessel must slow to 5 knots and take evasive action to maintain a distance of at least 300 metres from the marine mammal.
  - c. If a marine mammal is within 400 metres of the Paihia or Russell wharves, the vessel may depart from or come alongside the wharf provided that it first comes to a halt for at least 5 minutes to allow the marine mammal the opportunity to move away. Following this waiting period, the vessel must:
    - i. Reduce speed to a maximum of 5 knots.
    - ii. Take all reasonable precautions to avoid coming into closer proximity.

**Request to meet**

29. We are thankful to the local DOC team for the time they have taken to hear our concerns about the unintended consequences of the proposed sanctuary. They have given us helpful advice which we have taken into consideration in writing this submission.
30. The local team has made clear that the final decision about the sanctuary rests with the Minister of Conservation. For this reason, we respectfully request to meet with the Minister and her aides to discuss our concerns, our proposed mitigation, and any other suggestions which the Minister and her aides may have.
31. As we are concerned about the severe consequences, albeit unintended, if the proposal goes ahead in its current form, we have copied our submission to other members of the community and stakeholders who we believe could be included in a meeting to discuss mitigations.

**Summary**

32. Thank you for your time reading and considering our submission. We support the objectives of the proposed marine mammal sanctuary and believe that, so long as the above-mentioned unintended consequences can be resolved, the sanctuary will have long lasting benefits for the marine life within the sanctuary, as well as enhancing the enjoyment and wellbeing that the community and its visitors derive from the locale.
33. My contact details are below:
- Email: [REDACTED]
  - Phone: [REDACTED]

Yours sincerely,



Sam Peate

**General Manager**

CC: Hon Dr Ayesha Verrall, Acting Minister of Conservation  
Hon Michael Wood, Minister of Transport  
Hon Kelvin Davis, MP for Te Tai Tokerau  
Willow Jean Prime, MP for Northland  
John Carter, Far North District Mayor  
Michael Wood, Minister of Transport  
Jim Lyle, Harbourmaster

**WS-BOIMMS-143206**



14 May 2021

Department of Conservation  
34 Landing Road  
Kerikeri 0230  
Email: [boimms@doc.govt.nz](mailto:boimms@doc.govt.nz)

To Whom It May Concern:

**Submission on the proposed marine mammal sanctuary in Te Pewhairangi (Bay of Islands)**

**About Entrada Travel Group**

1. This submission is on behalf of Fullers GreatSights, a division of Entrada Travel Group, a large transport and tourism business with land and marine operations throughout New Zealand and Australia.
2. Fullers GreatSights has a significant presence in the Bay of Islands region, being one of the largest employers and operating a range of land and marine based tourism experiences as well as passenger and vehicle ferry services in the Bay of Islands and Hokianga.
3. This submission covers the effects the proposed sanctuary would have on Fullers GreatSights' tourism operations, and the ripple effect through to the local community that depends on tourism for employment and income. A separate submission has been made about the effects on Entrada's ferry operations.

**Fullers GreatSights operates sightseeing cruises within the boundaries of the proposed marine mammal sanctuary**

4. Fullers GreatSights operates year-round sightseeing cruises using a fleet of vessels purpose-built for customers to experience the amazing sights of the region in comfort.
5. Two of our vessels, Dolphin Seeker and Te Maki, hold DOC Marine Mammal Permits. The rest of the vessels in our fleet are not covered by permits.
6. Our sightseeing cruises are enjoyed by hundreds of thousands of passengers every year including a mixture of international and domestic visitors.
7. The region is dependent on tourism. The economic impacts of tourism visitation are enjoyed by a range of businesses such as hotels and motels, restaurants and bars, retailers, service stations and much more.
8. As the major tourism operator in the region, we appreciate the importance of growing visitation. An example of our actions in this area is our funding of and leadership role within the Bay of Islands Marketing Group.

**Although Fullers GreatSights believes the broad objectives of the marine mammal sanctuary are worthy, the rules as currently written would have unintended negative consequences for the local economy and resident welfare**

9. The marine mammals of Te Pewhairangi are a taonga that must be protected for future generations.
10. For many years, the ability to view marine mammals, especially dolphins, has been a key reason for people to choose to visit the Bay of Islands. We agree that the past actions of some



recreational and commercial operators have been harmful and that changes need to happen so that the welfare of marine mammals is not endangered.

11. We agree with the proposal to exempt Marine Mammal Permit holders from the proposed restriction 5(4)(a). Permitted vessels represent only a tiny fraction of total vessels in the region, the permits place high standards on operators, and monitoring and compliance requirements are included.
12. The proposal as written would cause several negative consequences for the region which would threaten the tourism and transport industries and thus have flow-on impacts to the wider community by cooling the economy and reducing employment. These consequences are elaborated on below.

**The proposed safe zone south of Tapeka Point and Motokauri Island would put at risk passenger safety and the ability to provide satisfactory visitor experiences**

13. The Bay of Islands, as its name suggests, is a region offering beautiful and inspiring experiences to visitors on sightseeing cruises.
14. For visitors to commit to the costs of travelling to and staying in the Bay of Islands, they need to be sure that the cruise they have booked will operate.
15. On days when open sea conditions are rough, nearly all sightseeing cruises including those operated by Fullers GreatSights travel into the zone south of Tapeka Point and Motokauri Island where in calmer waters customers can enjoy the sights of the region in comfort.
16. Under the proposed 5 knot restriction, cruise operators would face the following dilemma:
  - a) Travel along the usual itinerary out to open sea, putting customer safety at risk due to the rough sea conditions; or
  - b) Operate an alternative itinerary with a reduced number of visitor attractions and a greatly diminished customer experience; or
  - c) Travel into the safe zone at 5 knots with a resulting increase to the overall cruise duration, disrupting passengers' onward travel plans.
17. Any of the above options would affect the quality of experience provided to visitors which would lead to the appeal of the region falling. This would lead in turn to lower visitation which would greatly impact upon the wider community.
18. To avoid these negative impacts, we propose that the rules be modified so that vessels can operate in the safe zone above 5 knots provided that:
  - a) The vessel must hold a Marine Mammal Permit; and
  - b) A distance of at least 400 metres must be kept from all marine mammals. The vessel must come to a complete halt if marine mammals approach within 400 metres inside the safe zone; and
  - c) The vessel must record the number of days/cruises it enters the safe zone and report the same to DOC; and
  - d) The vessel can only access the safe zone a maximum of 20 times per year.

**The proposal would have negative consequences for vessel movements within the Waikare Inlet**

19. The proposed marine mammal sanctuary extends into the Waikare Inlet including the port of Opuā. The Waikare Inlet is a very busy enclosed limits waterway that is in continual use by a vast array of commercial and recreational vessels.
20. Fullers GreatSights' sightseeing vessels berth overnight in Opuā and make their way to Paihia for the cruise departure point. After departing Paihia, the vessel makes way to Russell to pick up passengers before starting the cruise.
21. Marine mammals are frequently sighted within the Waikare Inlet however we understand from conversations with local Department of Conservation employees that formal observation records are not currently being kept.
22. Based on feedback from our crew, we have observed marine mammals – notably dolphins, seals

- and orca – in the Waikare Inlet around twice every month. Some marine mammal visits, especially those by orca, can last for up to two hours.
23. The frequency and duration of marine mammal encounters within the Waikare Inlet means that there would be regular disruptions to vessel movements by Fullers GreatSights and other operators. These disruptions would have serious consequences for the community because of the inability to provide cruises as scheduled.
  24. To avoid these negative impacts of the proposal, we propose that:
    - a) The Department of Conservation introduces a “SMART Operator” training programme for commercial vessel operators in the region.
    - b) Accredited SMART operators may operate within the Waikare Inlet provided that if a marine mammal is within 400 metres, the vessel must come to a halt for at least 5 minutes to allow the marine mammal the opportunity to move away. Following this waiting period, if the marine mammal has not moved away, the vessel must reduce speed to a maximum of 5 knots and take all reasonable precautions to avoid coming into closer proximity.

**The proposal would threaten the viability of to the cruise ship industry, potentially removing the region from some itineraries**

25. Cruise ships visiting the region bring thousands of passengers to the region and are an important source of income for local businesses. The cruise ships depend on tender vessels, either operated by the cruise ship or by local operators, to transfer passengers to shore.
26. Cruise ships operate to very tight timetables with most passengers having just less than 6 hours on shore before returning to the ship to ready for the onward journey to the next port.
27. To avoid the risks of (a) cruise ships being diverted away from the Bay of Islands due to the presence of a marine mammal and (b) tender vessels being unable to approach the cruise ship due to the presence of a marine mammal, we propose that:
  - a) Cruise ships be exempted from rule 5(4)(a).
  - b) The Department of Conservation introduces a “SMART Operator” training programme for commercial tender operators in the region.
  - c) Accredited SMART operators may operate tender transfers to and from cruise ships provided that if a marine mammal is within 400 metres, the tender must come to a halt for at least 5 minutes to allow the marine mammal the opportunity to move away. Following this waiting period, if the marine mammal has not moved away, the tender must reduce speed to a maximum of 5 knots and take all reasonable precautions to avoid coming into closer proximity.

**Request to meet**

28. We are thankful to the local DOC team for the time they have taken to hear our concerns about the unintended consequences of the proposed sanctuary. They have given us helpful advice which we have taken into consideration in writing this submission.
29. The local team has made clear that the final decision about the sanctuary rests with the Minister of Conservation. For this reason, we respectfully request to meet with the Minister and her aides to discuss our concerns, our proposed mitigations, and any other suggestions which the Minister and her aides may have.
30. As we are concerned about the severe consequences, albeit unintended, if the proposal goes ahead in its current form, we have copied our submission to other members of the community and stakeholders who we believe could be included in a meeting to discuss mitigations.

**Summary**

31. Thank you for your time reading and considering our submission. We support the objectives of the proposed marine mammal sanctuary and believe that, so long as the above-mentioned

unintended consequences can be resolved, the sanctuary will have long lasting benefits for the marine life within the sanctuary, as well as enhancing the enjoyment and wellbeing that the community and its visitors derive from the locale.

32. My contact details are below:

- Email: [REDACTED]
- Phone: [REDACTED]

Yours sincerely,

[REDACTED]

Sam Peate  
**General Manager**

**WS-BOIMMS-143209**

**Jared Bothwell**

---

**Sent:** Monday, 17 May 2021 11:58 am  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary  
**Subject:** Marine Mammal Sanctuary...

I agree with the proposals....Michael A .V. Watson...

**WS-BOIMMS-143212**

**From:** Lorraine Mecca [REDACTED]  
**Sent:** Friday, 14 May 2021 7:30 am  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary  
**Subject:** Marine Mammal Sanctuary

From:  
Lorraine Mecca

[REDACTED]

I am in favor of forming a Bay of Islands Marine Mammal Sanctuary. I support the proposed marine mammal sanctuary because I feel current conditions are not protecting dolphins, whales or seals in and around the bay.

Kind regards,  
Lorraine Mecca

.

**Mecca**

[REDACTED]

**WS-BOIMMS-143215**



**From:** Peter Sharpe [REDACTED]  
**Sent:** Friday, 14 May 2021 8:07 am  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary  
**Subject:** Marine Mammal sanctuary

To whom it may concern.

I strongly support the proposal to have more restrictions on interactions between people and Marine mammals.

If any changes were to be made to strengthen, extend or enhance the proposal I would be in favour.

I agree with the characterization of the problem, the objectives of the sanctuary, and its impacts.

I own a waterside property where two sister dolphins come to have a baby dolphin. These are so precious to humans and the environment. We have to do everything to protect them.

My daughter, who has health problems which interaction with dolphins helps her, no longer swims with dolphins because of her fear that they are declining in the Bay.

Sincerely,

[REDACTED]

Russell

[Te Pahii](#)

[Bay of Islands Cottages](#)

[Challenging Kitsets](#)

[Duffus Memorial Trust](#)

**WS-BOIMMS-143218**

**From:** david radtko [REDACTED]  
**Sent:** Friday, 14 May 2021 10:48 am  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary  
**Subject:** BOI Marine Animals Proposal Submission

I have heard the details of the BOI Marine Mammals proposal and agree that it is an important issue to address before some of our most important natural assets are destroyed. Preserving and encouraging the ongoing health of these creatures is a time sensitive issue. Now is the time for us all to support this proposal.

Susan Goodall  
[REDACTED]

**WS-BOIMMS-143221**

**From:** Warren Haslip [REDACTED]  
**Sent:** Friday, 14 May 2021 11:23 am  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary  
**Subject:** Submission for Marine mammal sanctuary

Hi,

My name is Warren Haslip, From Russell in the Bay of Islands. Contact Ph number: 0275627955.

In my view marine mammals are a species that needs protecting, along with all other marine species to grow and develop the marine environment. That being said a marine sanctuary for mammals should be done for the right reasons and definitely not for self promotion, nor done in an unscrupulous fashion. After reading reports and with a little on the ground local knowledge I have come to the following conclusions.

- All the data supplied is skewed to offer a dissatisfactory account of current dolphin population in the Bay of Islands. Of the 278 Dolphins that it is implied have had a huge mortality rate down to 26, two very different areas of data collection have taken place. 278 dolphins in the wider area of the Northland Coastal Estuarine Species travelling and seen between Tauranga and the 3 Kings islands in the north. Sample data taken solely in the Bay of Islands (not the wider area) accounting for 26 dolphins. Should this data not be taken from the entire area for a correct account of dolphin numbers?
- [REDACTED] The independent Third party researcher for this project is none other than the husband of DOC lead researcher Cat Peter's - how can this be deemed an independent view? I call for a truly independent third party to research this area with no personal ties to existing researchers, commercial interests, local Iwi, nor DOC staff.
- Local behavioural patterns of Dolphins, It is widely agreed by long standing members of the boating community that the Bay of Islands has one resident pod of dolphins that spends the majority of it's time within these waters. This pod has become highly territorial, with three large males having been seen multiple times attacking and chasing away any other individuals or pods which come into the Bay. This in no way indicates a decline in population of dolphins, just a change in areas for the majority of the larger population.
- Commercial activities affecting the Dolphins mortality rates - I strongly believe that the local commercial operators put the Dolphins welfare before commercial gain and in no way operate in any manner that would affect a dolphins wellbeing, as part of our local commercial operator staff we have people who have spent their lives advocating and volunteering for marine mammal welfare initiatives, these are not people who would put commercial gain over the mammals welfare at any cost. More emphasis has to be put on the private boating sector, as over busy periods it can be clearly seen that a lack of knowledge operating vessel's around the dolphins raises the risk to the dolphins.

[REDACTED]

I request an answer for the above points outlining how the Department of Conservation accounts for these factors in this matter.

If you would like or require further comment or communication on the proposed sanctuary feel free to contact me via email or phone.

Warren Haslip



**WS-BOIMMS-143224**

I support the proposed marine mammal sanctuary in the Bay of Islands. It's long overdue.

Regards  
Eileen Kopec  
Russell





**WS-BOIMMS-143236**

**From:** Derry & Isabella Godbert [REDACTED]  
**Sent:** Monday, 17 May 2021 2:34 pm  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary  
**Cc:** Dean Wright; Ria Bright; Chris Richmond; John Booth; Chris Booth; Vicky Froude  
**Subject:** Marine mammals submission

To Submissions Committee,

I am submitting in support of the proposed Marine Sanctuary in the Bay of Islands [Te Peuwhairangi] I have 45 years of sailing diving and fishing in the bay of Islands.

I have noted;

- 1, The very obvious decline in Dolphins particularly Bottle nosed, to a lesser extent other Cetaceans.
- 2, A very clear reduction in general fish stocks. I fish with standard equipment and techniques which I have not altered over 45 years so this is a reasonably objective estimate. This is strongly supported by clear reduction in observable fish shoals at Cape Brett and Ninepin / Wiwiki.
- 3, Also noted a clear and marked arrival and increase of Seals in many parts of the Bay.

A very obvious and intelligent conclusion is that there is a shortage of food for Cetaceans in the Bay caused by competition with Seals and a shortage of food needing an active method of conserving and increasing fish stocks.

There does not seem to be anything in the proposed Marine Mammal Sanctuary to address these problems which are really required to achieve any practical benefits for Dolphins.

Discussing specific points in the proposal;

1, Seals, as mentioned above they do not appear to be in any need of protection. Requested action, remove proposal 1,

2, Vessels and 400m zone. This part of the Marine Mammals Sanctuary Proposal is so impractical that it hardly deserves comment except perhaps to the section 4 which unbelievably allows permitted [commercial]? vessels to continue damaging their own source of income!! it perhaps explains point 6 where no method of supporting / enforcing the proposal is mentioned. It would obviously be impractical from a fair and unbiased point of view. Even more extraordinary even if it could be applied it would cause major risks to legal marine traffic. Requested action, replace existing wording with; All powered vessels are advised / required to give marine mammals space by avoiding moving towards them in a manner that causes them to react negatively.

3, Swimmers within 400m of marine mammals How can a swimmer / diver? know when they are within 400m of a marine mammal? Obviously if dolphins are or come within sight 'swimmers' could be politely recommended to leave the water while the 'dolphins' are there. The relative speed of movement of swimmers and 'dolphins' is such that proximity is usually very brief.

Requested action, remove this section or replace with recommendation above.

4, Allowing commercial viewing by powered vessels is obviously not good for dolphins from DOC's evidence. Possible Requested action use wording "All vessels actively viewing marine mammals must do so under sail with motors and echo location gear silent. This a, allows the mammals to move away from the vessels b, reduces sound stress on the mammals and c, Supports 'global warming' aims.

5, Follow peer review protocols in any research on marine mammals.

6, Consequences of actions in proposals put forward. Requested Action, delete this section as impractical.

7, Requested actions, Make practical efforts to support marine mammal populations in the proposed Marine mammal sanctuary by a, developing / supporting small no take marine reserves to improve food for mammals, b, limit the size of the fishing 'take' from the overall Marine Mammals Sanctuary.

Name Derry Godbert



**WS-BOIMMS-144242**

**From:** Julie Insley [REDACTED]  
**Sent:** Friday, 14 May 2021 7:37 pm  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary  
**Subject:** Marine sanctuary submission

- Do you support or oppose the proposed marine mammal sanctuary? If so, why, or why not?
  - 
  - I would like to support the proposed sanctuary because I think it is highly important that we do whatever we can to protect our ocean mammals.
  - 
  - Do you believe the proposal should be changed or amended? If so, what changes would you propose, and why?
  - 
  - I am happy as it stands, and I trust your knowledge and expertise to do what is right and just for these iconic and valuable and gorgeous animals.
  - 
  - Do you agree with how we have characterised the problem, objectives, and impacts? If not, how would you change it?
- yes, I'm sure a lot of study, science and knowledge have gone on to this proposal.

Yours sincerely Julie Insley

[REDACTED]

•

**WS-BOIMMS-144245**

**Te Pēwhairangi (Bay of Islands) marine mammal sanctuary  
proposal submission form**

**Your details**

Your name: Nick Hanson  
 Organisation (if applicable): Royal Akarana Yacht Club  
 Street address: [REDACTED]  
 Suburb: [REDACTED]  
 City: [REDACTED]  
 Region: [REDACTED]  
 Email address: [REDACTED]  
 Phone number: [REDACTED]

Are you whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area?

Yes  No

If you answered yes, please provide details (eg. which hapū and/or iwi do you affiliate to):

**Which group(s) best describes your interest:**

- Northland / Te Pēwhairangi Bay of Islands community member  
 Whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area  
 Recreational maritime vessel operator  
 Commercial maritime vessel operator  
 Local business owner  
 Local community group  
 Member of the New Zealand general public  
 Science and research  
 Environmental groups  
 Other (please specify): \_\_\_\_\_

**Official Information Act 1982**

Please note that any submission you make will become public information and that anyone can ask for copies of all submissions under the Official Information Act 1982.

The Official Information Act states that we must make information available unless there is a good reason for withholding it and provides a list of such reasons in sections 6, 9 and 18. If you think there is a good reason to withhold specific information, please state this in your submission. A good reason may include commercial confidentiality or that it is personal information. Note that any decision that is made by DOC to withhold information can be reviewed by the Ombudsman, who may require the information to be released.

I would like specific information in my submission withheld.

Please state the reasons for wanting specific information in this submission withheld.





1. OPPOSE

The proposal as drafted shows a complete lack of understanding as to how the BOI marine area operates. The proposal is completely unworkable for any commercial or recreational maritime uses (fishing, sightseeing, yacht racing including Coastal Classic, BOI Sailing Week).

2. AMENDED

Completely remove the requirement to:

- Maintain a vessel distance of 400 metres from any marine mammal present within the boundaries of the marine mammal sanctuary; including stopping engines or dropping sails.
- Speed for all vessels restricted to 5 knots at all times in the two marine mammal safe zones.

Given that the majority of close contact with marine mammals is likely to be initiated with vessels having viewing permits there seems no justification for making these vessels exempt from the 400m separation restriction.

There are other, more remote, areas in the BOI more suited to inclusion in a Marine Mammal Safe Zone. The most obvious is Deep Water Cove which was successfully protected by a rahui widely accepted by the fishing and boating community.

3. DISAGREE

Commercial Viewing operations have only been excluded from this zone since 2019. It would seem there has been insufficient time given to measure the success of this limitation.

The Trioceans research does not show significant numbers of dolphins foraging, resting or milling in this zone. The majority of recorded sightings appear to be of dolphins travelling through the area.

**WS-BOIMMS-144248**

SUBMISSION TO THE PROPOSED MARINE MAMMAL SANCTUARY IN THE BAY OF ISLANDS

NAME Pauline Kempthorne

ADDRESS

[REDACTED]

EMAIL

[REDACTED]

PHONE

[REDACTED]

I AM

A Northlander  
An avid fisherperson  
NZ Citizen

SUBMISSION:

I, Pauline Kempthorne, oppose the proposed Bay of Islands Marine Mammal Sanctuary in Manawara Bay and surrounding area, in its entirety.

I first visited the Bay of Islands, in particular Jacks Bay, in late 1970,

Currently Own a property, with my husband in Jills Bay, (adjacent to Jacks Bay),which is now our permanent home.

In 1970,the Jack and Jill Beachcamp was in operation, with many people from all over the country, enjoying swimming, boating, fishing,water skiing etc.

In later years the land moved into private ownership, but the beach and sea remains in public ownership. The public and other Jacks Bay Residents, have access to the waterfront and beach from a walking track.

There is also a public boat launching facility in Dicks Bay.

In the 70's and 80's we all enjoyed our water sports, including kayaking, swimming, water skiing, fishing etc.

Our children also enjoyed, and still do these same activities , even though the skiing lane has been moved to Dicks Bay, from Jills Bay.

Jills Bay is now dotted with Harbour Board moorings.

Our grandchildren (4th Generation) now do likewise , adding wakeboarding, jet skiing, toboggans, biscuits and other forms of water sports to the mix.

The many owners of the greater area, all significant rate payers, take pride in maintaining the waterfront for all to enjoy.

We all love the dolphins that occasionally visit our bays, even nicer now that commercial operators have been excluded from the area.

To add here that the commercial operators, search for dolphins at speed, are incredibly noisy, we more often hear them coming, can even hear them as they pass through the Rawhiti Channel.

The many residents and visitors to the area are also entitled to use the area for activities and enjoyment, along with the mammals.

The current proposal to make the area a marine mammal sanctuary, which would entail cutting the motor vessel speed limit to 5 knots, would mean most of the water sports will be excluded from the whole Manawara Bay.

The fisher's amongst us will take the slow boat to fishing spots outside of the designated area.

Must add that since the 70's have noticed the significant decline in the quantity and size of, particularly snapper, caught in the greater Bay of Islands. Restrictions have been placed on recreational fishing, but not particularly on the commercial operators.

This, I believe, is a significant reason for the decline in numbers of dolphin and orca visiting many of the bays in the Bay of Islands. The declining food source.

Perhaps, a better course of action would be to ban the commercial fishing operator inside the bay of islands

Sanctuaries are very important for the future of all animals, mammals, birds and bugs, flora and fauna, humans are also entitled to their freedom of choice to participate in leisure activities.

There are many, unpopulated areas in the Bay of Islands, which would make amazing sanctuaries, like Deep Water Cove.

Therefore, in conclusion, I strongly object to this proposal for a marine mammal safe zone in the Manawaora Bay and surrounding area as it will have a serious impact on how we, our family, and other residents of the area enjoy the freedom to enjoy, as they wish, the waters of the area.

If we lose the freedom to enjoy the area, we will never get it back

**WS-BOIMMS-144251**



**AUCKLAND YACHT & BOATING ASSOCIATION INC.**

P. O. Box 90977, Victoria St West, Auckland, 1142  
p. 09 302 2030  
e. ayba.secretary@gmail.com  
w. www.ayba.org.nz

**Re PROPOSED MARINE MAMMAL SANCTUARY IN  
TE PEWHAIRANGI – BAY OF ISLANDS**

**SUBMISSION FROM THE AUCKLAND YACHT & BOATING ASSN. INC**

**OUR DETAILS**

Name: Janet Watkins, Executive Committee, AYBA  
Organisation: Auckland Yacht & Boating Assn. (AYBA)  
Address: AYBA, P.O. Box 90977, Victoria St West, Auckland 1142.  
My address [REDACTED]  
E-mail: [REDACTED]  
Phone: [REDACTED]

**ARE YOU WHANAU, HAPU OR IWI THAT EXERCISES KAITIAKITANGA IN THE PROPOSED  
SANCTUARY AREA?**

No

**WHICH GROUP(S) BEST DESCRIBE YOUR INTERESTS:**

The Yachting and Boating people of Auckland & Northland who cruise and race the coast and the Bay of Islands – in particular 45 Yacht & Boating Clubs of the Auckland Region.

**OFFICIAL INFORMATION ACT 1982:**

We agree to our submissions being made public under this act.

**SUBMISSION MADE BY & ON BEHALF OF THE AUCKLAND YACHT & BOATING ASSOCIATION INC.**

The AYBA represents most of the Yachting and Boating Clubs of Auckland and their members which include the keel boat owners who frequently cruise to the Bay of Islands. Some race in the Coastal Classic while others go north for Bay of Islands Week.

The Coastal marine environment is our recreation area and the AYBA is constantly aware of the need to protect this environment and its inhabitants and work with YNZ as a conduit for information to all our members.

**1. We fully support the need to protect the Bay of Islands and its bio-diversity BUT**

- a. We do not fully support the proposed marine mammal sanctuary as currently proposed.
- b. We do, however, support the need for the protection of the area and its inhabitants in some form.
- c. The Rahui protecting Deep Water Cove is proof of the effectiveness of some form of protection.

**2. Do you believe the proposal should be changed or amended? YES.**

**Suggested Solutions:**

**Education:** The constant repetition of the existing rules in a simple format to educate the wider public. Simple slogans like “Dolphins need their space” as “Wear a lifejacket”. The brochures



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and posters can say why. If people know why they accept the rules and are more likely to keep their distance.

#### **Assist enforcement with the promotion of local regular boat owners to Honorary Rangers with ID flags and a simple VHF or cell phone message.**

- We support the increased rule to disallow swimming with Dolphins but there needs to be an awareness that the dolphins are curious and may seek the swimmers.
- The increase of the distance limitation from 300m to 400m is aimless as the dolphins often don't make their presence known until they are on the bow waves. They are not easily spotted at 300 – 400 metres.

Though the current rules are not widely known, we believe that many would be happy to self-police if they simply understood what the rules were and why. **EDUCATION!**

Dolphins have always enjoyed playing in the bow waves and putting on a display of leaps and twists. Today's high speed power boats with their pinging sounders may have increased the attraction.

### **3. Solutions:**

We would like to see a far wider education programme around the existing rules and why some changes may be necessary. Some simple solutions could include:

- Signage at the marinas and boat ramps saying why they need "space".
- Posts on local facebook community pages **but discourage photo's of close encounters!!!**
- Talks at local boating clubs – Use YNZ & Regional Associations like AYBA to pass on the information to their members including brochures. **Generally, the skipper knows the rules & why but do the guests?!**
- Information leaflets at local hotels/motels always explaining **WHY!!!**

It is important that these communications not only include the rules, but also education about the impact of not abiding by them.

### **4. The 5 knot speed limit if approached by a dolphin:**

The inclusion of the statement that the restrictions apply if "a dolphin approaches you" is unenforceable because of the inability to actually see a dolphin until it is well within the limited range!

Yachts do often travel at over 5 knots when under sail, though most (except high performance yachts) would rarely travel faster than 10 knots. However, if a dolphin were to approach a yacht under sail the proposed rules suggest the yacht should drop sails in order to reduce their speed. In practical terms, for a yacht, this is not so simple. A yacht would have to round up head to wind & hold with an anchor or a motor before dropping the sails! It cannot be done in a hurry!

Furthermore, the starting of the motor and unpredictable manoeuvring in close quarters, creates an added risk and issue for the safety of the Dolphins and the crew!



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**RISK FACTOR FOR VESSELS: To slow down & stop in a rough seaway with strong winds or even in the big easterly swells that roll into the Bay** where dolphin often like to play could be un-seaman like and impose risks. There have been times, when returning from Cape Brett to the shelter of the northern inlets, would be long and arduous and very unpleasant thanks to the dolphin escort. **ANY RULES must be logical and not create other problems!**

#### Possible solutions to this issue may be:

1. Remove this reference in its entirety OR
2. **Educate about the discouragement of attraction – Has research been done in this area? What attracts the dolphins?** We used to blow a conch shell and they would appear. Do the echo sounders attract?
3. Making known the area currently frequented by dolphins could be short term as they move.
4. Is Making a Marine Mammal Safe Zone a practical solution – how would the dolphins be advised! We need to learn to share their world – **EDUCATION.**

#### 5. DO YOU AGREE WITH HOW WE HAVE CHARACTERISED THE PROBLEM, OBJECTIVES AND IMPACTS?

**There are a number of unanswered questions that may be affecting the dolphin populations and the mitigation of these problems may not be resolved by the solutions suggested:**

1. What evidence is there and how frequent, of injuries caused to dolphins by vessels. Dolphins are intelligent and will avoid any stressful situation. They will also seek help as we once experienced.
2. What is the wider experience of conservation organisations around the world? How many autopsies of adults & juveniles of both sexes have been carried and what are the results? Injuries? Malnutrition? Plastic? Water pollution!
3. What is the density of dolphin food species in the Bay now compared to 1997? Surely dolphins are now searching further afield for their food sources.
4. What is the effect of dolphins ingesting plastic both local and offshore?

We do not believe that the proposed solution addresses the main issue of seafood supplies in the Bay of Islands (fish, shellfish etc). Anecdotally the seafood stocks have dwindled significantly over recent years. However, the proposed Marine Mammal sanctuary fails to address this issue at all.

#### Some other solutions may be:

1. **The review of all fishing activities in the Bay** – commercial, bag limits, bans.
2. **Limiting the number of commercial Dolphin Watch operations per day.**
3. **Holding Tank discharge** – the current rules mean the holding tanks can be discharged in a large proportion of the proposed marine mammal sanctuary area. In order for this to be





**AUCKLAND YACHT & BOATING ASSOCIATION INC.**

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reasonably complied with, the number of possible holding tank pump-out facilities would need to be increased. Currently these are only at Opuia Marina and Doves Cove Marina.

4. **Encourage the development of mitigation plans** with the organisers to enable aquatic events and regattas to continue.

**IN SUMMARY**

The AYBA are keen to work with DOC towards the better protection of the Bay of Islands marine environment and its wildlife for the on-going enjoyment of all our boaties and sailors.

We will work with DOC to keep all our affiliated yacht clubs members and associates aware of any developments, recommendations and future rules.

*Janet M Watkins*

Janet Watkins

For Auckland Yachting & Boating Association Inc.

15 May, 2021.

Vice Commodore,  
Ponsonby Cruising Club Inc.

(Author of the "PICKMERE ATLAS of NORTHLAND'S EAST COAST")

**WS-BOIMMS-144254**

Dr Ingrid N. Visser (PhD)

16 May 2021

Orca Research Trust  
P.O. Box 402043, Tutukaka, 0153

**Submission on the proposed Te Pēwhairangi (Bay of Islands) marine mammal sanctuary**

I am making a submission on the proposed Te Pēwhairangi (Bay of Islands) marine mammal sanctuary, **which I oppose**.

I have been studying the marine mammals of New Zealand for the past three decades and I strongly support their protection. However, I oppose the above sanctuary project as it is currently presented, based on a number of factors. These are *inter alia*;

1. The data presented for the proposal is highly distorted and appears to be deliberately misrepresented to create alarm and thereby support for the sanctuary.

For example the DOC website (<https://archive.is/zzn1s>) states;

(i) *"The bottlenose population has declined significantly, from 278 in 1997 to 26 in 2020"*

However, on the website, DOC fails to acknowledge that the number of '278' represents a *Tursiops* population that did not reside in the Bay of Islands in 1997, but rather individuals who would transit through (with some animals frequenting the area more often than others). The 278 animals is a number derived from a long-term study that encompassed a much wider area than just the Bay of Islands, but the '26' used to present to the public is from the Bay of Islands only and the data on these individuals was collected from a short period of time.

(ii) *"Of these 26 individuals, only 16 now frequently visit Te Pēwhairangi (Bay of Islands)."*

However, on the website, DOC fails to indicate the number of survey days (and hours) the weather conditions, the season of when these surveys were conducted, the areas where surveys were carried out and the duration of the study (which are all correlated with the success of finding individuals).

I point out that having documented pods of *Tursiops* in the Northland area over the past 30 years, I can comment that their group sizes range in numbers (from 2 up to 82 – e.g., see Dwyer et al 2014) and individuals which have recently been sighted in the Bay of Islands, have stranded and been rescued (in the Mahurangi Harbour) and have subsequently been resighted near Whangarei Heads (e.g., see [https://www.facebook.com/permalink.php?story\\_fbid=2983155845300240&id=1535888773360295](https://www.facebook.com/permalink.php?story_fbid=2983155845300240&id=1535888773360295)), giving an example of the movements that individuals have within their home range, which includes, but is not limited to the Bay of Islands of relatively short periods of time.

(iii) *"75% of all calves die before reaching adulthood"*

However, on the website, DOC fails to give any context to this number – i.e., one must ask; is this only for the Bay of Islands? If the DOC answer is yes, then how is this possible, when the next bullet point says that there were no calves born? (i.e., you can't have 75% deaths of calves when there are 0 births of calves).

This point also doesn't state what the cause of the mortalities are. As this proposal is specifically about interactions with marine mammals i.e., boat traffic and swim-with events, the number of deaths caused by both of these impacts should be given. To my knowledge there are only two records of boat strikes for *Tursiops* in the Bay of Islands in the past 20 years.

One of those was *Whisper*, carrying a four-year-old juvenile (with no name) and she was arriving into the Bay of Islands through the Albert Passage. However, I note that this dead dolphin is not a 'calf' in the true sense as it was four years old. An additional event involved a mother called *Paris*, who was struck and was supported by her calf *Charlie*, neither of whom have been resighted since that event. I note here that in the case of *Whipster's* calf, there is no evidence that the strike occurred inside the proposed sanctuary and in the case of *Paris*, it was the adult who was hit, not the calf.

I am unaware of any *Tursiops* calf deaths as a result of swim-with interactions in the Bay of Islands. The NZ legislation forbids commercial operators to place swimmers in the water with *Tursiops* calves/juveniles, and this legislation has been in place for the last three decades, that therefore emphasises to me that that the proposed restriction against swimming with *Tursiops* is not the cause of the stated decline.

Furthermore, this point doesn't state over what period that 75% is generated and over what population base. For example, if you are looking at a 1 year period and three dolphins, compared to a 20 year period and 200+ dolphins, you likely have a completely different scenario being generated with a 75% mortality for each of those time periods and population sizes.

Even if the rate of death of the *Tursiops* calves is given for the entire Northland population, and it is correct at 75% over the 23 year period indicated by the DOC, this number has been used as a 'reason' for the proposed sanctuary, without a clear explanation to the stakeholders and the public, that overall mortality curves (i.e. mortality for newborns) is typically high for large mammals, and the natural mortality rate of *Tursiops* at various study sites is also relatively high – therefore although 75% is high, it is not something that can be compared without some context of what is 'normal' mortality rates for this species (e.g., Man & Watson Capps (2005) give a 44% of *Tursiops* calves die before weaning, and Steiner & Bossley (2008) give a 46% mortality rate for *Tursiops* calves prior to weaning).

Lastly, for this point I note that I am unaware of any carcasses at all of *Tursiops* calves' (with any cause of death) being recovered in the Bay of Island in the 2019-2020 period, which DOC has highlighted as a key period for their sanctuary proposal.

(iv) "No new calves were born during peak calving season (December to February) in 2019/20".

This implies that there were no calves born within the whole population. At the very least the information presented should have noted if there were no calves documented in the Bay of Islands area (however, I note that there is evidence to show that calves were born to the *Tursiops* population that frequents the Northland area, i.e., young of 0-2 years old have appeared in the Bay of Islands in 2021).

I again draw attention to my point (iii) above, as you can't have 75% deaths when there are 0 births.

In addition to those points above, I note the following

2. The DOC does not spend sufficient time on the water or in educational programs, protecting marine mammals. They have been informed of infractions and not pursued those involved and are rarely, if ever on the water during the critical summer period in key areas such as the Bay of Islands, Coromandel, Haruaki Gulf, Marlborough Sound etc. There is little information available to the public at boat ramps or through boat user training (e.g., the marine mammal rules and regs information supplied by Coastguard during training courses for skippers is minimal). The time, money and effort put into this marine mammal sanctuary proposal so far would have been better spent educating the whole of the New Zealand human population.

In the past, from my own boat and with my own finances, I have spent the summer holiday period going from vessel to vessel handing out information sheets about marine mammals and boating behaviour around marine mammals. During early morning periods I also handed out information sheets to boaters at

the boat ramp at Waitangi. I interacted with a minimum of 1,000 vessels per season that I conducted this educational program. At that time the DOC did not have any vessel on the water, at any point that was addressing the marine mammal boating issue and did not hand out any information sheets at the boat ramp.

3. The proposal would set out a different set of rules (with increased distance 'no go' zones to 400 m) for the Bay of Islands, from the current legislation. But the DOC doesn't (and can't) monitor the current legislation, therefore this would be a case of implementing legislation which was essentially unenforceable.

4. The proposal includes species which are recovering (e.g., New Zealand fur seals, humpback whales), or those for which there is no information on numbers or declines (e.g., pilot whales), yet the main thrust of the messaging has been about the decline of the *Tursiops*, therefore it is not scientifically robust that these other species are included.

5. If the details surrounding the proposed sanctuary were indeed accurate and the scientific reasoning robust, then the same arguments proposed should be applied to the area where the impact of boat traffic is the highest. That is, the whole of the Hauraki Gulf, as the example of highest-boat usage in New Zealand (year-round and not just during holiday season). The Hauraki Gulf is known to overlap with various marine mammal species distribution, including the dolphins seen in the Bay of Islands (i.e., 59% of the catalogued *Tursiops* overlapped between the Bay of Islands and the Hauraki Gulf, Berghan et al (2008) ). But no matter the location, the likelihood that appropriate and sufficient monitoring will occur is improbable given the pattern of behaviour by DOC in the past.

6. I also oppose the use of the term 'sanctuary' for this proposal. The area would not be a 'sanctuary' for the marine mammals who visit – it would be a 'reduced boat speed' zone(s) / 'no-go' zone(s). It is clearly not a 'sanctuary' when it is well documented that the Bay of Islands has seen dramatic impacts from aquaculture, overfishing, pollution run off, silting from adjacent land use, the building of marinas and other infrastructure and marine heatwaves – all of which impact marine mammals and none of which would be reduced/improved/removed in the proposed area. Therefore, the area is far from a genuine sanctuary or even a 'marine mammal safe zone' (the alternative wording used by the DOC).

In conclusion, although I am in strong support of improving protection for marine mammals in New Zealand waters, I do not believe that this is a robust proposal and I do not believe it should be implemented. I believe that there are zones of higher importance and a multitude of specific aspects which should be investigated if the DOC has an appetite for implementing genuine protection of marine mammals.

Respectfully



Dr Ingrid N. Visser (PhD)

#### REFERENCES

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**WS-BOIMMS-144257**

**SUBMISSION REGARDING PROPOSED MARINE MAMMAL SANCTUARY IN THE BAY OF ISLANDS**

**BACKGROUND**

I am the 3<sup>rd</sup> generation of a family that has owned land in Jacks Bay, Russell since the 1940's. My children, aged 3 and 7 years, are 4<sup>th</sup> generation. I have been holidaying in the Bay since I was a baby.

**SUBMISSION**

I would like to **oppose** the proposed marine mammal sanctuary for the following reasons:

- 1) Growing up we hardly saw any dolphins in the area, so I don't believe it is an area that has been hugely populated by dolphins over a long period of time. My grandparents and parents have told me in the past that there were never many dolphins in the area.
- 2) There does not seem to be any evidence to show that boating at average speeds has a negative impact of the dolphin population. If there is evidence I would be very interested to see this. I would think that the close encounters that the tourist boats have with the animals have a more negative impact on them than boating through the area they may be. And it appears that these rules are not changing for the current tourist operators in the Bay.
- 3) I don't believe there is enough, if any, information given to boaties using the Bay of Islands around the best way to view dolphins. Out in the channel I have seen smaller boats (travelling at both slow and medium speeds) getting between members of the dolphin groups and not respecting their need for space. The proposed sanctuary would not stop this sort of behaviour, however more education and monitoring around dolphin groups (especially in the tourist high season) would help to minimise this.
- 4) Using the water has always been a part of our family's lives. This includes fishing, shellfish gathering, waterskiing and towing the children on sea biscuits/toboggans. We do this within the proposed sanctuary area and so would be very affected by any changes to speed. This would mean that we cannot waterski or take our young children out to enjoy sea biscuiting and tobogganning in our local area. We would have to travel at least 30 minutes out to the channel in order to do this. We are then putting ourselves and our young children at risk by partaking in these usually safe water activities in busy areas where there are often tourists on small boats hired out of Paihia who do not follow the rules of the sea (as we have witnessed in passing many times over the years). It would have a hugely negative impact on our family's enjoyment of something that has always been available.

**SUMMARY**

In summary, I do not believe that there is any evidence that the creation of this proposed sanctuary will in fact have any impact of the dolphin population in the Bay of Islands. There are several other factors at play that are potentially more of a factor in their proposed decline (such as overfishing by commercial operators, lack of monitoring tourist boats around the dolphins, and the close proximity the commercial tourist operators have had with the dolphins) which have not been addressed. It will have a hugely negative affect on the local land owners, many who have respectfully used the waters for several generations and shown complete respect for the dolphins.

I would like to be kept updated with any developments of this proposal. I can be contacted on [REDACTED] or via email [REDACTED]

Yours sincerely,

Nikki and Callum Bines



**WS-BOIMMS-144260**

**Jared Bothwell**

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**Sent:** Sunday, 16 May 2021 3:39 pm  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary  
**Subject:** Bottlenose dolphins

Please save our Bay of Islands dolphins . I used to see dozens of dolphins swimming up the coast & up the waters into Opuā/Okiato, but I haven't seen any this year.  
Please save them before it's too late.

Dell Coyte



**WS-BOIMMS-144263**

**From:** Ben Taylor [REDACTED]  
**Sent:** Sunday, 16 May 2021 5:22 pm  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary  
**Subject:** Proposed Te Pēwhairangi (Bay of Islands) marine mammal sanctuary

To whom it may concern,

We agree overall that looking into strategies for the protection of marine mammals is crucial to their survival in the Bay of Islands. However, our business is a scuba diving training centre and we believe that there are parts to the proposal that would negatively impact our business and recreational diving in the Bay of Islands on a greater scale.

For the following reasons we cannot support the proposal:

1- In the proposal the *Prohibition on being in the water, such as swimming, within a 400 metres distance of marine mammals within the boundaries of the marine mammal sanctuary (MMS)* and the fact that *divers are categorised as swimmers* is the first part that we believe needs more research or amending. When we are out with a group of Open water divers (beginner divers) we would be diving at a maximum depth of 18m. If a marine mammal swims within range while we are in the water, it could be highly dangerous and stressful to these beginner divers to bring them to the surface to get them out of the water.

This would also be very difficult to carry out the rest of the course as we need certain surface interval time to allow divers to "off gas" so we can safely do repetitive dives. This could affect us financially if we ran out of time in the day from having to repeat dives we would need to take the customers out another day to finish the course (Added Fuel & Wages) or the customer might not be able to make it. We as an adventure tourism business, strive to never put our customers and students into danger.

In our experience when a marine mammal approaches a group of divers underwater, which is very rarely, they do not hang around. They are curious but do not interact much with us. Our proposal would be to exclude divers from the "swimmers" category. Create a separate set of rules for divers allowing us a sufficient amount of time to surface or allow the mammal to leave and excluding seals out of the water. Diving is already a high-risk sport, adding in stress to exit the water increases the likelihood of an accident to occur.

2- We advise that the proposal does not include seals. As almost all our dive sites are along the coast, the proposed restriction of: "Prohibition on being in the water, such as swimming, within a 400 metres distance of marine mammals within the boundaries of the marine mammal sanctuary" means that these exciting, safe sites we would not be able to dive if a seal is sitting on the rocks. If a Seal were on the rocks when we arrive at a dive site (sometimes quite common), we would not be able to get in the water even though they are asleep or relaxing and not affected by us. If the proposal includes seals, we eliminate most of our dive sites, particularly the safe, sheltered ones that we take our open water divers to. Not only that they exciting sites that people travel from all over the world to the Bay of Islands to dive, such as Deep Water Cove to dive the HMS Canterbury wreck or Putahatata island. The seals at these sites sit on the rocks or on the beach and we do not interact with them and they do not interact with us. They are often there when we arrive and there when we leave and are not bothered by us in the slightest. If a seal is on the rocks, this means not even getting in the water which is detrimental to our business if our customers can't even get in the water.

Yes, we are happy to comply with the proposed boating practises while we are getting to the dive sites, of slowing the speed and stopping when seeing Marine mammals etc. However some parts of the proposal could affect our business, the cost involved and our reputation for not being able to be consistent, it is already hard enough working around the weather at times without adding more disruptions.

We would love to support the action to protect our ocean and everything in it because they are in desperate need at the moment, but we cannot support this proposal in its entirety and hope that we are able to talk through a more realistic proposal for divers as a separate category to swimmers.

Regards

Ben Taylor  
Director

**Dive Zone Bay of Islands**

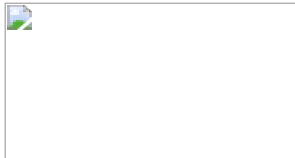
5 Klinac Lane, Waipapa

Bay of Islands 0230

Ph (09) 407 9986    Mobile [REDACTED]

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[www.divezoneboi.co.nz](http://www.divezoneboi.co.nz)



**WS-BOIMMS-144266**

**Jared Bothwell**

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**Sent:** Monday, 17 May 2021 4:41 am  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary  
**Subject:** Mammal Sanctuary, Bay of Islands

Mrs Jean Wade,



I should like to express my support for the Sanctuary to be established in the Bay of Islands. 2 years ago me and my family had the pleasure of visiting New Zealand on holiday and spent a week up in the Bay of Islands. The natural beauty of the area was so refreshing. In England we very rarely have any sightings of whales or dolphins and if we do it's normally credited to climate change causing the mammals to default from their normal path. Any chance of protecting the dolphins which can encourage them to remain in the Bays and successfully breed and allow the calves to survive to adult hood should be implemented as soon as possible. I feel the proposal is a good one and the dolphins are a very important part of the culture. It will still allow people to observe the dolphins even if it is from a distance. It may stop people from getting up close but if nothing is done quickly it sounds like that won't be an option anyway as the population will be extinct in the very near future.

I should like to wish everyone involved a successful outcome.

Kind regards  
Mrs Jean Wade

**WS-BOIMMS-144269**





To: Proposed Te Pēwhairangi (Bay of Islands) marine mammal sanctuary  
Department of Conservation  
34 Landing Road  
Kerikeri 0230

13 May 2021

From: Opua Business Association

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

Association secretary: Kylie Cox [REDACTED]

Association chairperson: Dan Cleaver [REDACTED]

**Attention: Hon Dr AYESHA VERRALL, Acting Minister of Conservation.**

### Submission re proposed marine mammal sanctuary for Bay of Islands

This submission is made on behalf of the Opua Business Association, which represents 39 organisations, providing goods and services to the Bay of Islands community and visitors, including many local and international boaties.

The Opua Business Association opposes the declaration of a marine mammal sanctuary to be called Te Pēwhairangi (Bay of Islands) as outlined in the New Zealand Gazette 20th day of April 2021 Notice Number 2021-go1422 with supporting information detailed on the Department of Conservation website, <https://www.doc.govt.nz/boimms>.

Whilst we are united in wanting to address the issue of dolphin population degradation, and marine conservation, we have significant concerns with this proposal.

### Limited effectiveness for excessive restrictions

- The research used to support this proposal was a study of behaviour only – this limited research being used to justify the proposal focused on vessel traffic only and does not consider other elements which may impact the dolphin population such as sedimentation, food source, and pollution. This may mean that the MMS restrictions proposed will have little or no impact on the dolphin population.
- The restrictions include all marine mammals without any justification that vessel traffic is an issue for them. This would mean if a fur seal were sitting on a rock at the entrance to a bay, vessels would be restricted from entering that bay until the fur seal had swam away.
- The areas selected for the Marine Mammal Safe Zones do not align with the Oceans 2020 research as to where dolphins select to rest naturally.

### Impractical

Stopping a vessel from continuing its course if a marine mammal is within 400m is impractical for a number of reasons;

- For some vessels, the ability to stop safely, with consideration for the swell, wind or nearby hazards will be impossible. If not stopping is selected a safety option who decides this? Can it be challenged?
- A vessel will almost never be stationary in the water as forces such as wind and current will always be acting on it.
- A requirement to stop or not go would significantly impact the Opuia to Okiato vehicle ferry services. With only 900m between wharfs if any mammals were in the area services would be suspended. This would in-turn affect the free-flow of people, goods, emergency services, school students etc.
- Regular events such as yacht races, swimming and fishing events would be severely impacted. No process for applying for and obtaining exemptions has been detailed if there is indeed to be one.

Operating a vessel at five knots in the proposed marine safe zones and stopping whilst underway will be impractical for a yacht

- Vessels under sail will have considerable challenges maintaining or reducing to only five knots and the areas impose a major restriction on where sailing will be possible.
- It is a major undertaking to stop a vessel under sail, dropping sails or hove-to may not be practical or safe to do. Holding course may be a safer and be less impactfully option for the dolphins and vessel operator.

The Opu Business Association proposes additional education and funding to enable the current restrictions to be understood and complied with and that the Department of Conservation consults with and engages all the Bay of Islands stakeholders to create an integrated forward thinking Marine Protected Areas strategy that addresses the broader conservation issues in our marine environment.

Thank you for your consideration,

Dan Cleaver

Chairperson

Opu Business Association

**WS-BOIMMS-144272**



14 May 2021

Proposed Te Pēwhairangi (Bay of Islands) marine mammal sanctuary  
Department of Conservation  
34 Landing Road  
Kerikeri 0230

Dear Sir or Madam

**Submission on the Proposed Te Pēwhairangi (Bay of Islands) Marine Mammal Sanctuary**

On behalf of Northland Regional Council, please find below our comments and feedback on the proposed marine mammal sanctuary.

**1. Overall Position**

We **support** the overall intent of the proposal, i.e. to ensure that Te Pēwhairangi (Bay of Islands) remains a place where bottlenose dolphins are locally resident, and the associated objectives.

Council has reviewed the proposed marine mammal sanctuary from the perspective of its responsibilities under both the Maritime Transport Act and the Resource Management Act.

Council has two main areas we wish to comment on: navigational safety concerns, and what more can be done to protect the marine mammals and marine biodiversity more generally.

Council welcomes the opportunity to work collaboratively with the Department and looks forward to discussing options for protecting our taonga species that are a fundamental component of what makes Te Pēwhairangi such a special place, and which contribute to the natural environment that local businesses and communities depend on as a source of income.

**2. Navigational Safety**

We are supportive of the exemptions currently proposed, but request that additional exemptions are included to ensure that vessels and their crew are not put in danger either because of their restricted ability to manoeuvre, constrained draught, or due to adverse weather conditions/sea state, or proximity to other vessels or rocks or other obstruction. We suggest the following additional exemption:

*"Where there are safety concerns for vessel or crew because:*



0800 002 004



[www.nrc.govt.nz](http://www.nrc.govt.nz)



[info@nrc.govt.nz](mailto:info@nrc.govt.nz)

Private Bag 9021, Whangārei 0148



- *Vessels are restricted in their ability to manoeuvre (i.e. vessels greater than 500GRT or vessels engaged in activities such as towing or dredging operations)*
- *Vessels are constrained by draught (e.g. vessels operating in confined channels or tide bound shallow conditions)*
- *Vessels are unable to comply due to weather and sea conditions*
- *Vessels are unable to comply due to risk of collision (e.g. with another vessel or with rocks or other obstruction)."*

The proposal (as currently drafted) has the potential to impact navigation and safety in the navigable waters of Te Pēwhairangi due to the types of vessels that are operating there and the weather conditions in which they operate.

Large vessels requiring a pilot (over 500GT) such as cruise liners can not just stop as this can take considerable time and distance. Speed is required to maintain steerage and manoeuvrability. This is exacerbated when wind speeds and swell conditions increase.

Vessels restricted in their ability to manoeuvre such as barge and tow operations are not able to just stop as they need to manage the tow in a safe manner. Similarly, vessels constrained by draught are unable to just stop without compromising the safety of vessel and crew.

Wind, swell, tide and weather conditions will also play an important part in the decision of 'is it safe to just stop the vessel or drop your sails'. Proximity to lee shores, geographical features such as underwater rocks and reefs, other vessels, size and types of vessels in beam-on conditions are all factors that will need to be considered by commercial and recreational skippers.

### 3. Additional Comments

- a. *Resourcing.* Council recognises the resourcing challenge that monitoring and enforcing the proposed marine mammal sanctuary places on the Department and urges the government to ensure that sufficient resources are allocated to ensure the Department is able to monitor, enforce and report on compliance with the proposed regulations.
- b. *Fishing Controls and Marine Protected Areas.* As the supporting information document (section 2.2 second to last bullet point) highlights, the Proposed Regional Plan (PRP) marine protected area/fishing control provisions (specifically including the Bay of Islands and overlapping the area proposed for the marine mammal sanctuary) are under appeal and set down for hearing in July and August this year. The outcomes of that hearing could have a major bearing on the movement of vessels engaged in commercial and recreational fishing activities, particularly between Rawhiti Point (Opourua Bay) and Kariparipa Point (Maunganui Bay/Deep Water Cove). It also aims to address wider indigenous biodiversity issues associated with current reduced fish abundance and marine protection matters, which are highly pertinent to dolphin food availability.

Council respectfully encourages the Department to raise the issues of the declining dolphin population and the proposed marine mammal sanctuary during the hearing



rather than at a future date. This Environment Court hearing presents an ideal opportunity, with a wide range of key stakeholders and experts involved, to consider various factors impacting on the suitability of the Bay of Islands as a habitat for dolphins and other marine mammals. The proposal for the marine mammal sanctuary is relevant to the decisions that will be made by the Court and the Judges should be made aware of the Department's marine mammal sanctuary proposal, albeit being proposed under different legislation.

- c. Council is keen to work constructively with the Department to better integrate marine biodiversity and management and we have several suggestions that fall outside the marine mammal sanctuary proposal which we would like the Department to consider:
- i. *A Dolphin Bubble – social distancing for dolphins.* While we understand the rationale for the Department pursuing a marine mammal sanctuary and the proposed restrictions and controls over vessel movements (and swimmers), Council is concerned that even if this were to be enacted, there is no guarantee that this would ensure the survival of a locally-resident population of bottlenose dolphins. Awareness raising and vessel owner buy-in are going to be essential. The idea or concept of social distancing for dolphins or a "dolphin bubble" could build on the understanding gained by the nation from dealing with covid-19 and be used as a means for clearly communicating what is needed if bottlenose dolphins are to remain resident. Council suggests that a concerted media campaign on a "dolphin bubble" would assist in achieving the outcomes sought.
  - ii. *Ongoing research into the factors affecting marine mammals.* As the Department notes in its proposal, there are various factors that are likely contributing to the declining dolphin (and other marine species) population including food availability, underwater noise, and habitat/ecosystem health, to name a few. Given covid has halted (albeit perhaps temporarily) visits of cruise liners, it would be useful to use the opportunity to monitor whether this has had an impact on the dolphin population, for example, or whether temporary rahui on certain vessels or activities may be needed to give our marine mammals time to recover.
  - iii. *Recreational vessel registration.* Council notes that there has been an increase in vessel ownership in recent years, and that as there is no clear rule for registration of recreational vessels, which, as the Department is well aware, makes enforcement problematic and time-consuming. A group of councils are seeking LGNZ recommend that Central Government establish and improve the maritime rules for recreational vessels in relation to vessel registration (amongst other matters). Council intends lobbying the Minister of Transport in this regard in forthcoming meetings. Council would appreciate the support of the Department, in particular regarding resolving the issue of vessel registration and is happy to discuss this further if appropriate.

Council is open to further discussions as to how best we can work together to achieve the outcomes sought for the marine mammal sanctuary and marine biodiversity more generally and hopes that our suggestions for how the proposal can be improved are useful.



We look forward to continuing to work with the Department to improve marine biodiversity management in Te Taitokerau.

Ngā mihi

A handwritten signature in black ink, appearing to read "M. Nicolson". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Malcolm Nicolson  
Chief Executive Officer



**WS-BOIMMS-144275**



To: Proposed Te Pēwhairangi (Bay of Islands) marine mammal sanctuary  
Department of Conservation  
34 Landing Road  
Kerikeri 0230

17 May 2021

From: Great Escape Sailing  
[REDACTED]

Attention: Hon Dr AYESHA VERRALL, Acting Minister of Conservation.

Our company, Interesting Projects Limited, trading as Great Escape Sailing, opposes the declaration of a marine mammal sanctuary to be called Te Pēwhairangi (Bay of Islands) as outlined in the New Zealand Gazette 20th day of April 2021 Notice Number 2021-go1422.

We oppose this proposal for the following reasons;

- Current restrictions have not been communicated effectively nor enforced. Many of the issues identified for dolphins in the BOIMMS information would be addressed with education and enforcement of current law. e.g., we have observed vessels speeding to catch dolphins and cutting in front of the pod, the BOIMMS supporting documentation also references non-compliance of existing regulations as an issue.
- Restrictions do not address many of other possible issues for the dolphin population, e.g., food source, pollution.
- The research and promotion of this proposal has focused on the dolphins in the Bay of Islands, yet the proposed restrictions apply not only if dolphins are present but any marine mammal including seals and orcas. This means huge areas will be impacted with significant restrictions on all boating and swimming activities. E.g., a seal sunning itself on the rocks in

the Opuia Basin would mean none of our boats could depart the dock and no one could swim at the beach.

- Exemptions to restrictions are proposed for the current permit holders which seems counter to some of the arguments presented in support of the proposal. Again, if current restrictions were communicated effectively and enforced the impact on dolphins from vessels would be minimised.
- Enforcement of the proposed restrictions is unclear, who will decide if a boat can safely stop? How will that be communicated? There is considerable uncertainty with some of the wording in the proposed restrictions which could mean we could end up having to justify the decision of one of our sailors in a court of law.
- Operating a vessel at five knots in the proposed marine safe zones and stopping whilst underway will be impractical for a yacht. When under sail we would have considerable challenges maintaining or reducing to only five knots consistently, and the areas proposed as Marine Safe Zones impose a major restriction on where sailing will be possible. There does not seem to be justification for including yachts in these restrictions nor any research that indicates how five knots as a speed under sail is beneficial for any marine mammal.
- Including the entire Bay of Islands as a Marine Mammal Sanctuary will have major impact on key maritime events for the region, events such as the Bay of Islands Sailing Week, Coastal Classic, Tall Ships Race, Brecca swim would not be able to proceed.

There is urgency to address the marine conservation issues in the Bay of Islands and we would appreciate the opportunity to engage in a process that includes all stakeholders to develop a workable solution. We would like to see an integrated long term marine conservation strategy that the entire community could be part of and embrace.

Yours sincerely,

Julie Kidman – Director

**WS-BOIMMS-144278**

**Te Pēwhairangi (Bay of Islands) marine mammal sanctuary  
proposal submission form**



**Your details**

Your name: Phoenix  
 Organisation (if applicable): Bay of Islands International Academy  
 Street address: \_\_\_\_\_  
 Suburb: \_\_\_\_\_  
 City: Kerikeri  
 Region: far north  
 Email address: [REDACTED]  
 Phone number: \_\_\_\_\_

Are you whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area?

Yes  No

**If you answered yes, please provide details** (eg. which hapū and/or iwi do you affiliate to):

**Which group(s) best describes your interest:**

- Northland / Te Pēwhairangi Bay of Islands community member  
 Whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area  
 Recreational maritime vessel operator  
 Commercial maritime vessel operator  
 Local business owner  
 Local community group  
 Member of the New Zealand general public  
 Science and research  
 Environmental groups  
 Other (please specify): \_\_\_\_\_

**Official Information Act 1982**

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The Official Information Act states that we must make information available unless there is a good reason for withholding it and provides a list of such reasons in sections 6, 9 and 18. If you think there is a good reason to withhold specific information, please state this in your submission. A good reason may include commercial confidentiality or that it is personal information. Note that any decision that is made by DOC to withhold information can be reviewed by the Ombudsman, who may require the information to be released.

I would like specific information in my submission withheld.

**Please state the reasons for wanting specific information in this submission withheld.**

**Your submission**

You can provide any feedback on the proposed marine mammal sanctuary you would like. However, answering the following questions may assist in making your submission:

1. Do you support or oppose the proposed marine mammal sanctuary?  
If so, why, or why not?
2. Do you believe the proposal should be changed or amended?  
If so, what changes would you propose, and why?
3. Do you agree with how we have characterised the problem, objectives, and impacts?  
If not, how would you change it?

1. I don't want the dolphins to go extinct  
2. No  
3. Yes

**WS-BOIMMS-144281**

Te Pēwhairangi (Bay of Islands) marine mammal sanctuary  
proposal submission form



**Your details**

Your name: Poppy Murrells

Organisation (if applicable): \_\_\_\_\_

Street address: \_\_\_\_\_

Suburb: \_\_\_\_\_

City: \_\_\_\_\_

Region: \_\_\_\_\_

Email address: \_\_\_\_\_

Phone number: \_\_\_\_\_

Are you whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area?

Yes

No

If you answered yes, please provide details (eg, which hapū and/or iwi do you affiliate to):

**Which group(s) best describes your interest:**

Northland / Te Pēwhairangi Bay of Islands community member

Whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area

Recreational maritime vessel operator

Commercial maritime vessel operator

Local business owner

Local community group

Member of the New Zealand general public

Science and research

Environmental groups

Other (please specify): \_\_\_\_\_

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I would like specific information in my submission withheld.

Please state the reasons for wanting specific information in this submission withheld.



### Your submission

You can provide any feedback on the proposed marine mammal sanctuary you would like. However, answering the following questions may assist in making your submission:

1. Do you support or oppose the proposed marine mammal sanctuary?  
If so, why, or why not?
2. Do you believe the proposal should be changed or amended?  
If so, what changes would you propose, and why?
3. Do you agree with how we have characterised the problem, objectives, and impacts?  
If not, how would you change it?

1) I Support the proposed marine mammal Sanctuary  
Because it's important to protect our bottle nose  
& dolphins *nic*

2) No I Support it as it stands

3) Yes

**WS-BOIMMS-144284**

**Te Pēwhairangi (Bay of Islands) marine mammal sanctuary  
proposal submission form**

**Your details**

Your name: MARGARET B. NICKS

Organisation (if applicable):

Street address:

Suburb:

City:

Region:

Email address:

Phone number:

Are you whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area?

Yes

No

If you answered yes, please provide details (eg, which hapū and/or iwi do you affiliate to):

**Which group(s) best describes your interest:**

Northland / Te Pēwhairangi Bay of Islands community member

Whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area

Recreational maritime vessel operator

Commercial maritime vessel operator

Local business owner

Local community group

Member of the New Zealand general public

Science and research

Environmental groups

Other (please specify): one time frequent visitor and submitter to a resource consent application for Paroa Bay 2010, 2014

**Official Information Act 1982**

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I would like specific information in my submission withheld.

Please state the reasons for wanting specific information in this submission withheld.

### Your submission

You can provide any feedback on the proposed marine mammal sanctuary you would like. However, answering the following questions may assist in making your submission:

1. Do you support or oppose the proposed marine mammal sanctuary?  
If so, why, or why not?
2. Do you believe the proposal should be changed or amended?  
If so, what changes would you propose, and why?
3. Do you agree with how we have characterised the problem, objectives, and impacts?  
If not, how would you change it?

I fully support the establishment of a marine mammal sanctuary in the Bay of Islands, especially the safe haven located in Paroa Bay and the seas between the two Mataroaia and Maturua Islands.

I happen to know these locations well prior to 2015 because I had visited them as a result of my friendship with long time ocean scuba who had settled in the Keri Keri Inlet Road. Moreover because of my knowledge of the area I had made submissions against the Herbert Trust's resource consent applications to construct a jetty in Paroa Bay back in 2016 and 2017.

I and the Herbert's immediate neighbours had all opposed these applications. We did not want to see the peace and tranquillity of the inner part of the bay compromised. Furthermore because of my past experiences, I did not want to see one of the few remaining safe havens for bottlenose dolphins disturbed.

The likely obstacles to this proposed safe haven could be the Herbert's planned activities. These newcomers from Auckland appeared to have little or no environmental or cultural sensitivity. Their application showed no consideration for their neighbours and demonstrated at the public hearings that their only interests were to satisfy their own demands. It emerged that they planned to bring in a large motor yacht and even intended to construct a helicopter pad. All such activities were

Page 2.

totally out of keeping with the existing environment.

Whether the Wetlands will oppose the establishment of the planned safe haven I obviously do not know, but if they do I would urge the Department of Conservation to ignore them. Frankly it is my considered opinion they should never have been granted consent in the first place.

This particular part of the Bay of Islands originally formed the stronghold of Ngāre Raumati Iwi. Ironically at the time of the original consent applications, the Northland Regional Council (the authorising body) chose to consult with all the local Iwi and hapū including Ngā Pahi except the genuine tangata whenua Ngāre Raumati. I therefore sought out a local descendant Emma Gibbs-Smith and informed her what was planned so she could be involved. After all, all the archaeological sites in the relevant area are in fact those of Ngāre Raumati and it was in their waters that they fished and held sway.

In 1824 the young rangitira Tui/Tuai died unexpectedly. However, there were no family successors strong enough to hold the iwi together with the result that in 1826 Rewa, a cousin of Hone Hika over ran the area and evicted the inhabitants. When Dument D'Urville returned in the *Atrolabe* the following year he found the principal pā site Kākāwāwā deserted and in ruins.

It will be necessary for the Department of Conservation to contact representatives of Ngāre Raumati as Ngā Pahi are not the original tangata whenua, none of the existing archaeological sites were constructed by them. I suggest Emma Gibbs-Smith of 10, Pataunui Road Russell, 0202 who through her mother is a direct descendant of Ngāre Raumati.

Unfortunately many of my records including copies

Page 3.

of my submissions to the Paroa Bay resource consent applications have been stolen. I regret to say that there is a destructive element in the Northland population that is anti environmental protection. The Bay of Islands in particular has suffered greatly from excessive development and tourism, the latter with disastrous results for marine mammals especially bottlenose dolphins. My friends have now sold up and left!

In February 2016 Catherine Peters and Karen Stockin released a report commissioned by the Department of Conservation on the 'Responses of bottlenose dolphin to vessel activity in Northland, New Zealand'. The researchers compiled the results of their work under the auspices of the Institute of Natural and Mathematical Sciences, Massey University.

This report showed how desperate the plight of the bottlenose dolphins in the Bay of Islands really was, that too much contact with boats was resulting in the neglect of their young calves with the result that few reached adulthood. Despite this DoC did not completely call off all dolphin encounters and still allowed two operators to continue.

Personally I considered this to be most unwise. DoC should not have handed to people. However, now that the local species is on the point of extinction the department has finally called off any further interactions with boats and people.

Page 4.

We are now in the midst of the Sixth Extinction of the many species of wildlife that exist on this planet Earth. The fact is that it is us, yes homo sapiens that is the principal predator. It is our activities, our destructive behaviour that is resulting in ongoing loss, in this particular instance in the Bay of Islands!

Famous scientists including ecologists have published accounts of the catastrophe confronting us. One Dr Eric Sala, a former professor and now a full time marine explorer for National Geographic has published a book "The Nature of Nature, Why we need the wild". Amongst other things he mentions how reserves and other protected places are helping to bring back species onto the brink of extinction.

By setting up the Bay of Islands marine mammal sanctuary we have an opportunity to not only protect these mammals but hopefully to restore the numbers of both rare dolphins in the bay.

However, such a project will require a change in human behaviour. Boat operators will need to become more sensitive to the needs of marine life. Our planet Earth has not just evolved for homo sapiens but has to be shared with all the countless other species. COVID 19 has given the Bay of Islands a breathing space but a time no doubt tourism will at least partially recover. When this

Page 5.

Happens boaters and commercial operators will have to become more circumspect and give marine life more space to move. In this instance DoC will have to be more pro-active in the way it promotes marine mammal protection and regulates tourism.

It so happens that Paroa Bay especially the upper reaches is well suited to form a safe haven. As it is very shallow in places it has not attracted masses of visiting yachts or commercial operators. It was here before 2010 I had sometimes seen a small pod of dolphins resting in peace far from the madding crowds! If there is anywhere in the Bay of Islands where dolphins would have a chance to regenerate it surely could be here.

I would hope that the Northland Regional Council has a change of heart and becomes more environmentally protective instead of pandering to human wants and <sup>economic</sup> exploitation. It could consider stopping powerboat racing for a start. Not only would this reduce the excessive use of fossil fuel at present but it would also cease to be a threat to sea birds and possibly marine mammals.

To conclude I cannot emphasize strongly enough the need to take belated action to save the local bottlenose dolphin population. As the saying goes better late than never. According to certain scientific reports even with only a few survivors (less than 10) it is still possible to re-establish a current population on the brink of extinction. The only obstacle is us. It is 'we' that have to change!

Signed

17. 5. 21.



**WS-BOIMMS-144287**

Te Pēwhairangi (Bay of Islands) marine mammal sanctuary  
proposal submission form



Your details

Your name: Rose HESSON  
 Organisation (if applicable): Eco Solutions  
 Street address: Home - [REDACTED]  
 Suburb: [REDACTED]  
 City: [REDACTED]  
 Region: [REDACTED]  
 Email address: [REDACTED]  
 Phone number: [REDACTED]

Are you whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area?

Yes Nāwai Pakēta !!  No

If you answered yes, please provide details (eg. which hapū and/or iwi do you affiliate to):

Kūi PASSIONATE ABOUT TATAO

Which group(s) best describes your interest:

- Northland / Te Pēwhairangi Bay of Islands community member  
 Whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area  
 Recreational maritime vessel operator  
 Commercial maritime vessel operator  
 Local business owner  
 Local community group  
 Member of the New Zealand general public  
 Science and research  
 Environmental groups  
 Other (please specify): \_\_\_\_\_

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I would like specific information in my submission withheld.

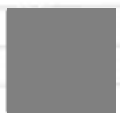
Please state the reasons for wanting specific information in this submission withheld.

**Your submission**

You can provide any feedback on the proposed marine mammal sanctuary you would like. However, answering the following questions may assist in making your submission:

1. Do you support or oppose the proposed marine mammal sanctuary?  
If so, why, or why not?
2. Do you believe the proposal should be changed or amended?  
If so, what changes would you propose, and why?
3. Do you agree with how we have characterised the problem, objectives, and impacts?  
If not, how would you change it?

I AM IN TOTAL SUPPORT OF THE MARINE MAMMAL SANCTUARY LETS SAVE THESE AMAZING CREATURES.



**WS-BOIMMS-144293**

**Te Pēwhairangi (Bay of Islands) marine mammal sanctuary  
proposal submission form**



**Your details**

Your name: Inky Vink  
 Organisation (if applicable): \_\_\_\_\_  
 Street address: \_\_\_\_\_  
 Suburb: \_\_\_\_\_  
 City: \_\_\_\_\_  
 Region: \_\_\_\_\_  
 Email address: \_\_\_\_\_  
 Phone number: \_\_\_\_\_

Are you whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area?

Yes  No

If you answered yes, please provide details (eg. which hapū and/or iwi do you affiliate to):

**Which group(s) best describes your interest:**

- Northland / Te Pēwhairangi Bay of Islands community member  
 Whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area  
 Recreational maritime vessel operator  
 Commercial maritime vessel operator  
 Local business owner  
 Local community group  
 Member of the New Zealand general public  
 Science and research  
 Environmental groups  
 Other (please specify): \_\_\_\_\_

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I would like specific information in my submission withheld.

Please state the reasons for wanting specific information in this submission withheld.

**Your submission**

You can provide any feedback on the proposed marine mammal sanctuary you would like. However, answering the following questions may assist in making your submission:

1. Do you support or oppose the proposed marine mammal sanctuary?  
If so, why, or why not?
2. Do you believe the proposal should be changed or amended?  
If so, what changes would you propose, and why?
3. Do you agree with how we have characterised the problem, objectives, and impacts?  
If not, how would you change it?

- I support the sanctuary



**WS-BOIMMS-144296**

Te Pēwhairangi (Bay of Islands) marine mammal sanctuary  
proposal submission form



Your details

Your name: *Fraser Kenney*

Organisation (if applicable):

Street address:

Suburb:

City:

Region:

Email address:

Phone number:

Are you whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area?

Yes

No

If you answered yes, please provide details (eg. which hapū and/or iwi do you affiliate to):

Which group(s) best describes your interest:

Northland / Te Pēwhairangi Bay of Islands community member

Whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area

Recreational maritime vessel operator

Commercial maritime vessel operator

Local business owner

Local community group

Member of the New Zealand general public

Science and research

Environmental groups

Other (please specify):

Official Information Act 1982

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I would like specific information in my submission withheld.

Please state the reasons for wanting specific information in this submission withheld.



**Your submission**

You can provide any feedback on the proposed marine mammal sanctuary you would like. However, answering the following questions may assist in making your submission:

1. Do you support or oppose the proposed marine mammal sanctuary?  
If so, why, or why not?
2. Do you believe the proposal should be changed or amended?  
If so, what changes would you propose, and why?
3. Do you agree with how we have characterised the problem, objectives, and impacts?  
If not, how would you change it?

*Clean the Oceans, Save the Dolphins*

**WS-BOIMMS-144299**

Te Pēwhairangi (Bay of Islands) marine mammal sanctuary  
proposal submission form



Your details

Your name:

XANA KENNEY

Organisation:

ENVIRO GROUP - B.O.I.I.A

Street address:

Suburb:

City:

Region:

Email address:

Phone number:

Are you whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area?

Yes

No

If you answered yes, please provide details (eg. which hapū and/or iwi do you affiliate to):

Which group(s) best describes your interest:

Northland / Te Pēwhairangi Bay of Islands community member

Whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area

Recreational maritime vessel operator

Commercial maritime vessel operator

Local business owner

Local community group

Member of the New Zealand general public

Science and research

Environmental groups

Other (please specify):

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I would like specific information in my submission withheld.

Please state the reasons for wanting specific information in this submission withheld.

**Your submission**

You can provide any feedback on the proposed marine mammal sanctuary you would like. However, answering the following questions may assist in making your submission:

1. Do you support or oppose the proposed marine mammal sanctuary?  
If so, why, or why not?
2. Do you believe the proposal should be changed or amended?  
If so, what changes would you propose, and why?
3. Do you agree with how we have characterised the problem, objectives, and impacts?  
If not, how would you change it?

SUPPORT DUE TO DECLINING  
NUMBERS ↓

**WS-BOIMMS-144302**

## Te Pēwhairangi (Bay of Islands) marine mammal sanctuary proposal Submission

Prepared by Amy Simpkin on behalf of Northland Inc

Amy Simpkin

Destination Management Plan Portfolio Support

P [REDACTED] M [REDACTED] E [REDACTED]

The Orchard Business and Event Hub, level one, entrance - 35 Walton Street,  
Whangarei 0110

### Submission Feedback

- Do you support or oppose the proposed marine mammal sanctuary? If so, why, or why not?  
After extensive consultation with the tourism industry, businesses and other organisations operating in the Bay of Islands, and as the Regional Tourism Organisation and economic development agency, Northland Inc opposes the marine mammal sanctuary (MMS).  
While we wish to recognise the important opportunities that the proposed MMS would bring, particularly regarding environmental conservation and the preservation of vulnerable marine species, there are many significant challenges to this proposal that have been brought to light through consultation. These include;
  - The proposed 400m clearance of marine mammals will severely restrict movement and activity on the water including restriction to the movement of people, emergency services, goods and services, for example, the vehicle and passenger ferry operations and tender movements from cruise ships.
  - Safety concerns about the ability to stop within the 400m range safely and then maintain steerage.
  - Impact on activity and events in the proposed MMS area including sailing regattas, fishing tournaments, swimming races etc.
- Do you believe the proposal should be changed or amended? If so, what changes would you propose, and why?  
For the reasons stated above, Northland Inc propose the following changes are made to the MMS proposal;
  - Amend the areas the MMS proposal covers by excluding the inner harbour, which would allow free movement of ferry operations and piloted channels.
  - Remove seals from proposal as this population provides further interruption to on-the-water activity due to the nature of the species being both water and land-based and with different movement patterns to whales and dolphins.
  - Amend the 400m clearance distance to the current 300m rule.
  - Amend the instruction of vessels to come to a complete stop in the presence of marine mammals to simply slowing to 5 knots as this is consistent with current rules and allows for safe steerage.
  - Allow for mitigation plans and/or exclusion options for high participation on-the-water events.

We also believe that the current regulations and rules for the protection of Marine Mammals are sufficient, however there is great opportunity and need for better

enforcement, monitoring and education to ensure ALL vessel operators (both commercial and recreational) are aware of these rules and following them.

- Do you agree with how we have characterised the problem, objectives, and impacts? If not, how would you change it?

On behalf of consistent and strong feedback from those based in the Bay of Islands, we believe that while this MMS seeks to protect marine mammals, it doesn't adequately reflect the wider research required and change that may need to occur to have a significant impact on the marine ecosystem of the area. Everyone agreed that protecting marine mammals and environmental preservation is paramount, however the MMS in its current form did not address all concerns such as fish stock and food source, pollution and other potential adverse conditions that marine mammals may be encountering in the Bay of Islands.

Northland Inc suggests further work is conducted in this area and most importantly, under full and wide consultation with local businesses, clubs, organisations, communities, iwi and hapu. Any changes to current operational rules for the Bay of Islands have a significant impact on both recreational and commercial activity, especially with regards to the visitor industry. However, approached in the right way, a marine mammal sanctuary or reserve would provide significant opportunity to both our marine ecosystem, those that inhabit it, those that interact with it and a positive key message for potential visitors to Northland and the Bay of Islands.

**WS-BOIMMS-144305**



Te Rūnanga o Ngāti Rēhia  
PO Box 202  
KERIKERI 0230



16 May 2021

Department of Conservation  
34 Landing Road  
KERIKERI 0230

Attention: Catherine Peters

via email: cpeters@doc.govt.nz

**RE: PROPOSED TE PEWHAIRANGI (Bay of Islands) MARINE MAMMAL SANCTUARY**

Tēnā koe,

On behalf of the hapū of Ngāti Rēhia and Te Rūnanga o Ngāti Rēhia (TRONR) please find this letter of support by way of submission, for the Marine Mammal Sanctuary (MMS) proposed for Te Pewhairangi (Bay of Islands).

Ngāti Rēhia claim a rohe in the general area of:

- Takou Bay
- Rāhiri
- Omapere
- Waitangi
- Purerua Peninsula
- Kerikeri

**KAITIAKI & AHI KAA**

Ngāti Rēhia is the recognised Tangata Whenua, Ahi-Kā and Kaitiaki of the above areas and see the whenua and moana as taonga. We have existed together with these taonga mai rāno, and our relationship with the land and sea is built on respect and the understanding that we are the Tangata Whenua, Ahi-Kā and Kaitiaki.

He Whakaputanga o Te Rangatiratanga o Niu Tireni and Te Tiriti o Waitangi are the founding documents of Aotearoa. The Waitangi Tribunal Te Paparahi o Te Raki 2016 Stage 1 Report found that Ngāpuhi never ceded sovereignty. It is on this basis that Ngāti Rēhia have sort to engage with all our community.

The main objective of TRONR is to develop a sustainable Economic, Social and Cultural base for the continued growth of Ngāti Rēhia.

TRONR have responsibilities for building relationships with other organisations who share our interest in long-term economic development within our rohe (region) particularly in the areas of:

- Tourism
- Education
- Environmental Management and
- Training

**RELATIONSHIP**

Due to the decline in the numbers of marine mammals in Te Pewhairangi and in particular the Bottlenose dolphins, Ngāti Rēhia have supported the above proposal by appointing a hapū representative to Ngā Hapū o Te Pewhairangi.

This appointment allows Ngāti Rēhia the opportunity to take responsibility and ensure that we do what we can to preserve and protect this precious taonga.

Our Ngāti Rēhia Kaitiakitanga responsibilities extend throughout our tribal boundaries which include Te Pewhairangi and all the taonga that reside and rely on all of us making key and important decisions.

This is one of those moments where that decision making is integral to the survival of our marine mammals.

Mauri ora,



Kipa Munro  
Chairperson  
Te Rūnanga o Ngāti Rēhia

cc:d - Bronwyn Bauer Hunt (DoC Operations Manager)

**WS-BOIMMS-144308**

**Te Pēwhairangi (Bay of Islands) marine mammal sanctuary  
proposal submission form**



**Your details**

Your name: Angela Brewer

Organisation (if applicable): \_\_\_\_\_

Street address: \_\_\_\_\_

Suburb: \_\_\_\_\_

City: \_\_\_\_\_

Region: \_\_\_\_\_

Email address: \_\_\_\_\_

Phone number: \_\_\_\_\_

Are you whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area?

Yes

No

If you answered yes, please provide details (eg, which hapū and/or iwi do you affiliate to):

**Which group(s) best describes your interest:**

Northland / Te Pēwhairangi Bay of Islands community member

Whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area

Recreational maritime vessel operator

Commercial maritime vessel operator

Local business owner

Local community group

Member of the New Zealand general public

Science and research

Environmental groups

Other (please specify): School Teacher

**Official Information Act 1982**

Please note that any submission you make will become public information and that anyone can ask for copies of all submissions under the Official Information Act 1982.

The Official Information Act states that we must make information available unless there is a good reason for withholding it and provides a list of such reasons in sections 6, 9 and 18. If you think there is a good reason to withhold specific information, please state this in your submission. A good reason may include commercial confidentiality or that it is personal information. Note that any decision that is made by DOC to withhold information can be reviewed by the Ombudsman, who may require the information to be released.

I would like specific information in my submission withheld.

Please state the reasons for wanting specific information in this submission withheld.

**Your submission**

You can provide any feedback on the proposed marine mammal sanctuary you would like. However, answering the following questions may assist in making your submission:

1. Do you support or oppose the proposed marine mammal sanctuary?  
If so, why, or why not?
2. Do you believe the proposal should be changed or amended?  
If so, what changes would you propose, and why?
3. Do you agree with how we have characterised the problem, objectives, and impacts?  
If not, how would you change it?

I agree with creating a marine mammal  
sanctuary so that future generations may  
experience them.

All good.

**WS-BOIMMS-144311**

Te Pēwhairangi (Bay of Islands) marine mammal sanctuary  
proposal submission form



Your details

Your name:

Amya Clayton

Organisation (if applicable):

Street address:

Suburb:

City:

Region:

Email address:

Phone number:

Are you whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area?

Yes

No

If you answered yes, please provide details (eg, which hapū and/or iwi do you affiliate to):

Which group(s) best describes your interest:

- Northland / Te Pēwhairangi Bay of Islands community member
- Whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area
- Recreational maritime vessel operator
- Commercial maritime vessel operator
- Local business owner
- Local community group
- Member of the New Zealand general public
- Science and research
- Environmental groups
- Other (please specify):

Official Information Act 1982

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I would like specific information in my submission withheld.

Please state the reasons for wanting specific information in this submission withheld.

**Your submission**

You can provide any feedback on the proposed marine mammal sanctuary you would like. However, answering the following questions may assist in making your submission:

1. Do you support or oppose the proposed marine mammal sanctuary?  
If so, why, or why not? *Support, for the betterment of the animals*
2. Do you believe the proposal should be changed or amended?  
If so, what changes would you propose, and why?
3. Do you agree with how we have characterised the problem, objectives, and impacts?  
If not, how would you change it?

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**WS-BOIMMS-144317: 1**

## Submission

On the **Proposal to establish “Te Pēwhairangi (Bay of Islands) marine mammal sanctuary”** by the Department of Conservation submitted via upload to the on-line form, and copied to email: [boimms@doc.govt.nz](mailto:boimms@doc.govt.nz)

18<sup>th</sup> May 2021

From Jane Johnston (BSc, MPhil)

[Redacted]  
[Redacted]  
[Redacted]

### 1 Introduction

#### **1.1 Statement of expertise and relevant experience**

I am a professional strategic planner, based in the Bay of Islands, currently acting in a self-employed consulting capacity.

My qualifications are in environmental sciences, with a BSc completed 1985 from Auckland University, and in resource and environmental management, with a Master of Philosophy with Distinction (in Resource and Environmental Management) awarded 1998 from Massey University. I also have a Diploma of Teaching (1986, Auckland Teachers College).

Following a decade teaching geography and sciences in secondary schools, and embarking on study towards a Master’s degree, my first employment in my new career was with the Department of Conservation.

For the duration of 1995 I facilitated the Kaimanawa Wild Horses Working Party and formulated the Kaimanawa Wild Horses Management Plan. The working party was comprised of diverse interest groups who had been engaging in a very public dispute about how best to address numerous issues associated with and for the horses. The population had spread across an extensive range within the Moawhanga Ecological District. The horses were causing damage to habitat of rare and endangered species within their expanding range. They also posed challenges for the Defence Force which administered the land as its main army training grounds. The horses were also considered iconic as wild horses had been present within around the central plateau since the 1800s. The horses were at risk of injury from artillery fire, and as wild animals enduring the hardships associated with survival in a harsh environment as the population grew. The Kaimanawa Wild Horses Protection Society, the SPCA and the International League for the Protection of Horses were well supported by the public as lobbyists for the horses to remain.

The resultant consensually agreed management plan was adopted by the then Minister of Conservation, and continues to be implemented to this day. That management plan hasn’t ever had to be reviewed by DoC because it continues to be lauded by all stakeholders as adequately achieving all of the objectives they agreed were relevant at the outset.

The Management Plan contains contingencies, allowing for adaptation of management practices based on monitoring and in the event new technologies are able to be brought to bare in the management of the population.

I note this experience because, in order to facilitate that group of representatives of competing interests, I learnt not only about the ecology of the Moawhanga, the needs of these wild horses, of the army and of conservation advocates but also a great deal about the art of facilitating a consensual approach. I became an expert in alternative methods for environmental dispute resolution.

Following my year employed with DoC, which had doubled as participant-observation research towards my Masters thesis, I produced 10 chapters towards that thesis. Having reviewed my work at the end of 1996, my Professor and academic supervisor at Massey University suggested I put it on hold to be completed as a Doctorate, and that I undertake a different piece of research to complete a new thesis towards completion of my Masters. I consequently undertook new research focusing on transportation issues and produced a thesis titled "Alternative Environmental Dispute Resolution Processes within the context of the Resource Management Act" (rather than conservation).

On completion of my Master's degree (in 1997, but not conferred till 98), I was employed by Massey University as a Research Assistant to deliver on a contract P. Horsley had secured with the Department of Conservation that resulted in a DoC Science for Conservation publication #169 "*Facilitating Community-Based Conservation Initiatives*" (2001, V. Forgie, P. Horsley, J. Johnston). The authors are presented in alphabetical order, rather than according to who had undertaken the research and written the paper, which I did during 1998, prior to peer review by Forgie (who updated with some more recent citations) and Horsley, necessitated by how long it took for DoC to publish (in 2001).

From late 1998 I was employed by Rodney District Council as a senior Strategic Planner. In that capacity I was part of the multi-agency technical working group supporting the inter-agency Hauraki Gulf Forum (established 1999), that led to the creation of the Hauraki Gulf Marine Park. My expertise within the technical group was in environmental monitoring as well as policy analysis and strategic planning. I had undertaken research and analysis and produced Rodney District's first State of the Environment Report ("*Window on Rodney*", 2000) and in doing so also designed the inaugural environmental monitoring programme for that District, which was subsequently shared across provincial councils around New Zealand. I was instrumental in including hapu/iwi representatives in the design and implementation of that monitoring programme, and in forging relationships that enabled the drafting and adoption of Memo of Understanding between Rodney District Council and local iwi.

Between early 2003 to mid-2007 I was employed as Senior Policy Analyst – Environment and Regulation at Local Government New Zealand. One of my roles was in leading and co-ordinating a local government sector input to the review of the NZ Coastal Policy Statement (NZCPS). Following my departure from LGNZ, I was sub-contracted to Boffa Miskell (in turn contracted to LGNZ) to provide a comprehensive review of the draft NZCPS, prior to it being considered for notification as a "proposed" NZCPS, and to draft a submission on behalf of the local government sector along with an annotated revised NZCPS, containing recommended amendments (along with substantive rationale for the recommended amendments). That work contributed significantly to the current NZCPS, operative today.

## 1.2 Potential Conflict of Interest Statement

I am presenting this submission as an individual, rather than as a technical expert on behalf of a client.

I have no current commercial or financial conflicts of interest.

***a) As a resident, making donations and otherwise volunteering assistance or support to environmental and conservation initiatives associated with the Bay of Islands:-***

I do reside in the Bay of Islands. My parents brought the family to live here in 1980, and I have been a regular visitor and sometimes resident every since. I have resided permanently (with my own immediate family) in Haruru Falls (4km out of Paihia, on the slope leading down to the Waitangi estuary) since mid-2012.

During the 80s and 90's my family owned a small launch, moored at Waitangi and enjoyed regular excursions around the Bay, to enjoy the islands, to over-night in the Bay, to swim and fish. My youngest siblings were 7yrs old when the family moved here. One of those is my brother Craig Johnston – owner/operator of Paihia Dive, along with his wife. Craig's first job was with Paihia Dive when he was 15yrs old, and he learnt to dive soon after. He now has 40yrs experience of living and working in the Bay of Islands, and has extensive knowledge of its ecology, varied habitats and all that lives (and moves) within the marine environment.

My mother (now 84yrs) was raised in Raglan, and we visited frequently throughout my childhood. Several households among our extended family still reside in that area. My cousin Fred Lichtwark singularly embarked on a personal mission, as a keen fisherman, to clean up a degrading Whaingaroa Harbour (Raglan) that became Whaingaroa Harbour Care. That initiative has been lauded as a successful, early community conservation initiative, and he continues to champion not only that initiative, but for a broader up-take of similar around the country.

The Bay of Islands has no equivalent champion and there is no operative Harbour-Care Group operating in the Bay. Rather, we have Bay Bush Action (volunteers and some contracting providing pest control on land and on the islands) which I have supported with donations. We also have Project Island Song, an initiative to replant the islands, that I have supported with donations, and via "Vision Kerikeri". I've supported community efforts to restore riparian habitat alongside some of major streams around Kerikeri, that feed into Kerikeri Inlet. I've been an active member of Vision Kerikeri, submitting to various proposed plans on behalf of that Association.

In the past, I have also made donations to the NZ Whale and Dolphin Trust, via the "Adopt a Hector Dolphin" campaign.

I make these points to declare that, yes, I have participated in activities intending directly or indirectly to "Save the Dolphins" and to restore the natural environment of the Bay, and am supportive of conservation efforts broadly speaking. And, members of my family engage similarly in activities that may also bring them some recognition for their expertise in the marine environment and in conservation efforts, and potentially financial reward.

***b) As a submitter to other planning processes:-***

Furthermore, as a member of local Ratepayer Associations, I have written submissions to both the Northland Regional Council and to the Far North District Council seeking greater levels of funding be allocated to fencing of rural property (in primary production) and for riparian planting.

I have also submitted on the proposed Waitangi River Catchment Management Plan, requesting similarly, and pointing out poorly managed development pressures within the catchment.

I have submitted to both councils on the need to better manage stream and river bank erosion to reduce the excessive sediment flows into the Waitangi River.

Having been located at its present site since before we arrived here in 1980, in the past decade excessive sediment loads in the Waitangi River have caused the temporary cessation of operation of the Water Treatment Plant that serves the resort towns around the Bay (located just above Haruru Falls). High intensity rain events can and do occur any time of the year in the Far North. The problem with the location of our current plant is not that the Waitangi River risks running dry, it is that the current site above the falls is increasingly at risk of flooding and even if not inundated, the high sediment load in the water at the intake within stream makes processing (and extracting potable water) extremely difficult.

Top Energy and other occupiers alongside the river have been forced to (and permitted to) construct significant river bank protection works, to save their properties from falling into the river, following a large storm in mid-2014. During that same event, significant erosion occurred at Te Tii Beach, as evidenced by the 'temporary' fence constructed at the top of the bank near the bluff.

The Far North District Council has, in light of risks to the current location of our Water Treatment Plant, embarked on finding a new site, to be able to take water not loaded with sediments.

Similarly, the local sewerage networks surrounding the Bay of Islands have failed numerous times, releasing volumes of faecal materials into the Bay of such quantities as to warrant no-swim orders for recreational bathing beaches and no-take orders for shellfish.

The Waitangi oxidation ponds serving the Bay resort area, as well as the scheme serving the township of Kerikeri have both been subject to Abatement Notices served by the NRC on the FNDC in 2012, as a result of failure to comply with discharge consents. Both of these schemes discharge into Waitangi wetlands near the coast - a wetland ecosystem that in turn discharges out into the Bay.

I have frequently made submissions to the Far North District Council, to hurry up and provide adequate sewage networks and treatment systems, able to achieve compliance with standards for discharge we expect, for the receiving waters of the Bay of Islands. Council is about to commission its new treatment plant serving Kerikeri, and the old plant will be decommissioned by mid-2021. This new scheme can be expected to put a halt to that source of pollution of the Bay. The Waitangi oxidation ponds system (serving Opua to Haruru, including Te Haumi, Waitangi and Paihia) have also been upgraded to remove the excessive ammonia that was being discharged into the Bay. That new treatment only came on line in the past year, and while ammonia levels are now compliant, nitrates are apparently still high, and other options for treatment are being considered.

**c) As an environmental educator with potential interest in outdoor education:-**

In light of my former experience as an educator, in 2015 I created a company of which I am the sole director and shareholder, called the “Bay of Islands Coastal and Marine Education and Recreation Limited”, with the intention of offering environmental and outdoor education opportunities within the Te Pewhairangi – Bay of Islands, to compliment the tourism sector’s offer.

Establishing that operation was put on the back burner when I was offered a 2.5yr fixed term contract I was keen on, and consequently undertook other projects as a consultant strategic planner. With the impact of COVID from early 2020, I am again dedicating time towards establishing this operation.

Such a venture, whether run as a commercial venture or with a charitable component could conceivably benefit from a declaration of the Bay as a Marine Mammal Sanctuary, as such a status would be able to be utilised as part of a marketing strategy. Without such a declaration, the many tourism and other operations in the Bay who might well be approached by marine mammals are not permitted to advertise that fact UNLESS they have a concession (from DoC) expressly to view (and otherwise, to interact with) marine mammals.

I make these points to underscore that my submission is not made in light of my personal interests, or recognising potential financial benefits in the event of a declaration of the Bay as a Marine Mammal Sanctuary, but rather my submission points are presented following a professional appraisal and consideration of the research as outlined in the Supporting Information document, and on-line via the links, alongside the proposal document and the drafted “Notice of Intention”.

**2 Comments on the Proposal**

- 2.1 I oppose the proposed marine mammal sanctuary;**
- 2.2 I do not agree with how you have characterised the problem, for reasons that follow below (in section 3 of this submission)**
- 2.3 In the event you do resolve to declare the Bay a Marine Mammal Sanctuary, I request the following Amendments:-**
- (i) The removal of the “marine mammal safe zones” in their entirety, or**
  - (ii) Provide an exemption for any vessel not powered by petrol, diesel or electric motors.**  
It is not always possible to safely operate and navigate a vessel under sail at less than 5 knots “at all times”.
  - iii) Amend the requirement at 4(a) for every operator of a vessel to “ensure” the vessel... “keeps 400 meters from a marine mammal”, to read:**  
*“If a marine mammal is observed within 400m, slow the vessel to less than 5 knots as soon as it is safely possible to do so, and attempt to manoeuvre at low speed*

*away from the marine mammals, maintaining a distance of greater than 300 meters”.*

- iv) Amend the requirement at 4(b) to use “all reasonable means to stop if a marine mammal moves within 400 meters... to allow the marine mammal to move 400 meters away”, to read

*“If a marine mammal is observed within 300m of a petrol, diesel or electric powered vessel, the operator of the vessel must slow the vessel and attempt to stop as soon as it is safely possible to do so, and/or attempt to manoeuvre at low speed away from the marine mammals, to try to maintain a distance of greater than 300 meters from the marine mammals”.*

The requirement to “Stop” ought not apply to vessels under sail, or powered by human effort (kayaks, paddle boarders), as it may not be safe to do so.

- v) Amend Clause 5(3)...

*“throughout the proposed sanctuary no person would be allowed to be in the water within 400 meters of a marine mammal”,* (which requires anyone swimming, snorkelling, diving, spear-fishing or paddle boarding etc, to immediately get out of the water, it also captures fur seals on land/basking on rocks anywhere along the extensive coastline around the Bay and islands) **to read,**

*“throughout the sanctuary, no person will enter the water if a whale or dolphin is observed within 300 meters and is generally travelling towards the location of any person intending to enter the water”,* and...

*“If a whale or dolphin approaches to within 200meters of a person in the water, the person must stop engaging in whatever activity they were undertaking and endeavour to get out of the water as soon as safely possible to do so, in the event that the whale or dolphin doesn’t move on within 10 minutes.”*

This allows for anyone already in the water, who finds themselves in the vicinity of whales or dolphins, to safely disengage in whatever activity they were undertaking and attempt to remove themselves from the vicinity of the whales and dolphins.

**These clauses ought to state, they do not apply to fur seals, in the event seals approach within 300 meters of a person in the water (undertaking any activity).**

- vi) Amend Clause 6:-

**The only exemptions necessary are those outlined in 6(a), 6(b).**

There is no good reason to provide exemptions as stated at 6(c) – compliance monitoring and enforcement activities can and ought to be conducted in accordance with any restrictions on other operators in the Bay, and can be undertaken once marine mammals have moved or the vessel is no longer within 300 meters of marine mammals.

Similarly, the Harbourmaster, 6 (d) ought to be capable of complying with restrictions, unless the circumstances expressly warrant non-compliance... so any non-compliance ought to be exceptional rather than a given.

This is particularly important in the event that there are increased efforts put into monitoring and enforcement by DoC, by Fisheries, by Customs, or by the Harbourmaster (etc). Exemptions ought to apply not to normal day-to-day movements, but to extremes, when they are actively in pursuit of a suspected rule breaker.

The only time the Navy might warrant an exemption is in wartime or during a declared civil defence emergency (rather than Waitangi celebrations, which is usually when there is a naval presence in the Bay). Again, these 'extreme' or infrequent events could be covered by other declarations (of War, or of a CDEM emergency) and so don't warrant a blanket exemption.

**vii) Amend Clause 7:**

**All vessels covered by the few commercial operators with existing Marine Mammal Viewing Permits, ought to be subject to the same restrictions as other operators (and private boaties), for the period of 3 years, until an assessment of the effectiveness of a Marine Mammals Sanctuary with respect to the dolphin population can be undertaken**

These are the largest and among the fastest vessels in the Bay. These operators have the most frequent and regularly timed schedules, which may have encouraged dolphins in the Bay to develop play 'habits', that see them interacting with boats.

### **3. Reasons for Opposing the Proposal.**

#### **3.1 Framing of the Problem**

At p6 of the proposal document it is stated that "the problem is defined by two issues:

The bottlenose dolphin is declining in Te Pewhairangi (By of Islands), where uniquely high levels of interaction are affecting all marine mammals,

Marine Mammals Protection Regulations do not adequately address interactions between people, vessels and marine mammals."

*"Uniquely high levels of interaction"*

It is not substantiated within the research, that the interactions are at "uniquely high levels".

I look for comparisons with other areas, and found information about Dolphin and Whale watching within the Auckland – Waitamata Harbour area. I found more operators, with bigger boats and more frequent excursions, as well as less seasonality associated with Auckland's population (Residents + tourists).

I looked for data on registered private boats, and found research associated with Maritime NZ that found 37% of all recreational boaties reside within the Auckland region, compared to just 4% in the Northland region.

Dolphin encounters are part n parcel of the attraction associated with the numerous vessels operating in Milford Sound and a particular drawcard to Kaikoura, which has a significant "Whale Watch" industry (that also encounters dolphins), as does Akaroa (Banks Peninsular).



Have any of those operations seen evidence of detrimental effects on the marine mammals using those habitats (including modified behaviours) associated with time spent interacting with boats.

For contrast with other high private or 'recreational' boating use, I also looked to the Bay of Plenty – Tauranga, where there are thousands of boaties (19%) enjoying the area, as well as around the Coromandel and Firth of Thames (with 18% of boaties residing in the Waikato region).

It is an unsubstantiated assertion that comparatively, the Bay of Islands has more boating interactions with marine mammals than other areas (known marine mammal habitats) well used by boaties.

The Bay of Islands is a highly seasonal 'summer-holiday' destination, in ways that are distinctive to many of the other places named above. It is also much busier during the weekend than during the traditional working week (Monday to Friday). The variance between time observing during peak season and during the weekend contrasted to off-peak and mid-week was not able to be extracted from the research as presented.

Similarly, the statement that the *Marine Mammals Protection Regulations do not adequately address interactions between people, vessels and marine mammals*, has not been tested for veracity in light of an apparent result that presents the Bay of Islands as different in terms of how people operate their boating pastimes, compared to elsewhere where marine mammals are encountered and may interact with people in the water or in vessels.

It is not robust science to draw the conclusions as have been drawn by the research (and DoC), in an absence of comparative data with other areas subject to the same Marine Mammals Protection Regulations, and to boating activity akin to what occurs in the Bay of Islands.

It is possible, and indeed likely, that the imposition of new and more onerous set of regulations (as laid out in the notice of intention) will be equally ineffective in achieving the desired behaviours of people boating, swimming or otherwise using the Bay.

It is also possible (and likely), that even if all vessel operators were compliant with the new regulations, that there would be little discernible improvement in the fecundity of female dolphins, in the survival of their young or in the population within the Bay, because no direct causal relationship has been established between changed dolphin behaviours within the Bay, and the observable decline in the population of dolphins visiting (or residing) within the Bay, and the activities as targeted by the imposition of these new regulations.

The dolphins observed in the Bay are not under-weight (for their respective ages) – according to a verbal answer provided by one of the researchers (when asked at the Q&A held in the Paihia War Memorial Hall, 1<sup>st</sup> May 2021 as the health of the dolphins is not explored in the Supporting Information), suggesting they are still hunting and catching enough to eat, despite numerous distractions and any nuisance caused by peoples' activities in the Bay.

There has been no evidence presented of any dolphin having actually been individually 'harmed', 'injured' or 'killed' as a result of 'non-compliance' with the MMP Regulations by boating or other activities of people in the Bay. Rather, there is a lot of supposition, premised on two distinctive events being observed:- one being the evident decline in dolphin numbers within the Bay (but not elsewhere necessarily, even though this research observed no dolphins outside of the Bay); the other being an increase in boating activity (and so pressure potentially, on dolphins) in the

Bay, which does allow opportunity for much more interaction between dolphins that are present in the Bay, with vessels and people in the water.

Perhaps that boating (and people in the water) pressure in and of itself, is generating sufficient noise and other changes within the marine environment, to make the Bay a less desirable place for dolphins, particularly those in the 'reproductive phase' of their life-cycle, or as they age-out of the reproductive cohort, when they have plenty of other coastline to range through, for mating, for nurturing and protecting their young, for sharing social-bonds, training their maturing adolescents, and for feeding and resting.

I suggest that perhaps "the issues" have been mischaracterised (and also by implication in the recommended response – more varied and more onerous regulations), as being one of deliberate high levels of 'non-compliance' with the Marine Mammals Protection Regulations as they stand. Rather, it may be a lack of information and of awareness in an absence of education campaigns, and of effort in compliance monitoring and enforcement action by DoC and other regulators of activities in the marine environment.

Rather than moving directly to the imposition of more varied and more onerous regulations (from a compliance perspective), other initiatives to achieve compliance (and effectiveness of the regulations) ought to be trialled first.

For example, there ought to be a concerted recreational boating education campaign (in conjunction with Water Safety NZ, and Maritime NZ, the Harbourmaster and Customs) – where information about NZ Marine Mammal Protection Regulations ought to be provided, alongside safety advice and fisheries regulations.

I have copied, for your information, two research reports associated with Maritime NZ, one looking at recreational boating across NZ (Maritime NZ – "*Recreational Boating and Marketing Monitoring Research*", 2020) the other looking at boaties awareness (Maritime NZ - "*Summary of Recreational Boating Research conducted by Research NZ*", Sept 2016). No where in either document is their any mention of any necessity for recreational boaties to be aware of and able to interpret and implement the Marine Mammal Protection Regulations.

The research supporting this notice of intention to declare the Bol a Marine Mammal Sanctuary, in my view, essentially, was blinkered in what it was looking at, how it located dolphins to observe, in what it consequently did observe, and in the conclusions drawn – in as much as what the research then attributes as the major cause of decline of the Bottlenose Dolphin population in the Bay.

### **3.2 Poor process of engagement and consultation**

There has been no effort to collaborate with the tourism operators around the Bay (on land or associated directly with the maritime environment), to engage them directly in environmental education and conservation efforts, or in raising awareness of the environmental issues associated with the Bay as a tourism destination.

This has the effect of alienating a group of key stakeholders who ought to be collaborators with DoC in environmental education and conservation effort.

There has been a complete overlooking (tantamount to a dismissal) of local experience, knowledge and expertise about the pressures on marine mammals in the Bay, not to mention other species. The research has failed to capture observations by locals, regularly out in the Bay, as to what is happening with and to the dolphins, and how they might be adapting their behaviours.

For example, there is anecdotal evidence of a number of young dolphins forming a group, and bullying other dolphins who attempt to enter the Bay, with aggressive behaviour observed. It is also described as unusual for dolphins to permanently reside in the area, almost exclusively – rarely venturing out of the Bay. Typically, Bottlenose Dolphins are highly mobile and have an extensive range. They are not confined to a ‘home’ Bay, and can and do choose to enter an area or not, for reasons known to dolphins and supposed by us.

There is anecdotal evidence of an increase in the fur seal population within the Bay, and of an increase in sighting of Great White Sharks (that are known to predate on infant dolphins).

I have copied FYI, DoC Science for Conservation publication # 169, “*Facilitating Community-Based Conservation Initiatives*” (2001) as an alternative approach to achieving the objectives you hope to achieve, by considering a sanctuary.

### 3.3 Habitat under threat – from various influences

When my family first started enjoying the Bay of Islands in the early 1980s, not only were there hundreds of Dolphins making use of the Bay, there were large numbers of Little Blue Penguin that we would see enjoying spring time mating and availing themselves of nesting sites around the coast. There were huge schools of piper and kahawai, and large flocks of red-billed gulls, black back gulls, terns and gannets. The coast was littered with shag colonies, and we frequently observed grey herons, dotterels and other wading shorebirds. All of these populations have been decimated over the past 4 decades, concurrent to the observable decline in dolphin numbers.

Yes, there were a lot less boats. There was also a lot less residential housing, far fewer visitors’ accommodation establishments, vehicles using the roads and activities on offer within and around the Bay. There were compliant sewage treatment schemes, much less subdivision (earthworks activity), and less primary production and industrial development in the catchments feeding sediments and other pollutants into the Bay.

There appears to have been no effort to identify any of these other changes and pressures on the marine environment, or on the Bay as a habitat once ideal for marine mammals, and to address the array of most significant impacts.

I noted earlier, that there has been on-going serious pollution of the Bay from failing Waste Water Treatment Schemes (for several years prior to the Abatement Notices finally being issued).

There has also been increasing pressure from farming and erosion of riparian margins, leading to higher sediment loads feeding out into the Bay.

There had been a doubling of cruise ships visiting the Bay between 2012 and 2020 (suddenly ceased in 20-21), and no accounting for what cruise ships might be discharging into the marine

environment as they approach the entrance to the Bay, or of the increase in boating traffic associated with tenders.

The Bay has also hosted increasing numbers of visiting yachties, as a result of annual racing regatta, along with a significant increase in the number of moorings and marina berths permitted within the inner reaches of the Bay of Islands.

Similarly, Far North Holdings Limited (the commercial holding company of the Far North District Council), has undertaken a programme of boat ramp upgrades (including to parking areas for boat trailers) around the Bay, to facilitate (enable) greater access to the coastal and marine area. This is, in fact, in keeping with an objective of the New Zealand Coastal Policy Statement. Particularly, to access areas that have already suffered significant degradation, in the sense that they are no longer “pristine habitats” requiring protection (and conservation effort), reducing the pressure to open up access to more natural or pristine areas.<sup>1</sup>

There has also been a lot of development around the Bay over the past 3 decades, in terms of residential subdivision, particularly in the past decade. This has been reflected in the more than doubling of size of the marina at Opua (in 2017), and wharf developments at both Russell and Pahia during 2019, as well as at Opua, as well as a growing marine industry providing services to boaties.

The fishing industry operating within and outside the Bay has changed considerably, with large vessels and fleets replacing the many small operators who used to be based at Opua.

During 2016 the world’s largest oil survey ship was undertaking seismic testing from the East Coast to Kaikoura Greenpeace...

*“Upon its arrival in New Zealand waters, the world’s largest seismic surveying ship turned off transmission from its mandatory AIS safety device, including throughout the devastating 7.8 magnitude earthquake that hit early on Monday morning and the subsequent tsunami threat. The 125 metre long ship, owned by the world’s biggest oilfield services company, Schlumberger, has not transmitted from its Automatic Identification System (AIS) for the past five days, except only once briefly on Monday...”*

*To survey for oil, the ship will blast underwater sound waves from arrays that drag for kilometres behind it every eight seconds, all day and night, for months on end. The boom of these sound waves reverberates throughout the ocean, and can have chronic impacts on whales and dolphins and potentially deafen whales. These marine creatures depend on their hearing to survive, whether it’s for feeding and*

<sup>1</sup> Typically, conservation effort targets ‘significant natural areas’, unimpacted (or less impacted) by development pressures. That approach is not reflected in this proposal for a Marine Mammal Sanctuary, at a location that has seen a serious decline in use by Bottlenose Dolphins (but not necessarily in Fur Seals). It is notable that the population outside of the Bay (around the rest of the Eastern coast of Northland) is not thought to have seen any significant decline. I was told verbally, that the estimated decline elsewhere is just 3%, contrasted to a purported 96% decline during the same time period referenced in the research (as presented). Perhaps a Marine Mammal Sanctuary ought to be declared for the entire Eastern coastline between Cape Reinga and Whangarei Heads, but excluding the Bay of Islands - as the area already subject to the most degradation as habitat for Dolphin. Apparently, more degraded even than the Waitemata Harbour, in the Harauki Gulf.

*nursing young, or communicating with mates. The ship will be seismic blasting between Napier and Kaikoura, an area inhabited by thousands of whales and dolphins.”* (Greenpeace NZ, published on its website, November 2016).

None of these impacts on the Bay of Islands as a habitat of marine mammals have been considered, or of what may have been happening along the broader extent of the East Coast (that also includes sand mining off-shore of Pakiri Beach).

That the marine environment is under threat, might well be the case, but that suggests it is not simply a matter of stopping boats dead in their tracks within the Bay, or getting swimmers out of the water when a marine mammal is within 400 meters.

### **3.4 The effectiveness of the use of separation distances to marine mammals**

There is no evidence that 400metre distance is any better for dolphins than the 300metre distance already required of boats in the vicinity of marine mammals.

There is no evidence presented that the cessation of ‘swimming with dolphins’ since 2019, has benefited the dolphins individually, or the recovery of the population at large.

There has been no evidence presented that a low fertility rate is unexpected, given the research (Supporting Material and via the links for the recent survey) has not presented information about the age and sex of the dolphins observed (the majority of whom are now thought to practically ‘reside’) in the Bay.

If 400metres distance is better for the well-being of Dolphins, than a 300m distance, it begs the question as to why (should a Marine Mammal Sanctuary be declared, aiming to allow dolphins to return to more ‘natural’ behaviours, in an effort to restore the visiting population to previous numbers), would the proposal continue to allow exemptions by way of concessions to view marine mammals. Surely, such concessions are counter-productive to an aim of preventing dolphins interacting with vessels (and people), as this exemption would continue to see the few largest tourism operators getting up close with marine mammals. Is getting close harmful to the dolphins, or is it not? Or is it supposition, that the local population will rebound if DoC permits just X close encounters/day.

Alternatively, if it is thought the number of small boats using the Bay are exacerbating issues for (or harming) the dolphins, then perhaps you ought to lobby to close the new ramps and trailer parks (or at least not upgrade any more of them), and to remove moorings and for NRC to start declining consents for marina and aquaculture developments.

### **3.5 The methodology applied to the research is flawed**

Spotting dolphins from transect lines (even with binoculars) would not allow the observers to know if dolphins were present elsewhere (out of sight, or well away from the current transect being traced) at the same time as lengthy observations were being made of dolphin behaviours.

The focus on observing dolphins' behaviour, particularly interactions with boats in the Bay, meant dolphins were not often observed when 'not' interacting with boats, or what was going on outside the Bay.

It is unclear if it was dolphins that were being spotted, or the behaviour of the largest boats in the Bay, alerting spotters to the presence of dolphins in the vicinity of the boats.

There appears to have been a high success rate in 'spotting' dolphins within the Bay of Islands, given the very low numbers of dolphins present, contrasted to spotting them anywhere else along the extent of the research area (particularly in light of commentary, in response to questioning, that the Bottlenose Dolphin population outside of the Bay of Islands has only declined by 3% over the same period).

In fact, no dolphins were spotted within the length of the Whangaroa Harbour (although transect lines stopped at its entrance) or anywhere outside of the Bay of Islands. Yet there were numerous spots, and multiple identifications of the majority of individual dolphins, from following transect lines within the Bay of Islands.

I don't consider the survey method, as undertaken, was a true population count across the range described as the extent of the field survey.

I could provide a separate critique of the methodology, to this submission, for your consideration. I have chosen not to share more as a submission, out of concern for the research team.

#### **4. CONCLUDING COMMENT**

I suggest that a marine mammal sanctuary be established along the extent of the East coast of Northland from the Whangaroa Harbour entrance to Whangarei Heads, excluding the area of the Bay of Islands (from its entrance) and the interior of the Whangaroa Harbour.

That is the area where marine mammals are (apparently) most abundant, and in need of habitat protection and security for nurturing young dolphins.

The Bay of Islands appears to be less than natural, and is (unfortunately) a degraded habitat for dolphins at this time. Until the marine environment (as receiving waters) is restored and recreational boating and public education is in place on how to behave within the vicinity of whales, dolphins and fur seals, efforts to restore local populations will likely be ineffective. More onerous regulations, perversely, invite increased non-compliance. Such an approach to conservation is ill-advised. Particularly in light of the difficulty expressed, undoubtedly, by other submitters, in being able to comply with aspects of the proposed regulations.... Some aspects just aren't feasible.

**WS-BOIMMS-144317: 2**

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RECREATIONAL BOATING AND MARKETING MONITOR RESEARCH  
JUNE 2020

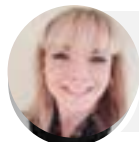
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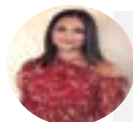
**Jonathan Dodd**  
*Research Director*



**Richard Griffiths**  
*Research Manager*



**Hanrie le Roux**  
*Research Executive*



**Marise Russo**  
*Research Executive*

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GAME CHANGERS





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## REPORTING NOTE AND METHODOLOGY

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### Reporting Note

Throughout this top-line report reference is made to groups within the boaties' sample we surveyed whose self-reported behaviour fails to meet Maritime NZ's desired levels of safer boating practice:

- Lifejacket Non-Users (who do not always wear lifejackets)
- Non-Signallers (who do not always carry two forms of communication)
- Weather Non-Checkers (who do not always check the marine or mountain weather forecast before going boating)
- Drinkers (who do not always abstain from drinking alcohol when boating)

As this is key behaviour that Maritime NZ wishes to improve, much of the analysis includes examination of how these four groups think and behave.

### Methodology

Maritime New Zealand has been tracking the boating habits of New Zealanders for several years, with Ipsos taking over the annual survey in 2017. Since that year the annual survey has been conducted online, with the questionnaires adapted and improved to match Maritime NZ's priorities of any given year.

For the 2020 survey, data was collected online via the Dynata and iSay consumer research panels from 24<sup>th</sup> April to 13<sup>th</sup> May 2020. The 2020 questionnaire added new questions about boat ownership and use, boating information sources, and perceived boating risks. A new section was added to allow non-boaties to answer safety-related questions about their close friends and family members who go boating.

The sample size in 2020 was n=2,006 (boaties n=910 boaties, non-boaties n=1,096). The margin of error associated with a probability sample of n=2,006 is  $\pm 2.19\%$  at a 95% confidence interval, which means that 95 times out of 100, we would expect to achieve a result of 50% to fall between 47.81% and 52.19%.

A new boat category - 'Dinghy with an engine' - was also added to the list of vessel options in 2020 to distinguish these vessels from 'power boats less than 6m in length'. This new dinghy option has led to some inevitable differences in results relating to boaties' reported dinghy usage.

In the four waves of Ipsos data collection to date, data has been slightly weighted to align to New Zealand population statistics.

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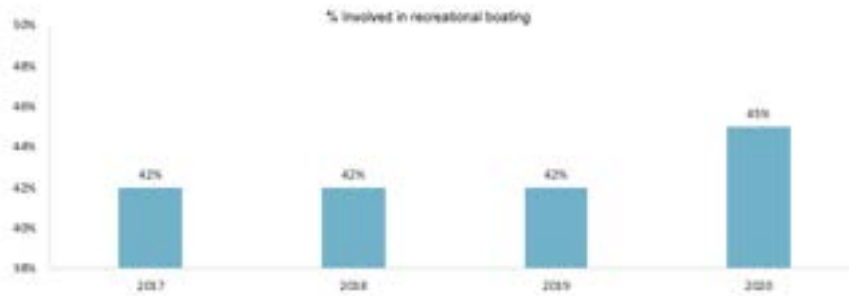
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DEMOGRAPHICS

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**2020 Participation Rates**

This year the proportion of recreational boaties amongst the general population is estimated to be 45%, the highest yet recorded. This extrapolates to approximately 1,672,920 adult New Zealanders involved in recreational boating.

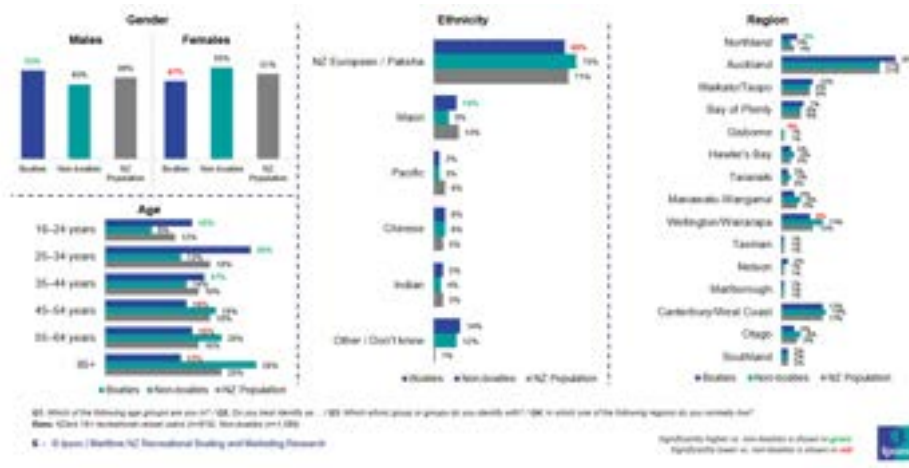


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**2020 Participation Rates: Boaties vs. Non-Boaties**

The sample included the following key demographics in 2020:

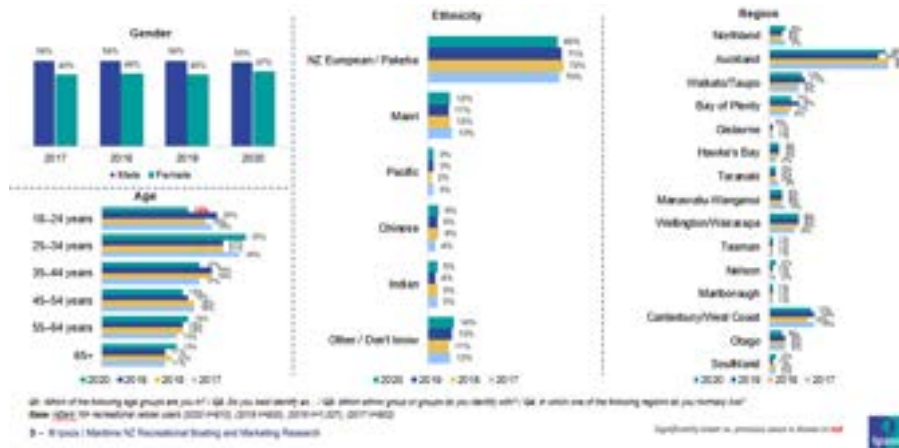
- A significantly higher proportion of males are likely to be boaties than non-boaties (53% boaties vs. 45% of non-boaties).
- 12% of boaties are significantly more likely to identify as being Māori than non-boaties (12% boaties vs. 8% non-boaties).
- A significantly higher proportion of 18-24 and 25-34 year olds are likely to be boaties than non-boaties (18-24 year olds: 15% of boaties vs. 8% of non-boaties; 25-34 year olds: 25% of boaties vs. 13% of non-boaties).



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**Participation Rates Over time: Boaties**

The boaties who have participated in the surveys from 2017 to 2020 have been very similar with regards to gender, age, ethnicity and region where they reside.



**2020 Demographics by Vessel Type**

The following insights were evident when demographics of boaties were analysed by vessel type:

- Boaties aged 25-34 are significantly more likely to use a power boat of up to 6 metres than boaties in any other age group (41%).
- Female boaties are significantly less likely to use a jet ski than male boaties (24% female vs. 35% male boaties).
- Boaties who identify as Chinese were significantly more likely to use a kayak than any other ethnic group (82%).
- Boaties in the Canterbury/West Coast region are significantly less likely to use a power boat of up to 6 metres than in any other region (33%).

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DEMOGRAPHICS OF BOATIES - 2020

	Gender		Age							Ethnicity					Region															
	Male (n=443)	Female (n=461)	18-24 (n=113)	25-34 (n=227)	35-44 (n=184)	45-54 (n=130)	55-64 (n=128)	65+ (n=128)	Māori (n=107)	Pākehā (n=32)	Chinese (n=27)	Indian (n=42)	Other (n=128)	Northland (n=42)	Auckland (n=128)	Bay of Plenty (n=42)	Canterbury (n=37)	Waikato (n=42)	Hawke's Bay (n=42)	Manawatu (n=117)	Wellington (n=117)	Hawke's Bay (n=117)	Northland (n=117)	Waikato (n=117)	Canterbury (n=117)	Manawatu (n=117)	Wellington (n=117)	Hawke's Bay (n=117)	Northland (n=117)	
<b>Total</b>																														
Power boat up to 6m	44%	38%	45%	41%	42%	45%	46%	46%	41%	54%	33%	38%	38%	41%	44%	50%	38%	52%	42%	35%	41%	31%	54%	54%	33%	47%	57%	47%	57%	
Power boat 6m+	29%	26%	26%	41%	20%	22%	20%	27%	28%	38%	32%	45%	31%	28%	34%	29%	38%	8%	10%	23%	28%	15%	48%	40%	24%	24%	24%	24%	20%	
Sail boat up to 6m	16%	13%	17%	19%	13%	14%	16%	17%	16%	13%	12%	16%	16%	14%	17%	11%	38%	10%	10%	20%	14%	44%	8%	23%	14%	18%	17%	17%	17%	
Sail boat 6m+	14%	17%	12%	15%	16%	12%	14%	14%	13%	16%	12%	15%	16%	20%	17%	10%	38%	15%	0%	13%	11%	15%	0%	0%	14%	16%	18%	18%	18%	
Jet ski	30%	35%	24%	46%	38%	23%	15%	4%	37%	44%	42%	48%	30%	21%	34%	32%	36%	24%	44%	21%	32%	15%	24%	22%	23%	18%	24%	24%	24%	
Dinghy (unpowered)	33%	39%	26%	37%	41%	23%	26%	36%	29%	35%	53%	43%	40%	40%	34%	28%	30%	30%	38%	41%	34%	41%	22%	53%	28%	31%	38%	38%	38%	
Dinghy (with engine)	31%	36%	26%	36%	36%	28%	30%	28%	37%	53%	30%	44%	35%	36%	30%	33%	36%	36%	40%	25%	28%	31%	24%	62%	30%	27%	52%	52%	52%	
Kayak	63%	64%	86%	74%	71%	60%	44%	33%	61%	72%	82%	53%	67%	68%	66%	65%	100%	66%	40%	75%	81%	72%	69%	77%	58%	59%	41%	41%	41%	
Canoe / walk a ma <small>www.rock.com</small>	24%	20%	27%	27%	30%	20%	15%	10%	18%	37%	54%	36%	30%	24%	22%	20%	38%	15%	10%	27%	22%	15%	15%	34%	24%	34%	23%	23%	23%	
SUP	28%	28%	43%	46%	31%	19%	13%	5%	27%	35%	48%	34%	34%	30%	35%	27%	0%	14%	15%	13%	28%	28%	37%	23%	24%	28%	30%	30%	30%	
Windsurfer	8%	11%	5%	12%	11%	8%	1%	3%	8%	11%	12%	16%	10%	3%	7%	11%	0%	13%	10%	5%	6%	15%	0%	0%	2%	10%	6%	6%	6%	
Other	2%	2%	1%	2%	3%	2%	1%	0%	2%	3%	0%	0%	2%	0%	1%	3%	0%	0%	0%	3%	2%	0%	8%	0%	1%	5%	0%	0%	0%	

Q1. Which of the following age groups are you in? / Q2. Do you best identify as... / Q3. Which ethnic group or groups do you identify with? / Q4. In which one of the following regions do you normally live? / Q5a. Can you tell me if you own, skipper or use any of the following types of vessels?

Base: NZREG 18+ recreational vessel users (n=910) \*Caution: low base size (n<30)

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Significantly higher vs. total is shown in green  
Significantly lower vs. total is shown in red

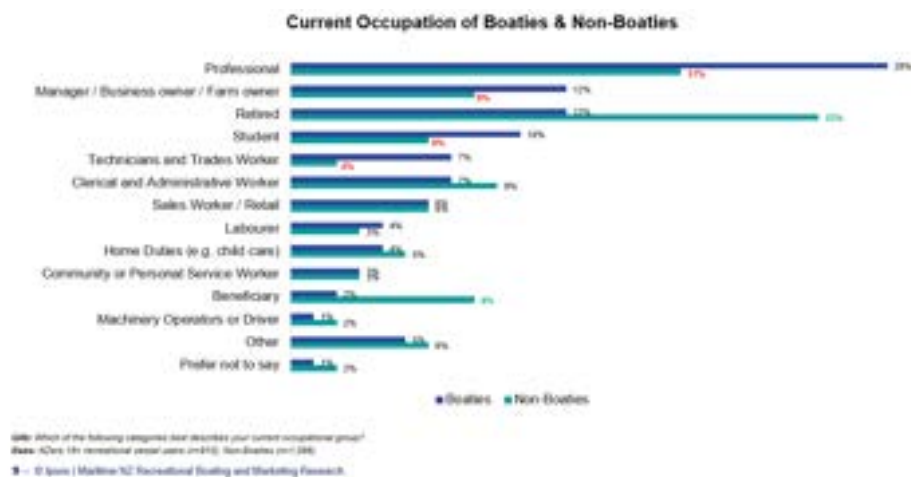


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**2020 Participation Rates: Current Occupation**

The following insights were evident when analysing the current occupation of boaties and non-boaties – income clearly has a part to play:

- Non-boaties are more likely to be retired than boaties (comprising 23% of non-boaties vs. 12% boaties).
- Boaties are more likely to be professionals (26%) than non-boaties (17%); and so understandably beneficiaries are less likely to be boaties (8% of the population are retirees who are non-boaties vs. 2% who are boaties).



**2020 Participation Rates: Vessel Type by Current Occupation**

The following insights were evident when analysing the current occupation of boaties by vessel type:

- Boaties who are managers or business owners were most likely to use a larger power boats (41%), jet skis (41%) or larger sail boats (23%).
- Boaties who are professionals (70%) or students (80%) were most likely to use a kayak, while technicians and trades workers were most likely to use a jet ski (45%).
- Boaties who are retired are least likely to use a kayak (36%) or a jet ski (5%), which seems to reflect the more physical nature of these options.

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CURRENT OCCUPATION OF BOATIES

	Total	Current Occupation													Prefer not to say (n=13)*
		Manager / Business owner / Farm owner (n=106)	Professional (n=238)	Technicians and Trades Worker (n=59)	Community or Personal Service Worker (n=20)*	Clerical and Admin Worker (n=65)	Sales Worker / Retail (n=58)	Machinery Operators or Driver (n=10)*	Labourer (n=34)	Retired (n=108)	Student (n=87)	Home Duties (e.g. child care) (n=35)	Beneficiary (n=22)*	Other (n=45)	
Power boat up to 6m	44%	50%	43%	49%	34%	32%	37%	61%	52%	48%	39%	50%	47%	36%	33%
Power boat 6m +	29%	41%	28%	38%	13%	26%	33%	10%	34%	24%	31%	24%	22%	21%	16%
Sail boat up to 6m	16%	16%	16%	21%	8%	17%	15%	8%	24%	18%	15%	3%	17%	17%	26%
Sail boat 6m+	14%	23%	15%	5%	0%	17%	8%	9%	19%	15%	11%	5%	30%	6%	28%
Jet ski	30%	41%	34%	45%	15%	30%	40%	9%	27%	5%	33%	23%	21%	20%	28%
Dinghy (unpowered)	33%	40%	28%	39%	35%	27%	35%	0%	45%	37%	37%	32%	34%	22%	33%
Dinghy (with engine)	31%	32%	29%	40%	32%	31%	31%	24%	35%	34%	29%	26%	40%	29%	30%
Kayak	63%	67%	70%	66%	66%	62%	62%	12%	67%	36%	80%	57%	45%	68%	75%
Canoe / waka ama	22%	25%	25%	17%	21%	28%	34%	20%	26%	11%	24%	25%	23%	11%	9%
SUP	29%	37%	33%	33%	33%	30%	40%	0%	31%	3%	37%	19%	13%	22%	43%
Windsurfer	8%	14%	10%	10%	7%	6%	7%	0%	13%	3%	7%	0%	5%	5%	24%
Other	2%	3%	2%	4%	4%	0%	0%	0%	0%	0%	2%	0%	0%	6%	0%



Significantly higher vs. total is shown in green  
Significantly lower vs. total is shown in red

Q4b: Which of the following categories best describes your current occupational group? / Q5a: Can you tell me if you own, skipper or use any of the following types of vessels?  
Base: NZers 18+ recreational vessel users (n=910) \*Caution: low base size (n<30)

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PARTICIPATION RATES

**Boating Regions**

Respondents were asked which regions they usually go boating in:

- Auckland was clearly the most popular region for boaties to use their recreational vessels in during the current year (36%).
- Waikato / Taupō (19%) and the Bay of Plenty regions (18%) were the next most popular.
- Gisborne was the least popular region in 2020 for recreational boating (2%).

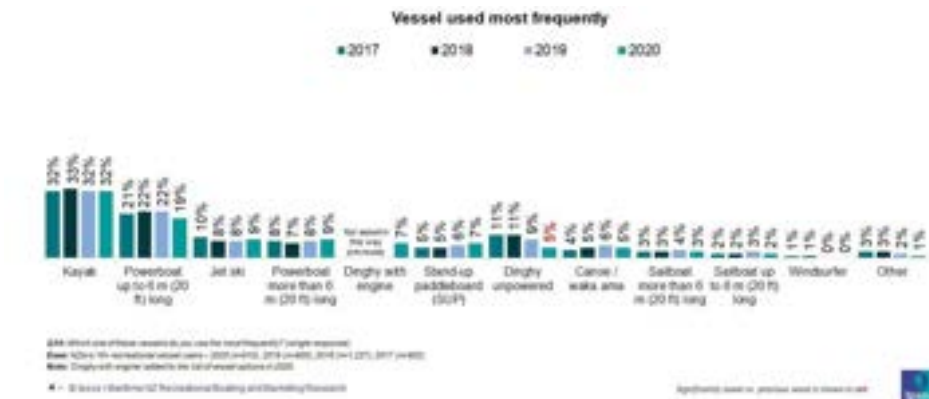


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**Vessel Usage**

Respondents were asked which vessel they use the most frequently:

- The most frequently used vessel in 2020 were kayaks (32%) – same as in 2019.
- This was followed by powerboats up to 6 metres (19%) and jet skis and powerboats over 6 metres (9% each).



Respondents owning at least one vessel (15% of adult New Zealanders) were asked how many of each type they owned. Understandably, cheaper, simpler vessels were the most common.

Boat type	No.	%	Average No. / Owner	Est. No. in NZ*
Kayak	286	32%	1.7	527,073
Power boat up to 6 metres long	117	13%	1.3	215,621
Stand-up paddleboard (SUP)	99	11%	1.3	182,448
Dinghy that is mostly used with an engine	95	11%	1.4	175,077
Dinghy or other unpowered / inflatable craft (powered only by oars)	77	9%	1.0	141,904
Jet ski	50	6%	1.0	92,146
Canoe / waka ama	49	5%	1.2	90,303
Power boat more than 6 metres long	44	5%	1.0	81,088
Sail boat up to 6 metres long	34	4%	1.1	62,659
Sail boat more than 6 metres long	20	2%	1.2	36,858
Other	18	2%	2.0	33,172
Windsurfer	14	2%	1.1	25,801

\*Indicative extrapolation only, does not include fleets or vessels owned for commercial purposes.

**Vessel Usage by Region**

A comparison between the vessels used most frequently and the regions where boaties usually go boating reveals how vessel choice differs by region:

- Boaties in Nelson were most likely to use a kayak (51%), while those in Southland were least likely to do so (19%).
- Boaties in Southland were most likely to use a powerboat of up to 6 metres (39%), while those in Tasman were least likely to use this type of vessel (8%).

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Regions for boating

	Total	North-land	Auck-land	Waikato / Taupo	Bay of Plenty	Gisborne	Hawke's Bay	Taranaki	Manawatu- Wanganui	Wellington / Wairarapa	Tasman	Nelson	Marlborough	Canterbury / West Coast	Otago	Southland
<b>Total</b>	<b>910</b>	<b>145</b>	<b>332</b>	<b>168</b>	<b>164</b>	<b>19*</b>	<b>33*</b>	<b>25*</b>	<b>33*</b>	<b>78</b>	<b>27*</b>	<b>41*</b>	<b>48*</b>	<b>101</b>	<b>61</b>	<b>25*</b>
Powerboat up to 6 m (20 ft) long	19%	16%	17%	21%	21%	12%	19%	27%	24%	18%	8%	10%	32%	13%	29%	39%
Powerboat 6+ m (20 ft) long	9%	8%	12%	9%	10%	5%	6%	0%	3%	8%	11%	2%	9%	8%	7%	11%
Sailboat up to 6 m (20 ft) long	2%	3%	3%	3%	2%	0%	10%	0%	0%	3%	0%	0%	2%	0%	5%	4%
Sailboat 6+ m (20 ft) long	3%	5%	3%	1%	2%	5%	0%	0%	3%	3%	0%	0%	4%	2%	0%	0%
Jet ski	9%	7%	10%	9%	12%	5%	7%	7%	3%	11%	8%	8%	4%	13%	6%	4%
Dinghy - unpowered	5%	5%	5%	4%	6%	16%	3%	7%	12%	8%	0%	0%	2%	10%	0%	4%
Dinghy - with engine	7%	8%	4%	6%	8%	0%	6%	20%	9%	12%	9%	6%	15%	9%	8%	8%
Kayak	32%	37%	31%	32%	27%	27%	32%	25%	30%	28%	47%	51%	27%	29%	34%	19%
Canoe / waka ama	5%	5%	4%	6%	4%	23%	15%	5%	9%	5%	3%	2%	2%	8%	6%	0%
Stand-up paddleboard (SUP)	7%	7%	10%	8%	6%	5%	3%	9%	6%	5%	13%	17%	4%	7%	3%	11%
Windsurfer	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Other	1%	0%	1%	1%	3%	0%	0%	0%	0%	1%	0%	3%	0%	1%	2%	0%

Q14: Which one of these vessels do you use the most frequently? / Q16: Sometimes people go boating away from home. In which regions do you usually go boating?

Base: NZers 18+ recreational vessel users (n=910). \*Cautions: low base size (<50).

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Significantly higher vs. Total is shown in green

Most frequently used vessel type



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**Vessel Ownership / Skippers**

Respondents were asked if they owned, skippered, or used / hired a range of different vessels for recreational or leisure purposes only (i.e. not for commercial purposes):

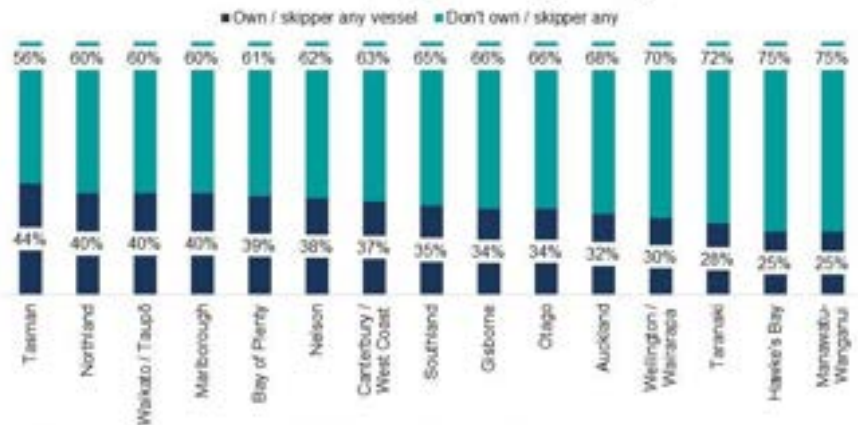
- 15% of respondents indicated that they owned or skippered any of the vessels listed for recreational / leisure-based activities.
- Boaties in the Tasman region had the highest level of ownership or use (44%), followed by those in Northland, Waikato / Taupō, and Marlborough (40% each).
- The Hawke’s Bay and Manawatu-Wanganui regions had the lowest level of ownership or use (25% each).

**Vessel ownership overall**  
■ Own / skipper ■ Don't own / skipper



The higher ownership numbers for Northland and Tasman reflect their higher usage of kayaks.

**Vessel ownership by region usually go boating in**



Boaties were also asked if they owned, skippered, or used a range of different vessels, and they could select multiple options for the same vessel types for first time in 2020 (in previous years, this question allowed respondents to choose only one option per vessel type; therefore, comparisons with past years should be made with care):

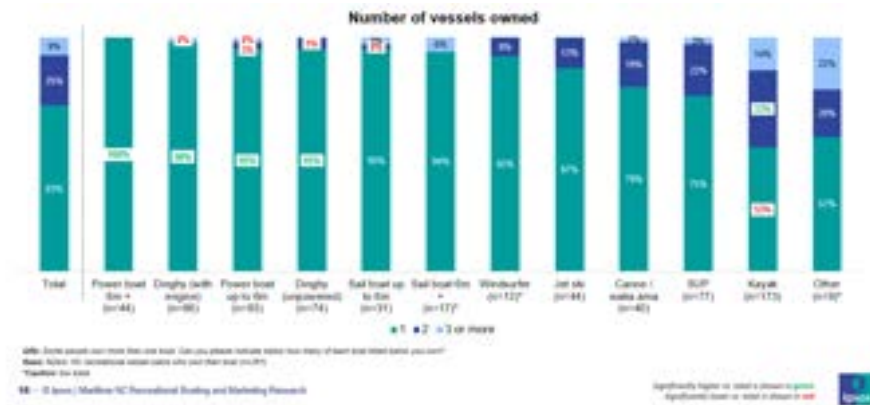
- Kayaks have the highest level of ownership across all four years (9% in 2020, 9% in 2019, 10% in 2018, and 8% in 2017), which complements the finding that this type of craft is the most frequently used vessel in the current year.
- Powerboats of up to 6 metres had the second highest level of ownership in 2020 (5% in 2020, 4% in 2019, 5% in 2018, and 5% in 2017).

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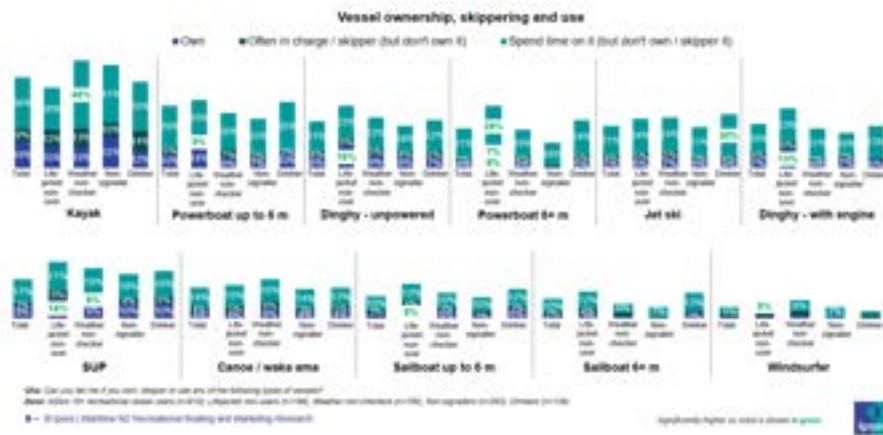
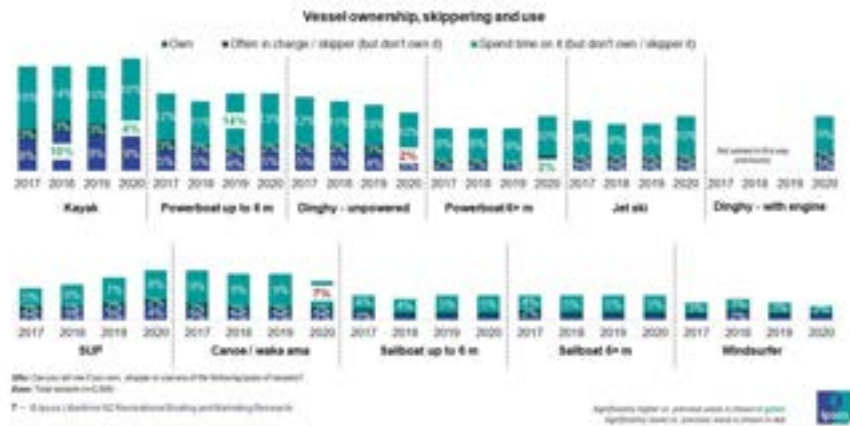
- In relation to kayaks, non-signallers were the sub-group with the highest level of ownership in the current year (22%), indicating that kayakers are less likely to take two forms of communication with them.
- Kayakers were also over-represented amongst the weather non-checkers, who were significantly more likely to spend time on kayaks than any other sub-group (48%).
- Lifejacket non-users were significantly more likely to be often in charge of or skipper powerboats of up to 6 metres that they do not actually own (9%).

**Number of Vessels Owned**

In 2020 respondents were asked for the first time how many vessels they own. As might be expected, people were more likely to own multiple vessels when the vessels in question were cheaper, e.g. SUPs, canoes and kayaks. Jetskis were the outlier in this regard and multiple jetski ownership could well reflect how those in higher earning professional occupations were more likely to own jetskis.



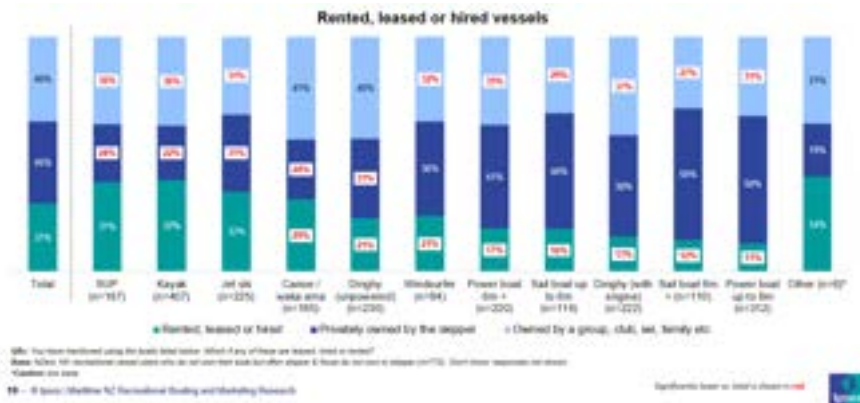
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**Hireage of Vessels**

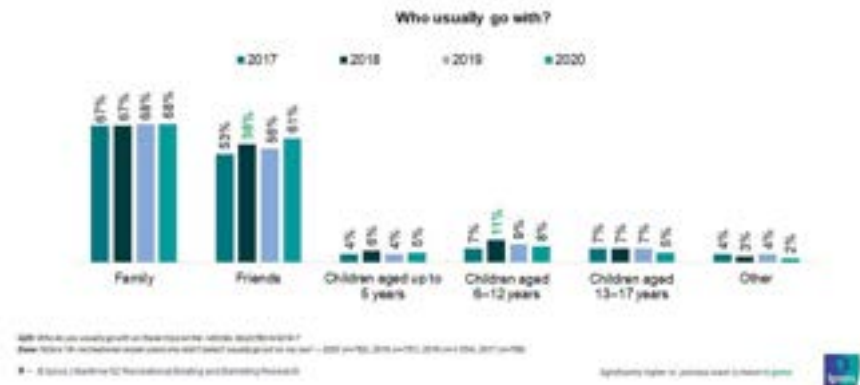
In 2020 respondents were asked for the first time if they leased, hired or rented the vessels they used. The vessels most likely to be rented were those typical of lake or beach resorts where rental facilities are more common, i.e. SUPs, kayaks and jetskis.



**Boating Passengers / Company**

Boaters were also asked who they usually go out on the water with:

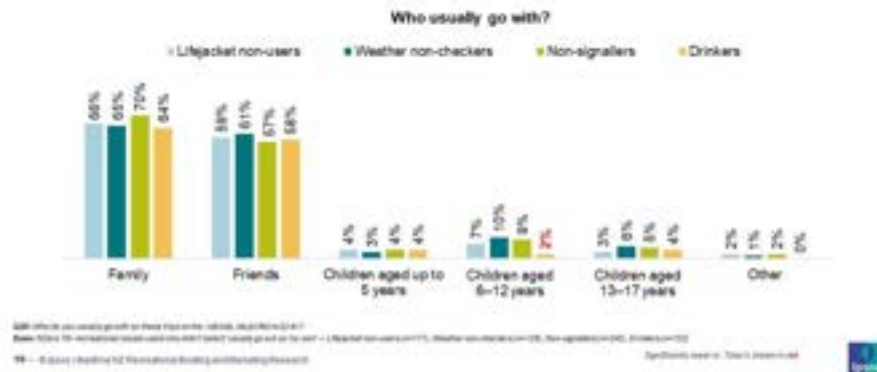
- Family members were the most popular guests in 2020 (68%), which was the same as the previous year.
- Friends were also popular at 61% – an increase of 5 points from 2019 (56%).
- Children, teenagers, and others were much less likely to be invited on recreational boating excursions (all less than 10%).



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Further analysis reveals the following insights amongst the four key sub-groups of interest:

- Drinkers are significantly less likely to take children aged 6–12 years out on the water (2%).
- Drinkers are more likely to take family members on boating trips (64%) than friends (58%).
- Non-signallers are more likely to take family members on boating trips than any of the other three sub-groups (70%).





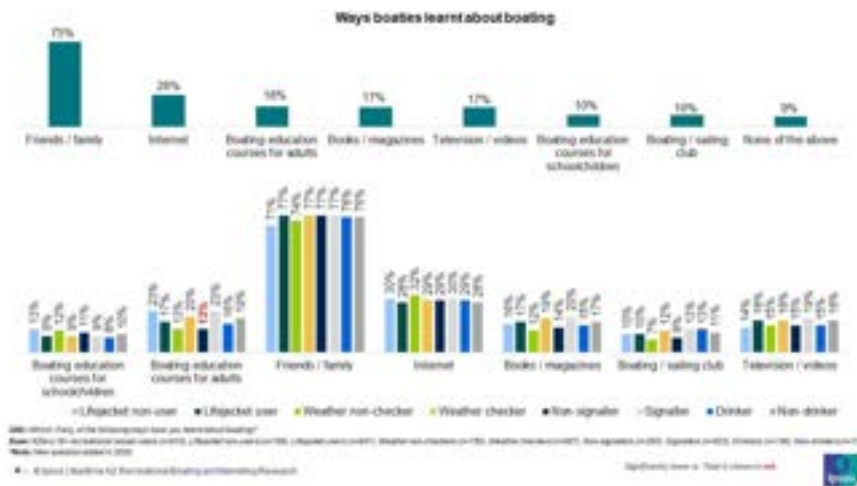
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KNOWLEDGE / BOATING COURSES

This year boaties were asked a new question about the ways in which they had learnt about boating:

- 75% of all boaties reported gaining their knowledge about boating from their friends and family.
- 28% indicated they had learnt about boating from the internet, which was the second main source of knowledge.
- 18% gained their knowledge from boating courses specifically designed for adults.
- While the majority of the four safety sub-groups also learnt about boating from friends and family, lifejacket non-users were more likely to gain knowledge from boating education courses than any other group (23%). Rather than this meaning that such courses led to boaties being less likely to wear lifejackets, the result indicates how those taking formal courses were more likely to use large powerboats – and these vessel users are less likely to wear lifejackets.

Some of those using boating education courses felt that they were not very relevant or useful, with reasons varying from their not actively using many of the skills they had learnt, to information being perceived as either ‘basic stuff’ or not providing enough depth, and / or not retaining the knowledge some years later.



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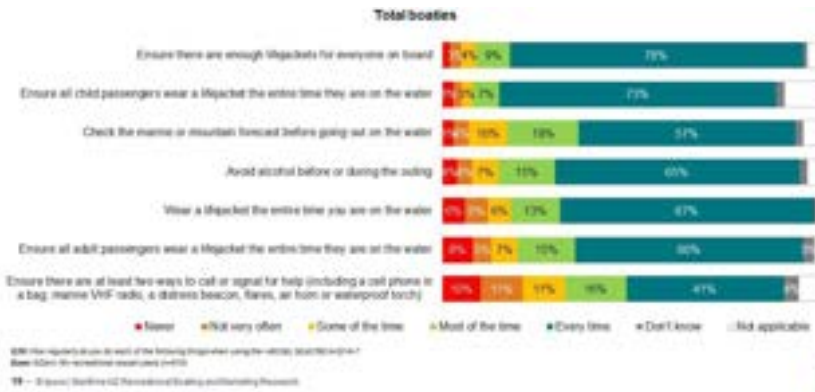
INCIDENCE OF SAFE / UNSAFE BOATING

**Boaties' Behaviours**

Boaties were asked how regularly they do a number of things relating to key safety measures when they are on board their most frequently used vessel.

Lifejacket carriage and child lifejacket usage are the safer boating behaviours that are more likely to be adhered to, but getting adults to wear lifejackets at all times remains a problem.

Weather-checking incidence is also problematic, as is the carriage of at least two forms of communication.



Prior to 2019, boaties who reporting doing at least one of the safety behaviours covered 'never' or 'not very often' were categorised as 'non-doers' of the activity in question (e.g. checking weather) so they could then be asked the appropriate follow-up questions pertinent to that behaviour (see the following section 'MAPS: Changing Boating Behaviour'). In 2020 we expanded this definition to include those who did the behaviour in question 'some of the time'. Using the previous definition, we see that there has been no significant change in reported levels of unsafe behaviours (the dotted lines show the increase in incidence using the widened definition).

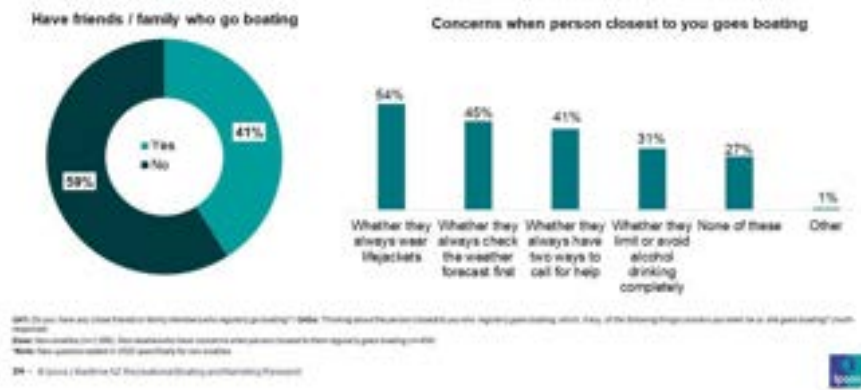


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**Non-Boaties**

Non-boaties were asked if they have any close friends or family members who go boating on a regular basis and also what concerns them when the person closest to them regularly goes boating. This new section for non-boaties reveals the following insights:

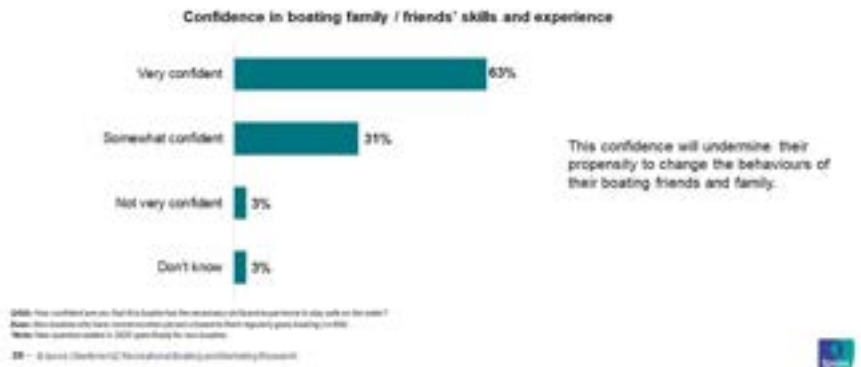
- 41% of non-boaties have close friends and family who go boating regularly.
- ‘Always wearing a lifejacket’ is the number-one concern (54%), followed by ‘always checking the weather forecast first’ (45%).
- Slightly more than a quarter of non-boaties reported that ‘none of these’ safety-related behaviours concern them (27%).



These respondents were also asked about their confidence in the level of necessary skills and experience that the person closest to them who regularly goes boating possesses to stay safe:

- 63% of non-boaties are ‘very confident’ in the skills and experience of their boatie.
- Only 3% are ‘not very confident’ in their boatie’s skill and experience levels.

This indicates that they will be unlikely to try and influence these boaties’ behaviours.



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SAFE / UNSAFE BEHAVIOUR

**Children and Lifejackets**

Boaties were asked when they believe children should wear a lifejacket (when they are on their most frequently used vessel):

- 90% reported that children should wear a lifejacket ‘all the time’.
- The current year has also seen a significant decrease in the number of boaties who believe children should wear a lifejacket ‘only when the boat is underway’ (3% in 2020 vs. 6% in 2019). While this looks like just a 3-point drop, it means a halving of the previous proportion.
- A new option, ‘only if the child can’t swim’, was added for this question in 2020. Only 1% of boaties agreed with this answer.

In 2020 a new section was added to the survey to gauge non-boaties’ views on boating safety, including how they feel about children wearing lifejackets:

- 97% of non-boaties believe that children should wear a lifejacket ‘all the time’.
- While only 2% of non-boaties believe that children should wear a lifejacket only after a vessel ‘is underway’, 1% of this respondent group selected ‘none of the above’ or ‘children should not have to always wear a lifejacket’.



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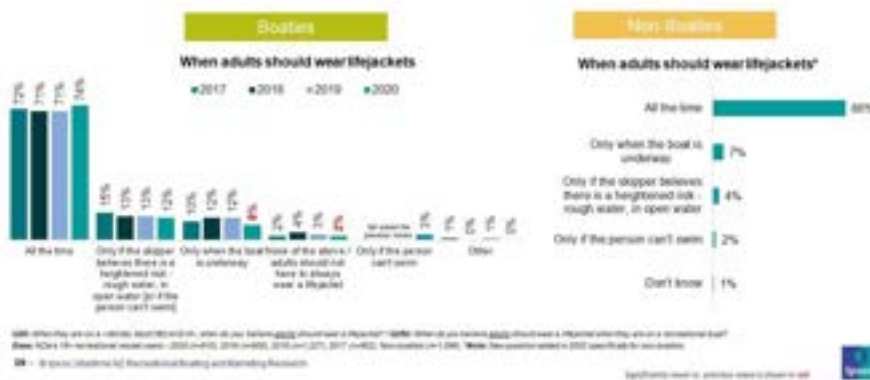
**Adults and Lifejackets**

Boaties were also asked when they believe adults should wear a lifejacket (when they are on their most frequently used vessel):

- 74% of boaties reported that adults should wear a lifejacket ‘all the time’ in 2020, which was a 3-point increase from 2019 (71%).
- There has been a significant decrease in the belief that adults should wear a lifejacket only after a vessel ‘is underway’ (8% in 2020 vs. 12% in 2019).

Non-boaties were also asked how they feel about adults wearing lifejackets:

- 86% believe that adults should wear a lifejacket ‘all the time’.
- While 7% of non-boaties believe that adults should wear a lifejacket only after a vessel ‘is underway’, a further 4% indicated this action was necessary ‘only if the skipper believes there is a heightened risk’ (e.g. from rough water or while the boat is in open water).



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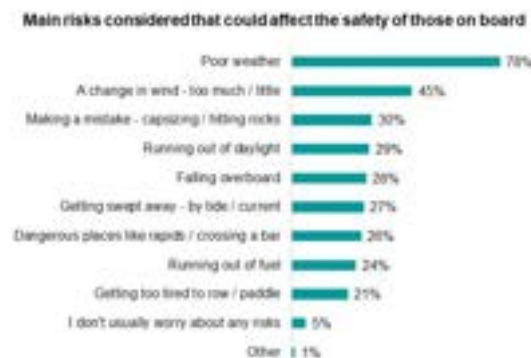
### Risk Perceptions

Boaties were asked a new risk assessment question in 2020 to explore the main risks that they or others on board think could affect their or others' safety when preparing for a normal boating trip:

- *Poor weather* (78%) and a *change in wind* (45%) were the two main risks identified by boaties.
- *Making a mistake such as capsizing or hitting rocks* (30%), *running out of daylight* (29%), or *falling overboard* (28%) are other safety-related risks that were identified in the preparation stage.

Further analysis revealed the following insights about risk and trip preparation amongst the four key sub-groups of interest. Understandably, a lower perception of risk is correlated with the likelihood of mitigating it:

- Lifejacket non-users are significantly less likely to consider *falling overboard* (21%) or *making a mistake* (20%) as primary risks.
- Weather non-checkers are significantly less likely to consider *poor weather* (69%) as a main risk.
- Non-signallers (who are more likely to use kayaks) are significantly more likely to consider *getting too tired to row or paddle* (28%) as a primary risk.
- While drinkers are significantly less likely to consider *falling overboard* (19%) as a main risk, this key sub-group are significantly more likely to consider *running out of fuel* (33%) as a primary risk. This reflects their greater propensity to use large powerboats.



Further analysis revealed that the risks considered when preparing for an excursion are specific to the type of vessel that boaties are using:

- SUP users are significantly more likely than other vessel users to report *getting swept away by a tide or current* (56%) or *dangerous places such as rapids or crossing a bar* (37%) as risks.
- Users of powerboats are significantly more likely to consider *running out of fuel* as a main risk with regard to safety (50% and 37% respectively).
- Users of smaller powerboats (up to 6 metres) are significantly less likely than other vessel users to report *dangerous places* as being a primary risk (18%).

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**Most frequently used vessel type**

Main risks considered that could affect the safety of those on board	Total	Powerboat up to 6 m (20 ft) long	Powerboat 6- m (20 ft) long	Sailboat up to 6 m (20 ft) long	Sailboat 6 m (20 ft) long	Jet ski	Dinghy - unpowered	Dinghy - with engine	Kayak	Canoe / waka ama	Stand-up paddleboard (SUP)	Wind-surfer	Other
<b>Total</b>	<b>910</b>	<b>178</b>	<b>85</b>	<b>22**</b>	<b>24**</b>	<b>82</b>	<b>49</b>	<b>58</b>	<b>291</b>	<b>42</b>	<b>67</b>	<b>1**</b>	<b>11**</b>
Poor weather	78%	78%	74%	76%	75%	70%	70%	92%	81%	77%	76%	100%	83%
A change in wind - too much / little	45%	46%	38%	49%	42%	36%	34%	65%	45%	54%	55%	100%	28%
Making a mistake - capsizing / hitting rocks	30%	24%	21%	41%	25%	32%	31%	34%	33%	43%	30%	0%	18%
Running out of daylight	29%	25%	21%	27%	15%	30%	31%	34%	32%	37%	33%	0%	20%
Falling overboard	28%	25%	25%	40%	24%	34%	34%	35%	27%	42%	23%	0%	10%
Getting swept away - by tide / current	27%	8%	9%	13%	4%	7%	44%	31%	40%	35%	56%	0%	37%
Dangerous places like rapids / crossing a bar	26%	18%	19%	23%	8%	20%	31%	20%	32%	34%	37%	0%	19%
Running out of fuel	24%	50%	37%	28%	30%	42%	15%	45%	3%	16%	4%	0%	10%
Getting too tired to row / paddle	21%	4%	6%	4%	0%	10%	34%	13%	36%	28%	30%	0%	18%
Battery / engine issues	0%	0%	1%	0%	0%	1%	2%	2%	0%	0%	0%	0%	0%
Lifejackets	0%	1%	0%	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%
Other boats / vessels	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	0%	0%
Other	1%	1%	2%	0%	4%	0%	2%	0%	1%	0%	1%	0%	8%
I don't usually worry about any risks	5%	7%	7%	0%	0%	4%	5%	2%	5%	4%	3%	0%	0%
I don't put myself / others at risk	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Q40: When you are preparing for a normal trip on a <VESSEL SELECTED IN Q14>, what are the main risks you or others on board tend to consider that could affect the safety of you or others on board? / Q14: Which one of these vessels do you use the most frequently? / Q35a: How important is boating safety to you?  
 Base: NZers 18+ recreational vessel users (n=910). \*Note: New question added in 2020. \*\*Caution: low base sizes (<30).  
 30 – © Ipsos | Maritime NZ Recreational Boating and Harbelling Research



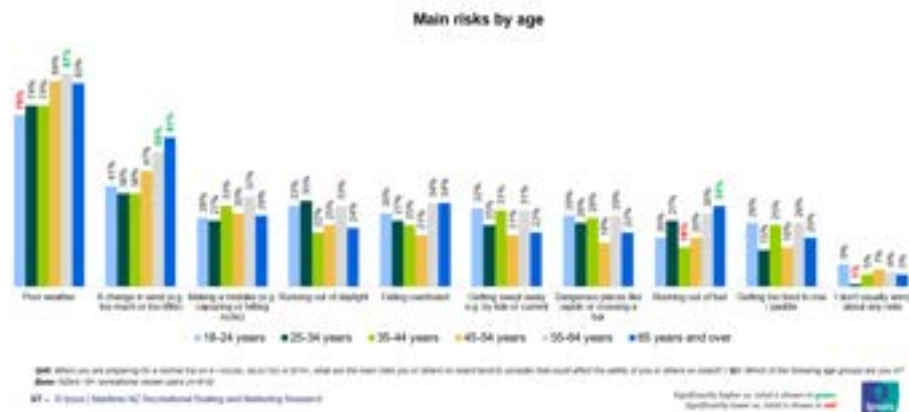
Significantly higher vs. Total is shown in green  
 Significantly lower vs. Total is shown in red

Main risks considered that could affect safety of those on board

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Further analysis revealed that older boaties are significantly more likely to be more risk adverse:

- 55-64 year old boaties are significantly more likely than any other age group to consider *poor weather* (87%) as a primary risk, while 18-24 year old boaties are significantly less likely to consider this to be a primary risk (70%).
- 55-64 year old boaties and boaties 65+ years of age are significantly more likely than any other age groups to consider *a change in the wind* (55% and 61% respectively) as a primary risk.
- While boaties over 65 years of age are significantly more likely than any other age group to consider *running out of fuel* (33%) as a primary risk, 35-44 year old boaties are significantly less likely to consider this to be a primary risk (16%).



Further analysis revealed the following insights about risk and trip preparation by region:

- Boaties from the Waikato/Taupō region are significantly more likely than boaties from any other region to consider *poor weather* (88%) as a primary risk.
- Boaties from the Taranaki region are significantly more likely than boaties from any other region to consider *getting swept away* (47%) as a primary risk.
- Boaties from the Hawkes Bay region are significantly more likely than boaties from any other region to consider *running out of fuel* (46%) as a primary risk.
- Boaties from the Wellington/Wairarapa region are significantly less likely than boaties from any other region to consider *getting too tired to row / paddle* (11%) as a primary risk.



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MAIN PERCEIVED RISKS BY REGION

	Total	Region													
		Northland (n=42)	Auckland (n=228)	Waikato/ Taupo (n=89)	Bay of Plenty (n=68)	Gisborne (n=53)	Hawke's Bay (n=28)	Taranaki (n=21)	Manawatu- Wairarapa (n=83)	Tasman (n=7)	Nelson (n=13)	Marlborough (n=13)	Canterbury/ West Coast (n=115)	Otago (n=42)	Southland (n=17)
Poor weather	78%	82%	76%	88%	80%	32%	84%	71%	76%	83%	85%	83%	72%	80%	76%
A change in wind	45%	55%	41%	52%	43%	62%	53%	38%	43%	41%	85%	52%	44%	59%	53%
Making a mistake	30%	27%	28%	31%	28%	38%	25%	32%	28%	30%	40%	44%	36%	27%	53%
Running out of daylight	29%	27%	26%	35%	38%	32%	33%	23%	30%	24%	12%	23%	29%	38%	42%
Falling overboard	28%	32%	29%	23%	31%	0%	23%	28%	29%	31%	25%	31%	27%	21%	42%
Getting swept away	27%	24%	28%	27%	28%	0%	20%	47%	30%	21%	40%	25%	22%	33%	31%
Dangerous places like rapids or crossing a bar	26%	21%	26%	27%	26%	30%	23%	34%	38%	18%	28%	23%	22%	31%	25%
Running out of fuel	24%	34%	22%	26%	30%	0%	46%	23%	14%	25%	15%	36%	19%	24%	35%
Getting too tired to row / paddle	21%	18%	20%	23%	16%	32%	13%	19%	28%	11%	40%	23%	27%	24%	19%
Battery/engine issues	0%	2%	0%	1%	1%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%
I don't usually worry about any risks	5%	2%	4%	0%	6%	0%	6%	9%	7%	7%	0%	0%	7%	2%	19%

Q4b: When you are preparing for a normal trip on a vessel selected in Q14, what are the main risks you or others on board tend to consider that could affect the safety of you or others on board? Q4: In which one of the following regions do you normally live in?

Base: NZers 18+ recreational vessel users (n=910)

\*Caution: low base size (n<30)

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Significantly higher vs. total is shown in green  
Significantly lower vs. total is shown in red

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**Importance of Boating Safety**

All respondents were asked how important boating safety is to them personally:

- 63% reported that boating safety was ‘very important’ to them in 2020, which was a significant increase from the previous year (52% in 2019).
- The proportion of respondents for whom boating safety is ‘important’ has remained relatively steady since 2017.



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### Boating Safety – Anecdotes

Boaties and non-boaties were asked about a situation where they have *gone out on the water despite their own or others' concerns about the safety of the trip* to offer insights about what can lead people into unsafe boating situations. The following quotations provide informative snapshots.

#### Example Boaties' Stories

“My brother-in-law once bought a boat from Trade Me without either seeing it or doing a sea trial. He knew nothing about boating and the whole exercise was a disaster. Blown engine on the first outing, nearly sank the boat when he took us out, didn't know basic rules (passing, different markers, etc.). We tried to advise him, but he wouldn't listen.”

“I was surf-kayaking in Waihi when a pod of orcas arrived that were seen as a big threat by friends on the beach. They didn't do anything to us so much as we kayaked along with them for about 5 minutes before they swam off. Friends were worried about what they saw happening as a death risk. I didn't approach the orcas so much as just regular kayaking when they started moving along with me.”

#### Example Non-Boaties' Stories

“My son-in-law often goes boating and takes the kids with him. I once asked the kids if they were wearing a lifejacket and they said no. When I asked their father why they weren't wearing them, he said it was too hot and the water was calm and mild.”

“I was out on a sailboat with my friend and her family and I wasn't a very confident swimmer personally, so was quite scared and it was quite windy, meaning the boat was rocking and the people on the boat weren't balanced. Everyone was on one side and the sailboat capsized.”

Boaties and non-boaties were also asked to recall *a situation where they or someone they know have not gone boating because the trip was thought to be too unsafe*. These included:

#### Example Boaties' Stories

“My husband and I have travelled from home down to Foxton to launch the boat but decided when we got there that the wind had got up and the sea had too many whitecaps, so turned around and came back home. We've done that more than once.”

“My teenage son wanted to take the boat out fishing by himself, but we said not until he has completed his Coastguard Day Skipper and VHF courses. He has just completed both, so now has to take his Dad out for his final test (at Level 2 Covid).”

#### Example Non-Boaties' Stories

“Two of my sons own boats. They always check the tides and the weather; and make sure their families all wear lifejackets. I'm very confident they are doing the right and safe things.”

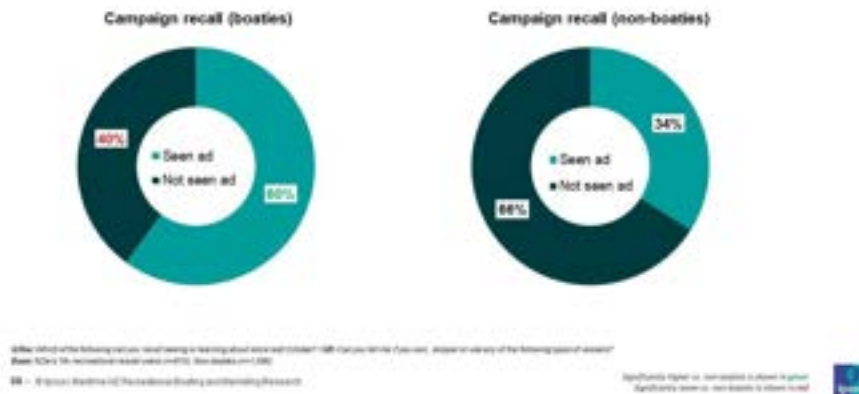
“My sister and her husband turned down invitation to go for a sail with my son on his dad's boat when they saw the beer and bottles of wine.”

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**Advertising Recall**

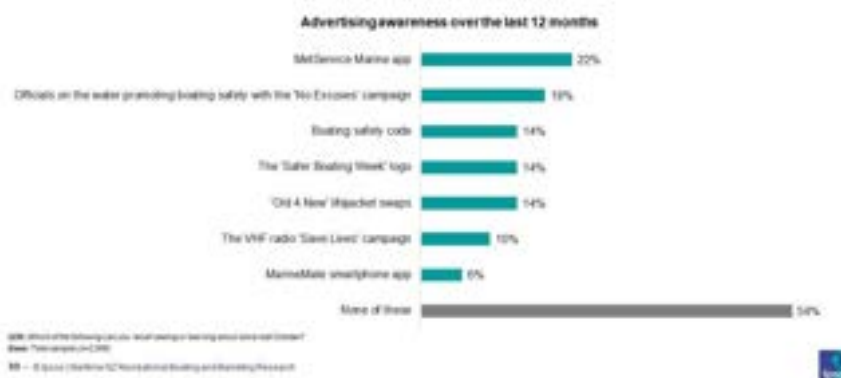
Both boaties and non-boaties were asked if they could recall seeing any advertising that comprise Maritime NZ’s safety campaign from October 2019 onwards.

Some 60% of boaties recalled Maritime NZ advertising, which was understandably higher than the recall levels of non-boaties (34%).



Boaties and non-boaties were also asked which advertising from Maritime NZ they could specifically recall seeing from October 2019 onwards:

- The advertising with the highest recall overall was the MetService Marine app (22%).
- This was followed by the ‘No Excuses’ campaign (18%), the Boating Safety Code (14%), and the ‘Safer Boating Week’ logo (14%).
- More than half of all respondents reported that they had not seen any advertising material from Maritime NZ (54%).



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Further analysis in relation to advertising awareness revealed some clear similarities and differences between boaties and the four key sub-groups:

- The MetService Marine app advertising had the highest recall overall amongst boaties (31%), followed by the ‘No Excuses’ campaign (24%), the Boating Safety Code (20%), and the ‘Safer Boating Week’ logo (18%).
- 40% of boaties reported that they had not seen any advertising material from Maritime NZ.
- The MetService Marine app advertising had the highest awareness amongst lifejacket non-users (34%).
- Weather non-checkers (6%) and non-signallers (7%) were significantly less likely to have seen the VHF radio ‘Save Lives’ campaign.



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## MAPS: CHANGING BOATING BEHAVIOUR

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### Underlying Theory

The questionnaire used the Ipsos MAPS model of behavioural change, which contends there are four areas in which behaviour is influenced (and this influenceable). These are:

- M. Motivational Factors (e.g. risk–reward calculations)
- A. Ability Factors (e.g. knowledge or skills)
- P. Physical Factors (e.g. access to requisite tools or equipment)
- S. Social Factors (e.g. peer pressure, social norms)

This model was used to better understand the barriers that exist in relation to the four key behaviours where Maritime NZ desires an increased amount of behavioural change in terms of:

- Lifejacket usage
- Weather-checking
- Taking sufficient forms of signalling
- Avoiding alcohol while boating

### A Note on Reporting

We assessed respondents' attitudes regarding safer boating behaviours by asking the extent to which they agreed or disagreed with a series of attitudinal statements designed to reflect the MAPS factors in relation to each safety behaviour. To avoid problems with the questionnaire's inferring 'correct' behaviours, the statements used presented a mix of desirable and undesirable safety attitudes. Therefore, we have indicated the answers that we desire to see in the following tables using blue text.

MARITIME NZ  
2020 RECREATIONAL BOATING SURVEY – TOP-LINE RESULTS

**Lifejacket Attitudes – Lifejacket Non-Users**

Lifejacket non-users exhibited the desirable response for 11 of the 12 statements shown in the table below.

There has been good progress with the belief that lifejackets should be worn at all times – in 2020 lifejacket non-users are significantly more likely to agree that ‘The people I normally go boating with all agree that lifejackets are important to wear at all times’ (57% agree vs. 37% agree in 2019), and they are reportedly less embarrassed to encourage others to wear lifejackets (13% embarrassed vs. 27% in 2019).

The main problem remains the belief that ‘It is OK to wear put on a lifejacket only when the conditions get rough’, as 44% of lifejacket non-users believe this.



**Interventions for Lifejacket Non-Users**

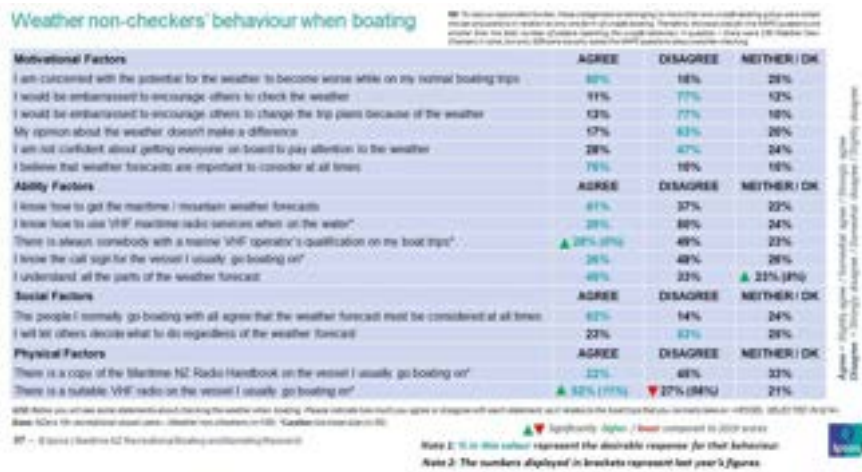
With 44% of lifejacket non-users believing that ‘It is OK to put on a lifejacket only when the conditions get rough’, there is a need to raise awareness of the fact that people can fall still overboard and get into trouble even in calm conditions. Rather than just encouraging lifejacket usage per se, promotions should specify how they are needed regardless of conditions.

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2020 RECREATIONAL BOATING SURVEY – TOP-LINE RESULTS

**Weather-Checking Attitudes – Weather Non-Checkers**

Weather non-checkers exhibited the desirable response for 11 of the 15 statements shown in the table below.

In 2020 weather non-checkers are significantly more likely to agree with the statements ‘There is always somebody with a marine VHF radio operator’s qualification on my boat trips’ (28% agree vs. 0% in 2019) and ‘There is a suitable marine VHF radio on the vessel I usually go boating on’ (52% agree vs. 11% in 2019). This means that although incidence of the ideal behaviour is still lower than desired, improvements have been recorded.



Interventions for Weather Non-Checkers

The two biggest problems regarding weather-checking concern boaties’ inability to use marine VHF radio services when on the water and the absence of a Maritime NZ Radio Handbook on the vessel usually used.

Therefore, we recommend that Maritime NZ consider the provision of free Maritime NZ Radio Handbooks (e.g. distributed at marinas or delivered directly to boats), and the development of VHF radio usage instruction stickers to be placed by radios. These could be distributed through avenues such as boating magazines, clubs, marinas, boat ramps, and on-water checks. The stickers or handbooks should allow boaties to write their vessel call-signs on them (see the following section).



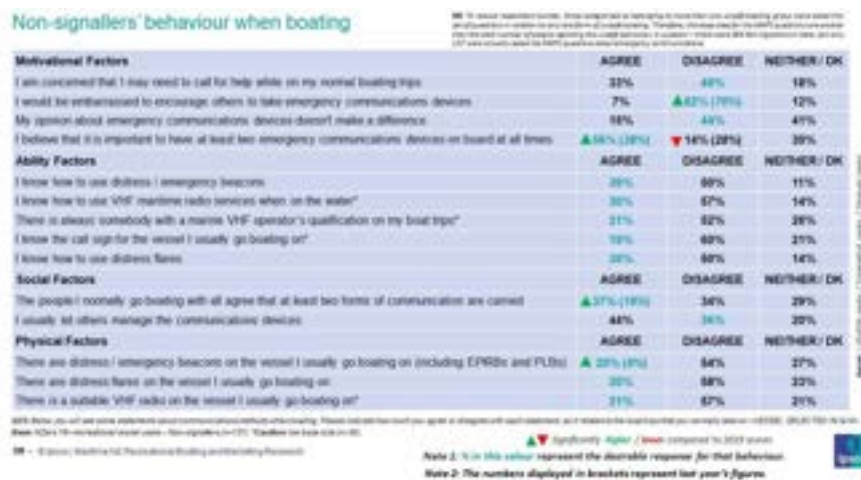
MARITIME NZ  
2020 RECREATIONAL BOATING SURVEY – TOP-LINE RESULTS

**Communication Attitudes – Non-Signallers**

Non-signallers exhibited the desirable response for only 5 of the 14 statements shown in the table below. This year, non-signallers are significantly more likely to agree with the following statements:

- ‘I would be embarrassed to encourage others to take emergency communications devices’ (82% agree vs. 70% in 2019)
- ‘I believe that it is important to have at least two emergency communications devices on board at all times’ (56% vs. 38% in 2019)
- ‘The people I normally go boating with all agree that at least two forms of communication are carried’ (37% agree vs. 19% in 2019)

This indicates that while people are increasingly likely to value having two forms of communication and to believe that their fellow boaties value this too, they are less likely to risk social stress by encouraging others they are boating with to take sufficient devices.



**Interventions for Non-Signallers**

Non-signallers are the boatie sub-group least likely to be compliant with the desired responses for their boating behaviour. Given they exhibited the desirable response for only 5 of the 14 statements asked, interventions are suggested for the two behaviours which had the least compliance.

Just 19% of non-signallers knew the call sign for the vessel they usually go boating on. As this needs to be used in conjunction with the vessel radio, we recommend that any radio-use instructions (see the previous section) allow for the vessel call-sign to be written on them.

Some 58% of non-signallers reported the absence of distress flares on the vessel they usually go boating on. As these require a one-off specific purchase and on-board storage, we believe that interventions similar to those used for lifejackets be investigated, e.g. subsidised price deals and increased awareness.

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2020 RECREATIONAL BOATING SURVEY – TOP-LINE RESULTS

**Drinking Attitudes – Alcohol Drinkers**

Although drinkers exhibited desirable responses for 8 of the 11 statements shown in the table below, there were no significant changes in 2020.

This means that the problematic issue remains people’s reluctance to try and reduce other people’s drinking, with 54% believing it is individuals’ choices to make.

Additionally, over half of the drinkers feel that alcohol is safe to drink for their kind of boating (which we know to be disproportionately more likely to be larger powerboats).

**Drinkers' behaviour when boating**

All 11 relevant statements were asked in February to November 2020. The probability that respondents will agree or disagree with each statement is based on the probability that respondents will agree or disagree with each statement. The probability that respondents will agree or disagree with each statement is based on the probability that respondents will agree or disagree with each statement. The probability that respondents will agree or disagree with each statement is based on the probability that respondents will agree or disagree with each statement.

	AGREE	DISAGREE	NEITHER / DK
<b>Motivational Factors</b>			
I am concerned with the potential for problems to occur when people drink too much alcohol when boating	81%	19%	20%
I would be embarrassed to encourage others to drink less alcohol while boating	22%	81%	27%
My opinion about alcohol doesn't make a difference	36%	27%	37%
I am not confident about getting everyone on board to reduce their alcohol consumption	30%	38%	32%
<b>Ability Factors</b>			
I know how to reduce on-board alcohol consumption to avoid problems	52%	29%	28%
Operating a boat when drunk is illegal	72%	14%	14%
<b>Social Factors</b>			
Those I normally go boating with all agree that alcohol consumption should be minimized when on the water	49%	26%	24%
It is up to individuals whether they decide to drink alcohol or not	54%	23%	21%
I reduce my alcohol consumption only if others are also drinking less	20%	54%	26%
<b>Physical Factors</b>			
It is easy to ensure less alcohol is drunk on board	59%	22%	22%
It is OK to drink alcohol for the type of boating I usually do	57%	22%	21%

88% of respondents who agreed or disagreed with each statement also indicated the reason for their response (see table on page 85). 88% of respondents who agreed or disagreed with each statement also indicated the reason for their response (see table on page 85). 88% of respondents who agreed or disagreed with each statement also indicated the reason for their response (see table on page 85).

Note: % in this column represent the desirable response for that behaviour.

**Interventions for Drinkers**

The main challenge in reducing on-board alcohol consumption is the **social** pressures that inhibit people’s likelihood of trying to reduce others’ drinking – people feeling that it is up to individuals to decide, and that they would be embarrassed and ineffective if they tried to reduce another boatie’s drinking. To address this behaviour, drinkers would potentially benefit from guidance on how to set the default position of not drinking on board and how this could be framed as the ‘collective responsibility’ of all passengers.

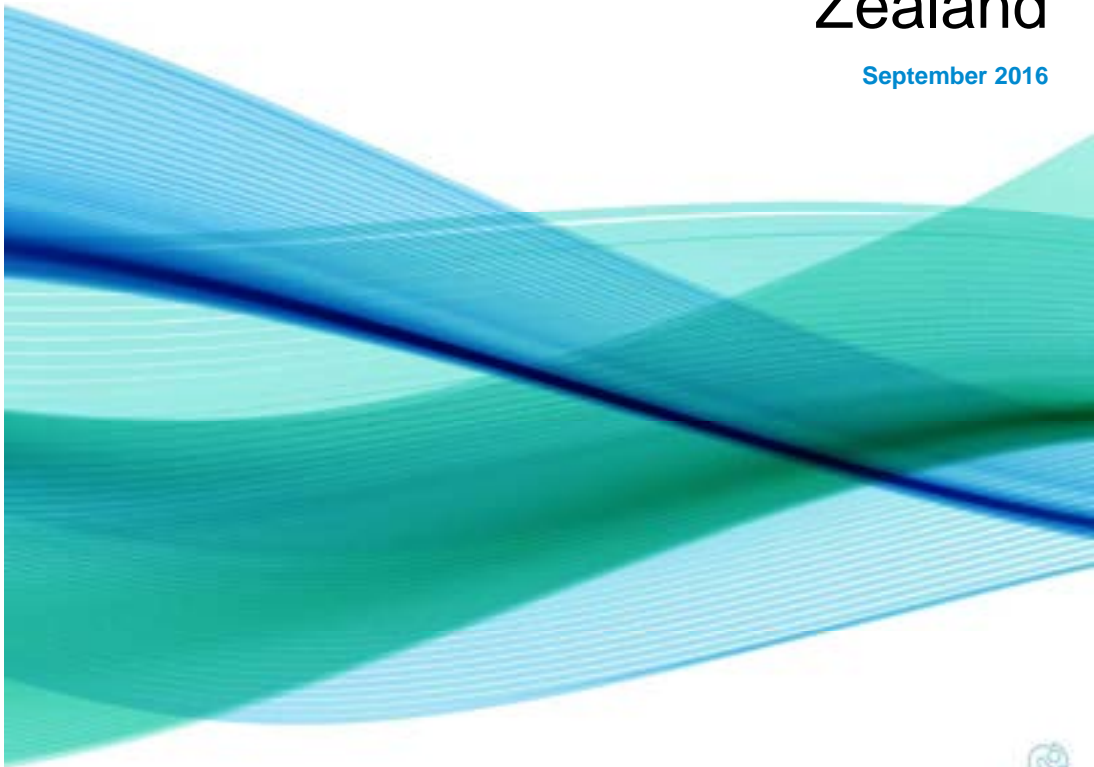
There is also a **physical** factor, in that 57% of drinkers agreed that ‘It is OK to drink alcohol for the type of boating I usually do’ – i.e. the nature of their boating is felt to be acceptable regarding alcohol consumption. These drinkers were notably more likely to be large powerboat users. Therefore, we recommend that the aforementioned drinking-reduction / avoidance messages be tailored to target those in large powerboats.

**WS-BOIMMS-144317: 3**



# Summary of Recreational Boating Research conducted by Research New Zealand

September 2016





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## Introduction

Whether at sea, on lakes or rivers, recreational boating in New Zealand is a popular pastime and enjoyed by many people. There are however, a number of fatalities each year that are associated with this activity. In 2000 the National Pleasure Boat Safety Forum (Forum) was established to investigate and coordinate national recreational boating safety initiatives. Maritime New Zealand, functioning as the chair of the Forum, commissioned Research New Zealand (Research NZ) to survey the recreational boating population in order to provide more data to contribute to a more complete picture of the boating population in New Zealand. Additionally, the aim of the research was to gauge whether the appropriate safety messages and initiatives were reaching the appropriate audiences.

Between March and April 2016, Research NZ surveyed 1,500 New Zealanders aged 18 and over for this survey, with 765 (51%) reporting that they were some way involved in recreational boating. The purpose of this survey was to examine the extent to which New Zealand's adult population currently participate in recreational boating activities, with a particular focus on their safety-related attitudes and behaviours and their awareness of Maritime New Zealand's recent recreational boating safety campaign. Only households with landline phones were surveyed as part of this research.

For the purpose of this research and reporting, recreational vessels were classified into the following six groups: Power boats under six metres; power boats six metres or more; sail boats under six metres; sail boats six metres or more; kayaks and users of 'other' vessels (canoes, SUPs, jet skis; dinghies and windsurfing boards). It should be noted when making direct comparisons between 2013/14 and 2016 survey periods that the most recent survey was conducted after one of New Zealand's hottest summers on record, while in contrast, the 2013/14 surveys were conducted during the winter months (in June/July).

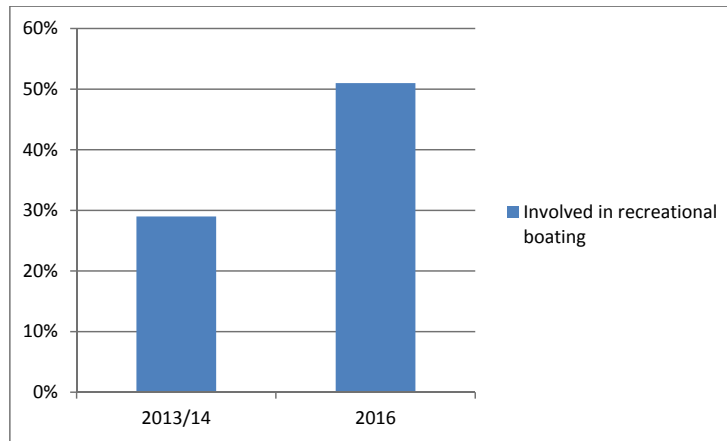
## Scope and spread of the recreational boating community

One component of the survey measured a number of aspects of the recreational boating community (numbers involved, locations, number and types of vessels owned and used, age, gender, ethnicity and region). Each of these aspects of the recreational boating community will be summarised below.

## Size of the New Zealand recreational boating community

The survey determined that of the 1,500 people surveyed, 51% identified as being involved in recreational boating (Figure 1). Based on the survey responses and using the number of adult New Zealanders as identified by Statistics New Zealand as of 1 January 2016, this represents approximately 2,317,621 adult New Zealanders involved in recreational boating.

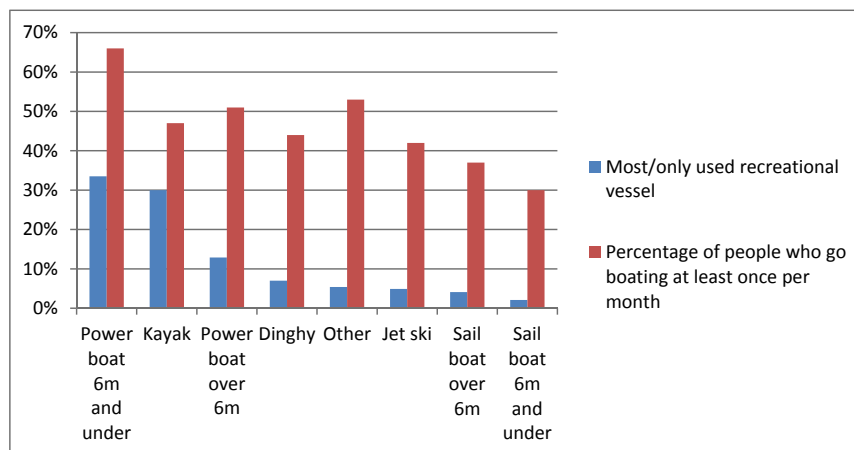




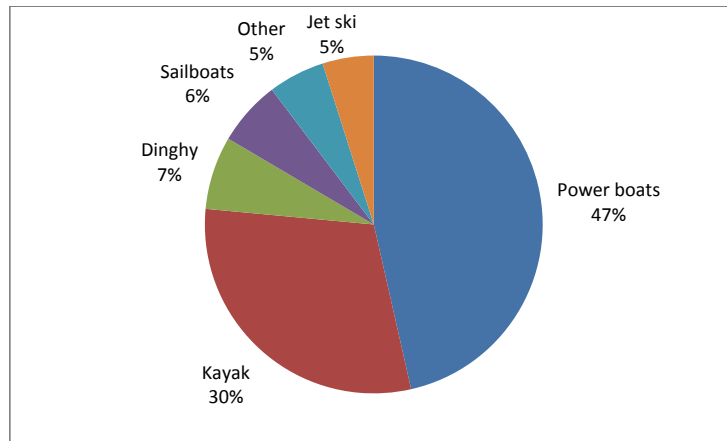
**Figure 1 Percentage of New Zealanders involved in recreational boating**

The majority of the recreational boating community in New Zealand reside in the upper North Island, with 22% in the Auckland region, 9% in the Waikato, 9% in the Bay of Plenty and 4% in Northland. Outside of this area, 16% live in Canterbury, 11% in Wellington-Wairarapa and 6% in Otago.

The proportion of recreational boaters using or owning different categories of recreational vessels can be seen in Table 1 below. The table also shows the percentage of recreational boaters who go out in each category of vessel at least once per month.

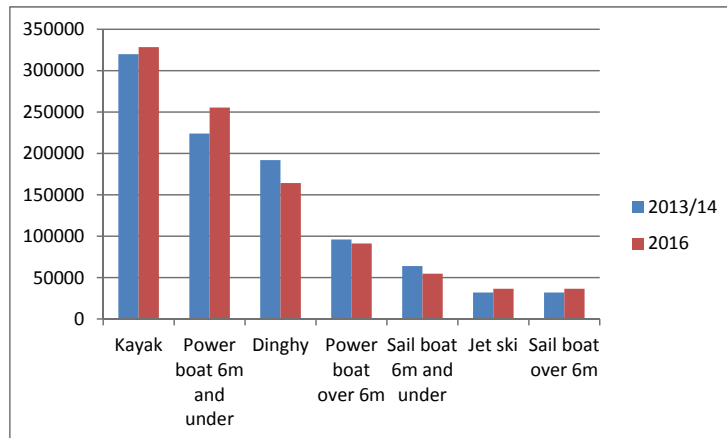


**Figure 2 Type of recreational vessel owned or used**



**Figure 3 Most popular recreational vessels in New Zealand**

The questions were refined to be able to make an estimation of the minimum number of vessel types that are owned in New Zealand. The questions did not take into account whether owners owned more than one of each type of vessel (Table 2). For example, the survey would capture ownership of a kayak and jet ski, but would not capture ownership of two canoes.



**Figure 4 Number of recreational vessels owned in New Zealand, 2013/14 & 2016**

Vessel category	Estimated number owned
Kayak	328,484
Power boat 6m and under	255,488
Dinghy	164,242
Power boat over 6m	91,246
Sail boat 6m and under	54,747
Jet ski	36,498
Sail boat over 6m	36,498

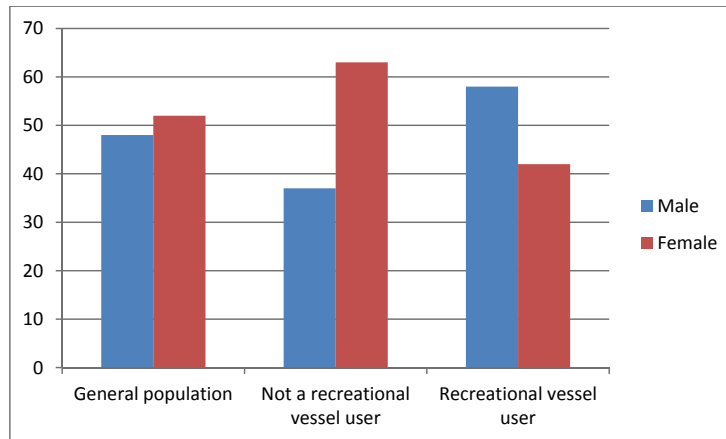
**Table 1 Estimated number of recreational vessels owned in New Zealand, by category**

### Demographics of the New Zealand recreational boating community

The profile of the recreational boating community is presented below, with corresponding graphs in Appendix 1.

#### Gender

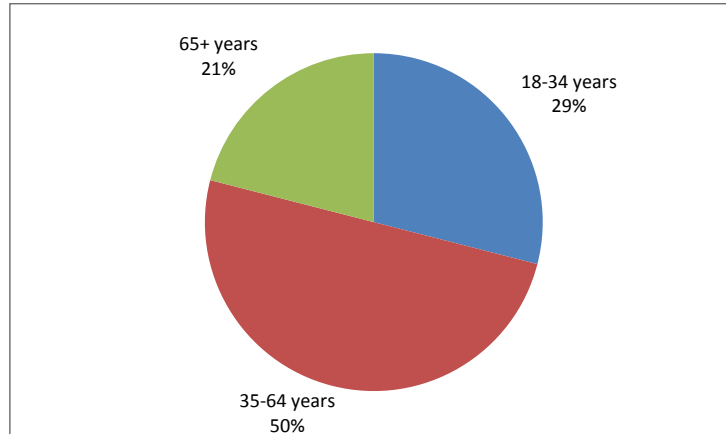
There is a larger percentage of males who own/use a recreational vessel (58%) compared to the proportion of males in the general population (48%). Females represent a smaller percentage of recreational vessel owners/users (42%), when compared to the general population (52%). Sail boat owners are predominately comprised of males, with 71% of that demographic, followed by 64% of power boat users and 57% of 'other vessels'. A larger proportion of females comprise the kayaking population with 52% of the kayak population.



**Figure 5 Recreational boating community gender profile**

#### Age

Recreational boaters are more likely (50%) to be aged 35 to 64 years than adult New Zealanders. Users of kayaks are fairly evenly divided with 47% between 18-34 years old and 46% 35 to 64 years old. 58% of powerboat and 53% 'other vessels' users are 35 to 64 years old, while 45% of sail boats are in this age range.



**Figure 6 Recreational boating community age profile**

#### Ethnicity

A large majority (88%) of recreational boaters identify as NZ European than in the adult population (75%). Power boat users are significantly more likely to identify as NZ European (92%). Maori are more likely to use smaller vessels, while those identifying as Asian are more likely to use sail boats.

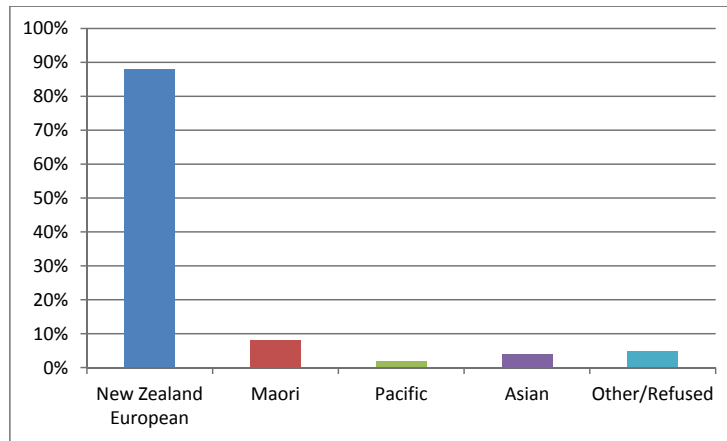


Figure 7 Recreational boating community ethnic group profile

**Region**

Most recreational boaters lived in the central/lower North Island (43%), with 27% from the upper North Island, followed by the South Island (30%). However, a large proportion of sail boat users (45%) indicated living in the upper North Island, while kayak (46%), 'other vessels' (44%), and power boat (43%) lived in the central/lower North Island. In the South Island, 'other vessels' was the largest percentage of recreational boat users with 33%.

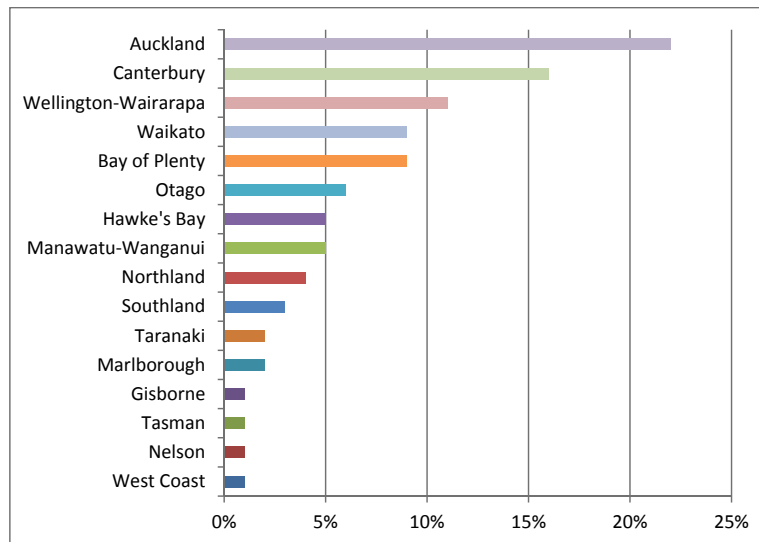


Figure 8 Recreational boating community area of residence

### Boating experience

The percentage of recreational boaters with up to five years' experience is 22%; those with 6-20 years' experience is 31% and 44% have more than 20 years' experience.

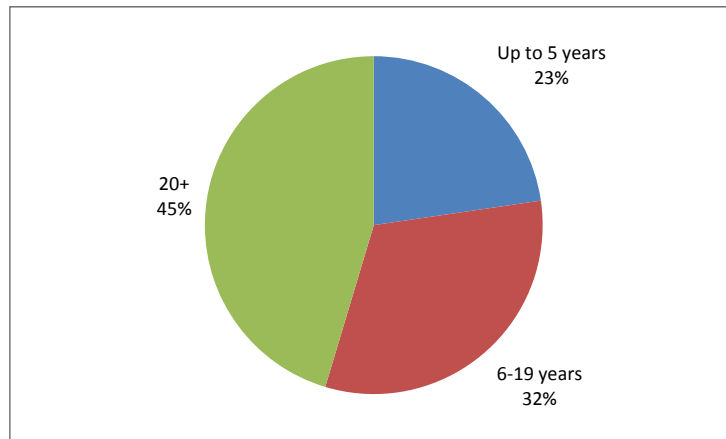


Figure 9 Boating experience

## Recreational vessel users' attitudes vs. behaviours in regards to boating safety

### Lifejackets

There are a number of factors that Maritime New Zealand has identified as being associated with recreational boating incidents and fatalities. One of these key factors is whether sufficient lifejackets are carried and worn on recreational boating excursions. It is a legal requirement to carry a correctly sized, serviceable lifejacket for each person on board a recreational vessel in New Zealand. Maritime New Zealand further recommends that the right size and type of lifejackets be worn at all times by adults and children on small boats while underway. In addition, Regional Councils have bylaws that may prescribe mandatory lifejacket wearing at all times while on the water.

The below charts and tables present the results concerning the recreational boating population's general attitudes towards wearing lifejackets.

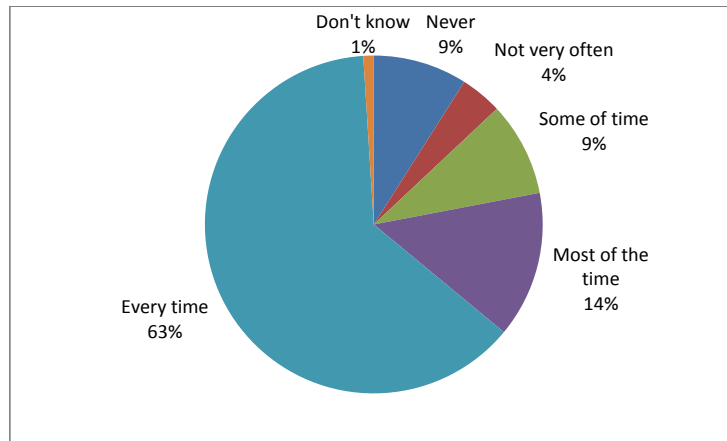


Figure 10 Profile of recreational boating community that wear lifejackets

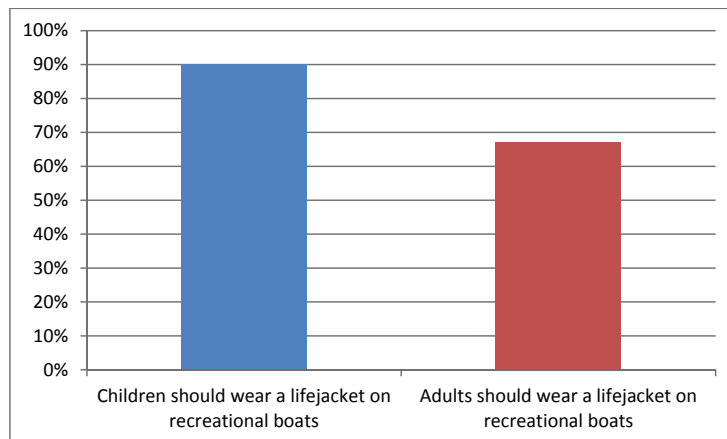


Figure 11 Attitude towards wearing lifejackets on recreational boats

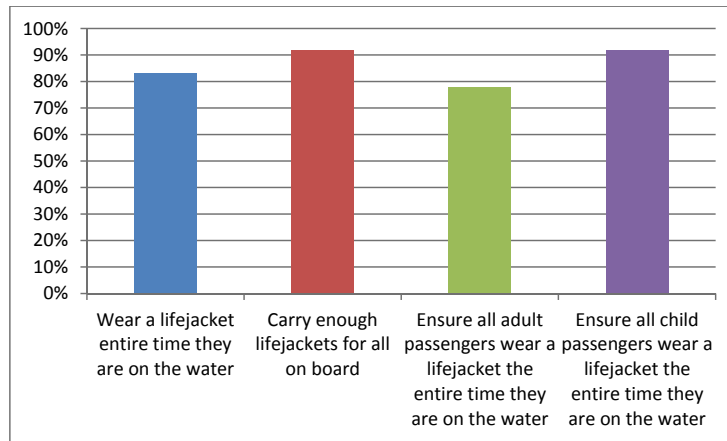


Figure 12 Attitudes regarding wearing lifejackets on recreational vessels

### Emergency communications

Maritime New Zealand recommends that recreational boaters carry at least two forms of communications that will work when wet. Further, Maritime New Zealand recommends that these devices be ones that will work in the area in which boaters are boating.

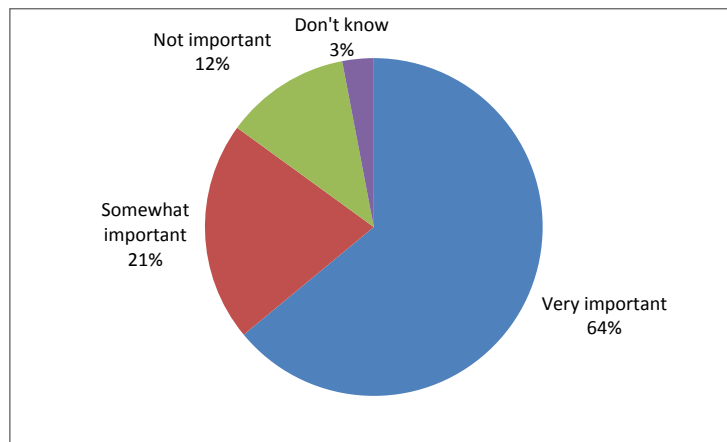


Figure 13 Emergency communications

A majority (64%) of recreational vessel users agree that it was very important to carry two forms of communication on their vessel, while 55% reported doing so every time they go out on the water. Sailboat users were significantly more likely to agree that it was very important to carry two forms of communication (88%, up from 66% in 2013/14). Although the difference was not statistically significant, sail boat users also appeared to be more



likely to report actually carrying two forms of communication when they go out (78%, up from 66% in 2013/14).

### Weather forecast

Almost three-quarters (74%) of all recreational vessel users agreed that it was very important to check the weather forecast before going out on the water. Sixty-five percent reported doing so every time.

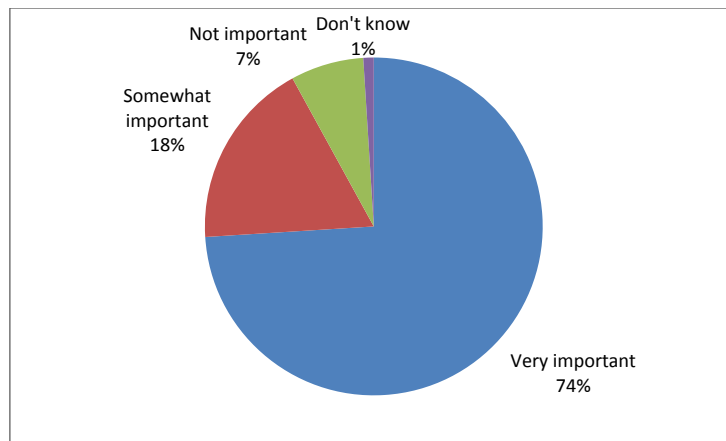


Figure 14 Check the weather forecast

### Alcohol use

Seventy-two percent also agreed that it was very important to not consume alcohol before, or while they're on the water and 80% reported that they never did so. Compared to 2013/14, users of 'other' vessels were significantly more likely to report that they never consume alcohol before or during an outing on the water (89% compared with 77% in 2013/14). However, as mentioned earlier, this apparent difference must be treated as indicative, due to differences in the way in which users of 'other' vessels was defined between the two surveys.

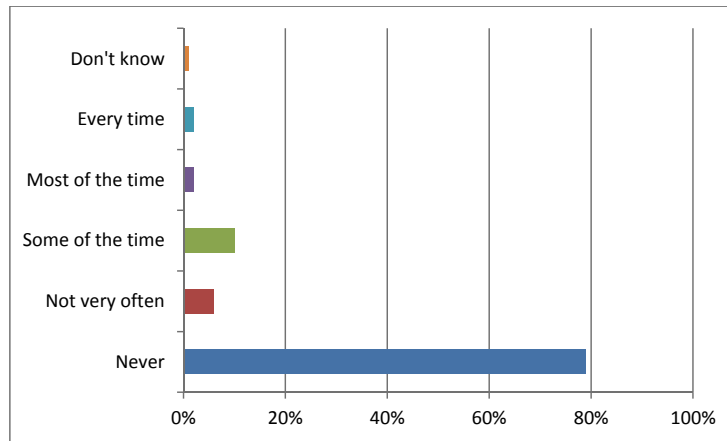


Figure 15 Alcohol consumption

### Concluding notes

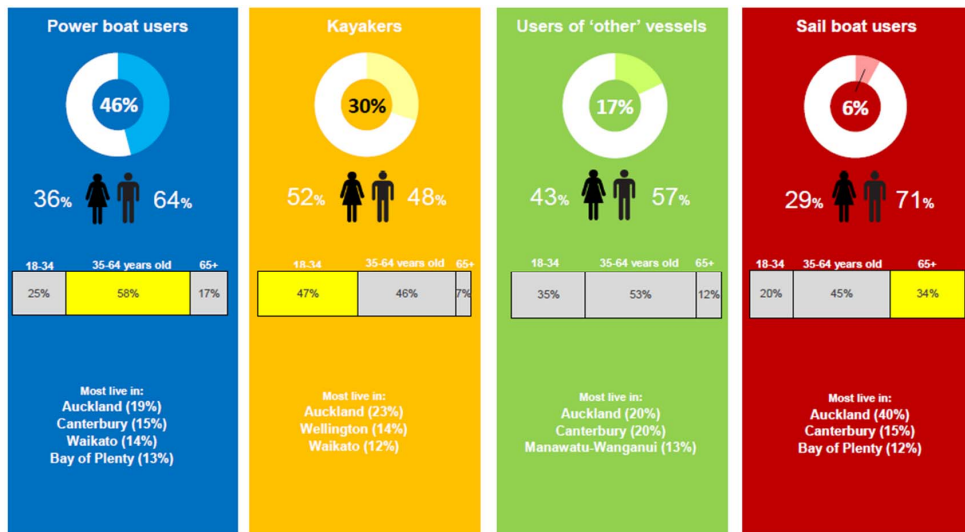
Even though 93% of recreational vessel users stated that boating safety was important/very important to them personally, the safety attitudes and behaviours of recreational boaters don't always match up, as demonstrated in Figure 19. The attitudes and behaviours vary across vessel user groups, and also within each user group with respect to lifejackets, communications, weather and alcohol use.



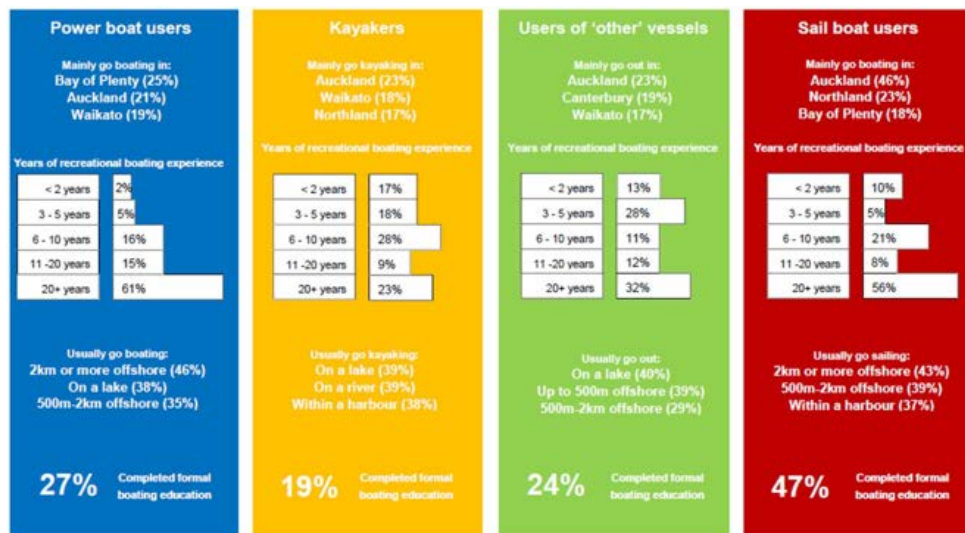
Figure 16 Attitudes towards safety and actual safety behaviours – power boats and sail boats



**Appendix 1: Attitudes and behaviours**



Note: The yellow age bands represent the vessel type that each of the three age groups are most likely to use.



**WS-BOIMMS-144317: 4**

**From:** [REDACTED]  
**Sent:** Thursday, 20 May 2021 1:39 pm  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary  
**Subject:** more thinking about protecting marine mammals in the Bol  
**Attachments:** New boat ramp and trailer park for the Bay of Islands\_N Advocate\_18th May 2021.pdf

Dear DoC - supplementary to submission receipt # BOIMMS-1301961.

I've attached an article published in recent local paper.

Perhaps you (DoC) could ask the CEO of FNDC for more info about the survey that he reports found 2,900 trailer boats associated with residents living around Bol I assume, but only 48 trailer parking spaces. So they've just spent \$990K to extend a road, upgrade a ramp and build a carpark to enable access and parking for 18 boat trailers. They think accessing the marine environment of the Bol is worth spending that sort of Ratepayers money on (and is what the Kerikeri community wants), and the NZCPS and the NRC appear to agree. That is a drop in the bucket compared to what FNHL has already delivered this past 5yrs, and intends in the next few years (e.g. \$13.4m for allocated to the Paihia waterfront development – seawalls, groin, attenuator, reclamation and beach replenishment).

The NRC has data on # of moorings within the Bay (there is a Moorings and Marina Strategy, consulted upon about 4yrs ago), while Far North Holdings Ltd has info on berths in marinas, and capacity alongside wharfs (they own/manage all of them within the Bay, as CCO of FNDC).

A good examination of the most recent aerial photography undertaken by FNDC + NRC (by a remote sensing expert), would enable a count of private access points around the coast into the Bay (there are a number of boat sheds near and over water, and numerous coastal properties with their own tractors and access points – even if not of the scale at Snells-Algies area on the Mahurangi Peninsular).

I don't know if anyone has ever tried to survey the number of boats scattered around the Bay on anchor – with no dedicated mooring or marina space.

However, these sorts of figures do suggest that there is a finite number of boats accessing the Bay, and so a targeted education campaign and engagement with boaties would be feasible and more palatable and probably more effective in achieving good outcomes for marine mammals, than more regulation (to not comply with, in an absence of monitoring and enforcement).

Locals could also be engaged in sighting and observing marine mammals, and contributing to research (seasonal surveys on numbers, reporting behaviours) as well as in reporting regulation-breaking of fellow vessel operators.

One of the other documents I attached the other day (from Maritime NZ) provides data based on a survey about if recreational boaties take their 'vessels' out of the region they normally live in and access the marine environment. Within that table, it is reported that something like 68% of Auckland based boaties do tow to Northland and to the Waikato to visit. Who knows how many of them come this far up the East coast and into the Bol. After every long weekend it is noticeable how many boats are being towed South – if you don't catch them at the boat ramps, they can be seen filling up their car before they leave, at one of the few petrol stations around the Bay.

Coastal boat traffic associated with regatta can be targeted as part of registrations for entry to the event (such as the Coastal Classic from Auckland to the Bay, the Tall Ships Race, the Opuia Regatta ect).

I also forgot to mention that there had been an annual 'speed-boat race' in the Bay. I don't know when it started, but it definitely went ahead for the first few years I was residing back up here – so I saw it first in early 2013 and probably until about 2015 or 16, at which time someone put a stop to it, because of concern about the impact on marine mammals, of the excessive noise and maneuvering of those boats. That event was staged off Waitangi, pretty close to shore. Presumably someone thought dolphins could have been within range to be affected. If there are no or very few dolphins in the inner reaches of the Bay, maybe speed boat racing will resume, even if a Marine Mammal Sanctuary is declared, because there would be nothing in those regulations to prevent speed boat racing – when no one can see any dolphins. Similarly, there are Jet Ski hire and tours offered off Paihia wharf. The 'Excitor' (a commercial speed boat, that boasted the fastest trip to the hole in the rock from Paihia, but broke backs) has moved on, but an equivalent offer arrived with the "Mac Attack" and now also "Ocean Adventure". These very fast boats don't go looking for marine mammals and can probably avoid them and comply with separation rules, but there is nothing in the regulations limiting how many such boats can be operating commercially or privately within the area. It's a pity "the hole in the rock" is right out at the entrance to the Bay, and not somewhere like Tapeka. It would save a lot of noise, fuel and less traffic right out to the entrance to the Bay. And, now there is a helicopter landing pad out there too. Maybe, during the day, dolphins can hear the Bay a long time before they can see it, and choose to swim way off shore to go around us. Maybe you could construct a fake hole in the rock near Tapeka Point or the Black Rocks.

Just some ideas, in light of fact that I think it very likely that a lot of submitters will be opposed to a BOI MMS in the form proposed, but still very keen do something to improve the habitat and to see dolphins return to the Bay.

There has long been advocacy and lobbying for a marine park of some kind (like the Hauraki Gulf Marine Park), or for marine reserves to be established in some areas (to complement rahui) – but that comes with another suite of issues and opponents (recreational fisheries). But, there is nothing to stop DoC collaborating with the locals (tourism sector – via business associations) to promote the Bay as an area of focus for marine mammals protection.... Without needing to formalise any status as a 'sanctuary', a 'park' or a 'reserve'.

I guess a question is – how much is DoC able to spend towards education and engagement to protect marine mammals and on getting locals involved in conservation work or in habitat restoration – in light of how much our local councils and their CCOs are prepared to spend to keep bring more boats and people into an area where DoC already thinks has a 'uniquely high level of interaction with marine mammals'.

The budgets are completely contradictory. So, you need to convince the team of 5million (or at least the 15,000 or so residents around the Bay) to get tuned in and turned on to protecting marine mammals and their habitats.

It's also very clear that MOST tourism businesses are not engaged directly or even indirectly with marine mammal encounters. Nor are marine mammals in the top 10 drawcards for visiting the Bay. So, to not be hypocritical, DoC needs to be consistent and cancel all concessions that allow a few operators to break rules that apply to the thousands of others accessing the Bay. Why allow some tourists to get up close to NZs endangered species, apparently putting them at risk, while NZ residents and all the other tourists (getting on boats going swimming, fishing, snorkelling and have a



picnic on an island – not even contemplating dolphins, and certainly not ‘promised’ to see one or get another free trip) have to obey rules to keep a good distance away from marine mammals. It’s a bit of nonsense. If getting close is harmful to dolphins. Stop it for everyone. Those operators will still fill their boats to see the sights, and maybe see dolphins from 300m away.

Best Regards, Jane Johnston



Virus-free. [www.avg.com](http://www.avg.com)

**From:** [janjohnston@av.com](mailto:janjohnston@av.com)  
**To:** [janjohnston@av.com](mailto:janjohnston@av.com)  
**Subject:** [www.avg.com](http://www.avg.com)

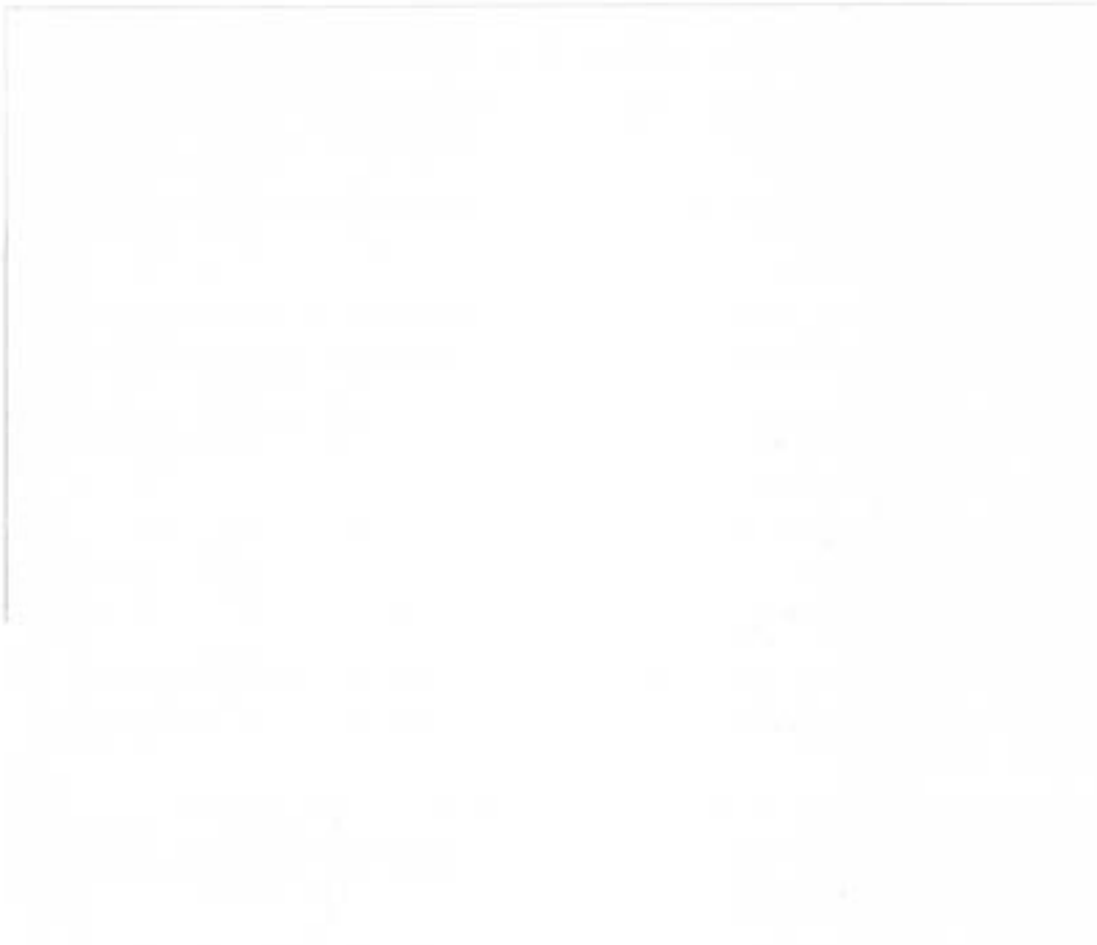
Dear Jane,  
I have received your email regarding the issue with the AVG virus-free icon. I am sorry to hear that you are experiencing this issue. I will investigate this further and get back to you as soon as possible. In the meantime, please ensure that your AVG software is up to date and that your system is protected by a reliable antivirus solution. If you have any other questions or need further assistance, please do not hesitate to contact me. Thank you for your patience and understanding. I will get back to you as soon as I have more information.

Best regards,  
Jane Johnston

**WS-BOIMMS-144317: 5**

5/20/2021

New road, trailer parking open up boat access to south Kerikeri Inlet - NZ Herald



NORTHERN ADVOCATE

## New road, trailer parking open up boat access to south Kerikeri Inlet

19 May, 2021 05:00 AM

🕒 4 minutes to read

Down breaks over the Kerikeri Inlet boat ramp at Rangitoto/Windsor Landing. Photo / Peter de Graaf

By: **Peter de Graaf**

Peter de Graaf is a reporter for the Northern Advocate

Bay of Islands boaties can finally access a boat ramp on the south side of Kerikeri Inlet almost 20 years after it was built.

The new access road and boat trailer parking at Windsor Landing, also known as Rangitoto, were blessed by members of local hapū Ngāti Rēhia and Te Uri Taniwha at dawn on Monday.

The boat ramp was built in the early 2000s by a private developer for what was to have been an exclusive subdivision.

After the developer disappeared and the consent lapsed, the ramp passed into Far North District Council ownership.

However, with no public access, its use was limited to locals who had permission to drive across a neighbouring property. Lack of parking and shallow water further limited its use.

The search for public water access on the south side of the inlet started in 2004; consents for the Rangitoto project were issued in 2007.

It was delayed by the global financial crisis then by legal action and an occupation by members of Te Uri Taniwha, because a mangrove inlet forming part of a centuries-old fish trap had to be filled in to create the carpark.

Construction resumed late last year after Ngāti Rēhia gave the project its blessing, saying people were increasingly being locked out of the Bay of Islands by the coastal property boom.

About 40 people, mostly local residents, attended Monday's pre-dawn blessing.

The facility includes a new access road, parking for 18 boat trailers and seven cars, a re-surfaced ramp, and the existing jetty and floating pontoon.

It also features two carvings by Ricky Ashby representing his Te Uri Taniwha ancestor Kopiri and his wife Whakapū.

The project was managed by council-owned company Far North Holdings.

General manager Chris Galbraith said it had involved challenges, a lot of emotion, some pain, and "amazing" neighbours.

<https://www.nzherald.co.nz/northern-advocate/news/new-road-trailer-parking-open-up-boat-access-to-south-kerikeri-inlet/MURUWLMFY57I2FKIDJLB...> 2/3

5/20/2021

New road, trailer parking open up boat access to south Kerikeri Inlet - NZ Herald

The land-based part of the project had cost \$850,000, which included widening a section of Inlet Rd, while \$110,000 had been spent on dredging.

Council chief executive Shaun Clarke said a study a few years ago found the Bay of Islands had 2900 trailer boats but just 48 trailer parking spaces.

Access to much of the coast was controlled by private landowners and, until Monday, there was not one public boat ramp between Kerikeri and Waitangi.

Clarke said he was grateful to those who had forced a halt to the project, ensuring the council took extra care around a midden and a fish trap once work resumed.

"Not a single thing the council does has unanimous support ... But this is about getting ordinary people onto the water in numbers," he said.

Despite concerns from some members of Te Uri Taniwha, Ngāti Rēhia kuaia Nora Rameka said she was persuaded to support the project after visiting the boat ramp shortly after last year's lockdown.

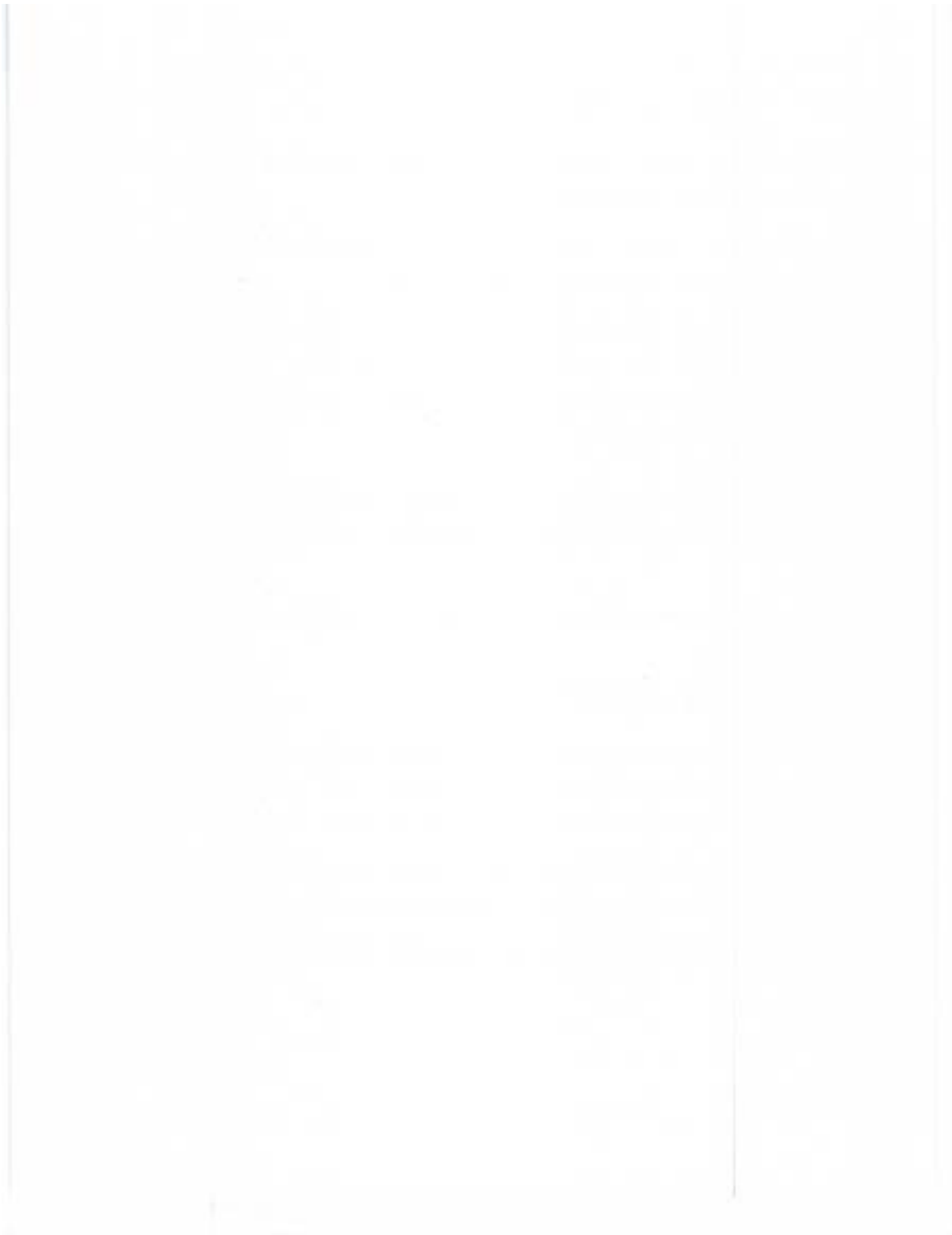
She found the area crowded with families gathering food but they could only get there by crossing private property.

"That's why I tautoko this completely," she said.

Before sunrise kaikarakia Hone Mihaka recited a whakapapa linking those present with the Te Uri Taniwha ancestors represented by the carvings Te Kōpiri and Te Whakapū, and spoke of "the ancient bones that still lie in the area's caves and wāhi tapu".

He was joined in the karakia by Bernard Makoare and Kipa Munro, who said: "Though we knew this spot was beautiful before, now the beauty is shared with many."






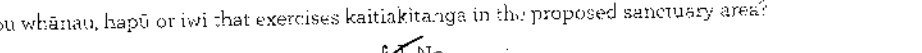
The boat ramp is about 10km east of Kerikeri's town centre on Inlet Rd, 400m after the seal ends.



**WS-BOIMMS-144320**

**Te Pēwhairangi (Bay of Islands) marine mammal sanctuary  
proposal submission form**

**Your details**

Your name: Melanie MacDiarmid  
 Organisation (if applicable): Kenken Cruising Club  
 Street address:   
 Suburb:   
 City:   
 Region:   
 Email address:   
 Phone number: 

Are you whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area?

Yes

No

If you answered yes, please provide details (eg, which hapū and/or iwi do you affiliate to):

**Which group(s) best describes your interest:**

- Northland / Te Pēwhairangi Bay of Islands community member  
 Whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area  
 Recreational maritime vessel operator  
 Commercial maritime vessel operator  
 Local business owner  
 Local community group  
 Member of the New Zealand general public  
 Science and research  
 Environmental groups  
 Other (please specify):

**Official Information Act 1982**

Please note that any submission you make will become public information, and that anyone can ask for copies of all submissions under the Official Information Act 1982.

The Official Information Act states that we must make information available unless there is a good reason for withholding it and provides a list of such reasons in sections 6, 9 and 12. If you think there is a good reason to withhold specific information, please state this in your submission. A good reason may include commercial confidentiality or that it is personal information. Note that any decision that is made by DOC to withhold information can be reviewed by the Ombudsman, who may require the information to be released.

I would like specific information in my submission withheld.

Please state the reasons for wanting specific information in this submission withheld.



### Your submission

You can provide any feedback on the proposed marine mammal sanctuary you would like. However, answering the following questions may assist in making your submission:

1. Do you support or oppose the proposed marine mammal sanctuary?  
If so, why, or why not?
2. Do you believe the proposal should be changed or amended?  
If so, what changes would you propose, and why?
3. Do you agree with how we have characterised the problem, objectives, and impacts?  
If not, how would you change it?

1. KenKen Cruising Club objects to the proposal in its current form because of concerns about the safety implications if the sanctuary rules were adopted as currently proposed.
2. The Club is particularly concerned with the proposal that vessels are required to stop within 400m of marine mammals. The Club suggests that some allowance be given to the safety of humans in these situations. Simply adding the clause "if safe to do so" may suffice.

**WS-BOIMMS-144323**



Department of Conservation  
Bay of Islands Area Office  
34 Landing Road  
Kerikeri 0230

By email: boimms@doc.govt.nz

**10 May 2021**

**Proposed Te Pēwhairangi (Bay of Islands) Marine Mammal Sanctuary**

**SUBMITTER DETAILS**

**Full name:** Environmental Defence Society Incorporated  
**Address for service:** PO Box 91736, Victoria Street West, Auckland 1142  
**Contact:** Raewyn Peart (Policy Director)  
**Telephone:** [REDACTED]  
**Email:** [REDACTED]

**1. Introduction**

- 1.1. This is a submission on the proposed Te Pēwhairangi (**Bay of Islands**) Marine Mammal Sanctuary.
- 1.2. The Environmental Defence Society (**EDS**) is a not-for-profit organisation dedicated to achieving good environmental outcomes for all New Zealanders. It is a policy think-tank and litigator that demonstrates a long-standing commitment to the improvement of marine species and ecosystem management. In 2012, EDS published findings from a review of the legislative framework established by the Marine Mammals Protection Act 1978, along with recommendations on how to strengthen protection for marine mammals.<sup>1</sup> Building on this work, EDS published a book on the relationship between humans and dolphins in Aotearoa New Zealand.<sup>2</sup> The book specifically addresses the plight of the Bay of Islands bottlenose dolphin population and tracks the history of the dolphin tourism industry in the proposed sanctuary area.<sup>3</sup>
- 1.3. EDS is not associated with a whānau, hapū or iwi that exercises kaitiakitanga in the proposed marine mammal sanctuary area.

<sup>1</sup> Mulcahy, K. and Peart, R. (2012) *Wonders of the Sea*. Environmental Defence Society. An electronic version of the publication is available at: <https://www.eds.org.nz/>

<sup>2</sup> Peart, R. (2013) *Dolphins of Aotearoa: Living with New Zealand Dolphins*. Craig Potton Publishing, Nelson, NZ. pp. 307.

<sup>3</sup> Ibid, at pages 168-180.

## 2. Summary of submission

- 2.1. EDS supports the proposed Marine Mammal Sanctuary in the Bay of Islands.
- 2.2. EDS does not support the proposal to exempt existing holders of marine mammal viewing permits from the requirement to maintain a minimum separation distance of 400 metres from marine mammals inside the Sanctuary. Such an exemption creates an inconsistent framework that will potentially undermine the recovery of the bottlenose dolphin population in the area.
- 2.3. EDS supports the proposal to establish two Marine Mammal Safe Zones inside the Sanctuary, within which vessel speeds will be restricted to a maximum of 5 knots.
- 2.4. EDS suggests that the proposed co-management body be required to develop an integrated adaptive management plan to improve outcomes within the Sanctuary. The development of such a plan, with appropriate monitoring and review mechanisms, will help to ensure the long-term protection of marine mammals in the Bay of Islands.

## 3. The proposal

- 3.1. On 20 April 2021, the Acting Minister for Conservation issued a Notice of Intention to Declare a Marine Mammal Sanctuary in the Bay of Islands pursuant to section 22 of the Marine Mammals Protection Act 1978 (**MMPA**).<sup>4</sup> The Department of Conservation (**DOC**) concurrently released consultation documentation including information on the rationale, objectives and impacts of the proposal.<sup>5</sup>
- 3.2. It is understood that the proposal seeks to establish a Marine Mammal Sanctuary with full coverage across the waters of the Bay of Islands (being the marine area bounded by Cape Wīwīki to the north and Cape Brett to the south).<sup>6</sup> It is also proposed to create two Marine Mammal Safe Zones inside the Sanctuary, with one located between Tapeka Point and Whangaiwahine Point, and the other between Motuarohia Island (Robertson Island) and Moturua Island.<sup>7</sup> Restrictions on in-water and vessel activities are proposed to be implemented within the Sanctuary and Marine Mammal Safe Zones.
- 3.3. The proposal seeks to achieve five core objectives:<sup>8</sup>
  - 1) "Halt and reverse the decline of Te Pēwhairangi (Bay of Islands) bottlenose dolphin subpopulation.
  - 2) By 2026, 50% of bottlenose dolphin calves are surviving to adulthood.
  - 3) By 2026, bottlenose dolphins are spending equal amounts of time resting, foraging, travelling and socialising.

<sup>4</sup> "Notice of Intent to Declare a Marine Mammal Sanctuary" (20 April 2021) New Zealand Gazette No 2021-1422.

<sup>5</sup> Department of Conservation (2021) *A proposal to establish a marine mammal sanctuary in Te Pēwhairangi (Bay of Islands): Public consultation document Tuhinga take korero.*

<sup>6</sup> The Notice of Intent describes the coordinates of the proposed sanctuary as "comprising all the areas of the sea enclosed by a straight line running from 174°8.210'E, 35°9.383'S to 174°19.809'E, 35°10.174'S ('outer boundary') and then running along the shoreline within that outer boundary on the line of mean high water springs." At page 1, para [1]. The proposed area is also shown on Map 1 of the proposal, above n 5, at page 13.

<sup>7</sup> Notice of Intent, above n 4, at page 1, para 2.

<sup>8</sup> The proposal, above n 5, at page 11.

- 4) By 2026, northeastern coast marine mammal species are visiting Te Pēwhairangi (Bay of Islands) at least once every 2 years.
  - 5) Te Pēwhairangi (Bay of Islands) is recognised nationally and internationally as an important area for marine mammals".
- 3.4. EDS supports the objectives of the proposed Sanctuary. Based on the findings of recent scientific research into the behaviour and population status of bottlenose dolphins in the Bay of Islands, it is clear that urgent and effect management action is required to prevent localised extinction.
- 3.5. The Aotearoa New Zealand bottlenose dolphin population is split between two distinct eco-types; the nearshore coastal environment and the open ocean environment. The coastal population is classified as "nationally endangered" due to an estimated less than 1,000 individuals remaining in the wild.<sup>9</sup> There are four geographically distinct sub-populations of coastal bottlenose dolphins in Aotearoa New Zealand, and the Bay of Islands has historically played an important role in sustaining the national population, by providing critical habitat for breeding and nursing activities.<sup>10</sup>
- 3.6. Recent research findings raise serious concerns about the future of the Bay of Islands bottlenose sub-population:<sup>11</sup>
- The number of bottlenose dolphins visiting the Bay of Islands declined by 91% between 1997 and 2020 (from 276 to 26). Only 16 of the 26 dolphins observed in the 2019-2020 study period were identified as frequent visitors, raising concerns about the potential for rapid localised extinction.
  - Studies report high and unsustainable mortality rates of 50-75%. No new calves were observed in the peak calving season of 2019-2020.
  - While DOC has implemented a variety of management measures, including a moratorium on the granting of new permits for dolphin watching or swimming in 2009; and the imposition of strict conditions on commercial permit holders in 2019; vessel presence in the Bay of Islands remains high compared with other areas in Aotearoa New Zealand.
  - The near constant presence of vessels was found to disrupt normal behaviours that are critical for dolphin survival (including resting and feeding) and reproductive success. Dolphins are being driven out of the Bay of Islands and into more exposed breeding and nursing environments. The loss of an important nursery habitat raises concerns for the long-term conservation status of the national bottlenose dolphin population.

<sup>9</sup> Refer to Department of Conservation "Bottlenose Dolphin", <https://www.doc.govt.nz/nature/native-animals/marine-mammals/dolphins/bottlenose-dolphin/>

<sup>10</sup> Ibid.

<sup>11</sup> Refer to the consultation documentation; Tangaroa Research Institute of Oceanographic Studies (TriOceans) (June 2020) Identifiable individuals, behavioural responses to vessel and calf survival of bottlenose dolphins (*Tursiops truncatus*) in Far North waters, New Zealand. Prepared for the Department of Conservation. Available at: <https://www.doc.govt.nz/about-us/science-publications/conservation-publications/marine-and-coastal/bottlenose-dolphin-in-far-north-water-new-zealands/> and to Peters, C. and Stockin, K. (2016) *Responses of bottlenose dolphins to vessel activity in Northland, New Zealand*. At page 85. The report is available at <https://www.doc.govt.nz/about-us/science-publications/conservation-publications/marine-and-coastal/responses-of-bottlenose-dolphin-to-vessel-activity-in-northland/>

- 3.7. EDS supports the establishment of the Sanctuary without delay and provides some submissions below on its design.

#### 4. Proposed restrictions on in-water activities

- 4.1. It is proposed to prohibit any person from being in the water within 400 metres of a marine mammal in any part of the Sanctuary (including the Safe Zones).<sup>12</sup>
- 4.2. EDS supports this restriction. It will deter vessel operators from infringing the proposed separation distance of 400 metres to appease swimmers; and avoid exposing marine mammals to unnecessary risk from vessel manoeuvres.<sup>13</sup>
- 4.3. Previous research on swim interactions with bottlenose dolphins in the Bay of Islands indicated that whilst some dolphins exhibited significant attraction towards swimmers, others exhibited avoidant behaviours and moved away.<sup>14</sup> The more avoidant dolphins were less frequently seen in the Bay of Islands, while dolphins that engaged more frequently with swimmers were unable to perform behaviours that are critical to survival (including resting and foraging). EDS considers the prohibition is an appropriate and necessary action to ensure dolphins that exhibit avoidant behaviours are not unintentionally driven from the Bay of Islands to more exposed marine environments. It will also help ensure that dolphins remaining in the Bay are not distracted from normal behaviours essential to their long-term health and wellbeing.

#### 5. Proposed restrictions on vessel operations

- 5.1. The proposed restrictions will also require vessel operators to maintain a minimum separation distance of 400 metres from marine mammals within the Sanctuary<sup>15</sup> and to not exceed a vessel speed of 5 knots within the Marine Mammal Safe Zones.<sup>16</sup>
- 5.2. The minimum separation distance is set out at Paragraph 5(4) of the Notice of Intention which states:
- “Throughout the proposed sanctuary every vessel operator would need to:
- a. Ensure that the vessel it operates keeps 400 metres from any marine mammal.
  - b. To [sic] use all reasonable means to stop if a marine mammal moves within 400 metres of the vessel operator’s vessel, to allow the marine mammal to move 400 metres away.”
- 5.3. EDS supports these restrictions and considers them to be an important measure to achieve the objectives sought in relation to the bottlenose dolphin population. Previous research has observed significant behavioural changes in bottlenose dolphins resulting from vessel interactions including reductions in resting and foraging activity and increases in socialising and diving activity.<sup>17</sup> The requirement to maintain a minimum separation distance of 400 metres at

<sup>12</sup> Notice of Intention, above n 4, at page 1, para 5(3).

<sup>13</sup> Reverse manoeuvres were previously utilised as a mechanism for swim placement by some commercial vessel operators and private vessel operators in the Bay of Islands; refer to Peters and Stockin, above n 11, page 85.

<sup>14</sup> Peters and Stockin, above n 11, at page 96.

<sup>15</sup> Notice of Intention, page 1, para 5(4)(a) and (b).

<sup>16</sup> Notice of Intention, page 1, para 5(2).

<sup>17</sup> Peters and Stockin, above n 11, at page 65.

all times will ensure dolphins are not intentionally exposed to vessels and therefore enable dolphins to undertake biologically significant behaviours.

- 5.4. The requirements in Paragraph 5(4) help fill an existing gap in the regulatory framework. Under the Marine Mammal Protection Regulations (**MMPR**) no minimum separation distance applies in respect of dolphins if a vessel complies with the “no wake” speed requirement (approximately 5 knots) and there are less than 3 vessels in position.
- 5.5. However, the Notice of Intention proposes that any commercial vessel with an existing marine mammal viewing permit will be exempt from the requirement to maintain a minimum separation distance of 400 metres from marine mammals inside the Sanctuary.<sup>18</sup> EDS submits that this proposed exemption creates an unsatisfactory and inconsistent management framework that will undermine the objectives of the Sanctuary and should therefore be removed.
- 5.6. The findings of the TriOceans report 2020, commissioned by DOC to assess the effectiveness of regulations enacted under the MMPR in 2019, provide insight on permitted vessel interactions with bottlenose dolphins in the Bay of Islands. Permitted commercial operators are restricted to one 20 minute encounter with bottlenose dolphins. Observations of commercial permit holder interactions with dolphins showed that, on average, the restrictions were providing for up to 0.5 vessels to locate within 300 metres of bottlenose dolphins per hour.<sup>19</sup>
- 5.7. Given the alarming decline in the number of bottlenose dolphins visiting and remaining in the Bay of Islands, and the adverse behavioural impacts the presence of vessels have on bottlenose dolphins, EDS considers any allowance for commercial permit holders to locate within 400 metres of the dolphins is inappropriate.

## 6. Proposed Marine Mammal Safe Zones

- 6.1. As previously outlined, the proposal seeks to establish two Marine Mammal Safe Zones inside the Sanctuary, in which vessel speeds will be restricted to a maximum of 5 knots.<sup>20</sup>
- 6.2. EDS fully supports the proposed Marine Mammal Safe Zone and associated restriction on vessel speed. It is understood that the proposed Safe Zone locations are currently frequented by bottlenose dolphins and are therefore areas where the highest interactions have previously occurred.<sup>21</sup>
- 6.3. EDS emphasises that previous research has shown that the patterns of bottlenose dolphin utilisation of key rest areas changes through time and is variable across seasons.<sup>22</sup> Indeed, past research concluded “newly imposed static area specific management zones ... would likely be redundant”.<sup>23</sup>

<sup>18</sup> Notice of Intention, above n 4, at para 7.

<sup>19</sup> Above n 11.

<sup>20</sup> Notice of Intention, above n 4, at page 1, para 5(2). Relating to any permits issued before 20 April 2021.

<sup>21</sup> DOC, above n 4, at page 16.

<sup>22</sup> Peters and Stockin, above n 11, at page 104.

<sup>23</sup> *Ibid.*

- 6.4. EDS submits that the proposal should include an administrative requirement that obliges Ngā Hapū o te Pēwhairangi and DOC (as the proposed co-management body) to develop an integrated adaptive management plan to supplement the initial restrictions imposed as part of the Sanctuary. This plan could consider a combined temporal and spatial management approach, with periodic closures of discrete areas during peak breeding times. It could also include complementary conservation measures developed in collaboration with other government agencies (e.g. Fisheries New Zealand, Maritime New Zealand and the Northland Regional Council) to address cumulative effects from other marine activities (including fishing and maritime transport) and land use in the adjacent catchment (sedimentation and pollution).



**WS-BOIMMS-144326**

**Submission on Proposal to Establish a Marine Mammal Sanctuary in the Bay of Islands**

By Dr Simon Hooker

Marine Ecologist

Auckland

New Zealand



I do not support the proposal to establish a marine mammal sanctuary in the Bay of Islands. Below are the reason why.

I agree that there may well be a decline in dolphin populations in the Bay of Island and there seems to be good scientific research and personal observations to back this up (at least in the short-term).

Firstly

Regulation to the extent that it takes primary rights of free passage off a subset of New Zealand citizens (i.e., free movement of recreational boats) is not to be taken lightly. The research to clearly link recreational boating activities and a decline in dolphin numbers is very rudimentary. It is therefore important that if any new regulations are put in place, they will actually solve the problem especially given they are removing NZ citizen rights.

Good science does not jump to conclusions especially if those conclusions could be explained by other hypotheses. We would all like there to be an easy answer to this but turning a hypothesis (recreational boating is causing the decline) to an actual fact is not science. I refer to the public consultation document – “we know that the dolphins and other marine mammals are spending too much time in the company of humans” in the context of dolphins and recreational boats in the Bay of Islands. This statement of fact is reiterated many times in various documents I have read but has not been rigorously tested. There are correlations but putting causal effects to correlations is not science. The correlations are the beginning and need to be tested.

Researchers postulate that dolphin interactions with recreational boats are so detrimental to the dolphins that they starve and die. This should be rigorously tested. Are Bay of Island dolphins thinner than other non-impacted populations? Why have no control populations been incorporated into the experimental protocols? There has been considerable and good research showing the decline in dolphin numbers in the Bay of Islands (e.g Peters and Stockin 2016) but they all too quickly jump to the conclusion that recreational boats are the problem.

What other hypotheses have been tested that could explain the correlations? E.g.

1. That the commercial operators are causing much if not all of the decline. There seems some initial evidence for this since there is a fairly good correlation between the start of

commercial dolphin operators (1991) (see Fumagalli et al. 2021) and the decline dolphin numbers. There has been substantial recreational activity in the Bay of Islands for many decades without the associated decline in dolphins? Researchers even state that dolphins are affected by commercial operators beyond the effect of recreational boats (Constantine et al, 2003) and that commercial operators often flout the rules (Peters and Stockin 2016).

2. That declining fish stocks are driving dolphin populations away or at least stressing the resident populations. North-eastern inshore commercial fisheries are poorly managed due to the Government's use of Maximum Sustainable Yield models. These models use the word "sustainable" in the sense of commercial economic sustainability not environmental/ecosystem sustainability which most New Zealanders would assume is the case. This causes fisheries to be heavily over exploited on a environmental sustainability basis.
3. That dolphins are just actively avoiding the Bay of Islands area for any number of reasons and the overall numbers of dolphins has not actually declined.
4. There are probably many other alternative hypotheses that informed researchers could postulate that need to be rigorously discredited.

#### Secondly

The proposed regulations are unworkable. With reference to page 12, under "Proposed Solution" of the consultation document:

1. Being in the water within 400 metres of a marine mammal. Most people will not know if they are within 400 metres of a marine mammal to the point that they will ignore this regulation. For most non-science members of the public who are not actively involved in looking for marine mammals, a dolphin is hard to see at even 200 metres at sea level. Putting regulations in place that will be regularly flouted (by accident or not) is poor governance. It will put a huge divide between the regulators and the public. How will this be policed? Some poor Government person shouting on a megaphone to "get out of the water"?
2. Maintain 400m distance from any marine mammal. "you are required to take all reasonable measures to stop and allow animals to pass to 400m away". What is "all reasonable measures"? Does the NZ courts have to decide this!!! Stopping a yacht in 20 knots or more of wind is not easy and possibly potentially dangerous. It also goes against all the personal observations of dolphins I have seen for the past 50 years in north-eastern NZ. Dolphins do what dolphins want to do. Either dolphins seek out boats or they do not (mostly they do not). If they do follow the boat, they stick with the boat no matter what you do. This cannot be regulated as we do not and cannot control dolphin behaviour. How does the proposed regulations deal with this common dolphin behaviour? The answer is it cannot. The only way to regulate the hypothesis that is presented in the Public Consultation Document is to ban recreational boating.
3. Enforce the existing regulations. On page 7 of the consultation document, it states that "On multiple occasions the Department of Conservation Te Papa Atawhai has recorded up to 60 vessels, predominantly private, attempting to interact with a pod of dolphins". Clearly the current regulations are being ignored or flouted. Why does DoC think that making more regulations is going to solve the problem if it cannot or will not enforce the current regulations.

Lastly

It seems to me that regulating recreational (i.e. non- professional activities) is the easy solution to indicate that the Government is trying to do something. However, this is not good enough when planning to remove fundamental rights of NZ citizens. Also, these regulations may well be worse than doing nothing as they will take the eye of the ball of declining dolphin population numbers which needs to be adequately researched and addressed.

Proposed solutions

After adequate research:

1. Look to heavily regulate and decrease commercial dolphin enterprises in the Bay of Islands.
2. Reduce inshore commercial harvesting activities within 12 nautical miles of the coast of the Bay of Islands.

**WS-BOIMMS-144329**

**From:** Annette Brown [REDACTED]  
**Sent:** Tuesday, 18 May 2021 8:38 pm  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary  
**Subject:** Te Pēwhairangi (Bay of Islands) marine mammal sanctuary proposal submission

- Do you support or oppose the proposed marine mammal sanctuary? If so, why, or why not?

I am opposed to the proposed marine mammal sanctuary as I do not consider it to be a fair and realistic proposal for all involved.

I believe that the second zone being sea area between Tapeka Point and Whangaiwahine Point enclosed to the South by a straight line running from 174° 7.390' E, 35° 14.498' S and 174° 11.237' E, 35° 14.904' S, unfairly penalises residents in the area.

I believe more restrictions should be instead placed on commercial operations.

- Do you believe the proposal should be changed or amended? If so, what changes would you propose, and why?

Yes I believe the proposal should be amended.

For the second zone being sea area between Tapeka Point and Whangaiwahine Point enclosed to the South by a straight line running from 174° 7.390' E, 35° 14.498' S and 174° 11.237' E, 35° 14.904' S, I believe the speed for all vessels be restricted to 12 knots at all times. This speed would be far more realistic and not penalise residents living in the area trying to go about their normal activity.

The Manawaora Bay, Te Huruhi Bay, Jacks Bay Dicks Bay areas are frequented regularly by many vessels taking anchor overnight.

Many locals use the shallows of Dicks Bay and Jack's bay for water skiing.

I believe more restrictions should be instead placed on commercial operations.

Annette Brown  
[REDACTED]

**WS-BOIMMS-144332**

SUBMISSION REGARDING PROPOSED MARINE MAMMAL SANCTUARY  
IN THE BAY OF ISLANDS

**Introduction**

My name is David Kempthorne. My family has resided in Jacks Bay since my grandparents bought property surrounding Manawaora Bay, Jacks Bay and Dicks Bay in 1947. I am based in London but return regularly to New Zealand to visit family and plan to return permanently.

I generally support the Department of Conservation's (DOC's) objective of establishing a Marine Mammal Sanctuary (MMS) that supports the rehabilitation and growth of the bluenose dolphin population.

However, I **oppose the proposed Marine Mammal Safe Zone covering the largest of the two proposed areas** (this consultation response focuses exclusively on the larger of the two MMSZs) on the grounds that the restrictions in these areas are not justified by the evidence and will not achieve DOCs objectives for the following reasons:

- *Inappropriate location of the MMSZ*: The MMSZ occupies an area where the dolphin population density and vessel movements are very low. These allocation of the larger MMSZ will therefore not achieve DOC's objectives and will impose undue and significant costs for the local community. There are other areas where an MMSZ would be more appropriate due to regular and high traffic of commercial and private vessels (commercial vessels which in particular actively seek out dolphin populations for tourists).
- *Failure to consider all potential impacts*: DoC has not considered or researched explanations for the decline of the bluenose dolphin population (other than increased interactions with private and commercial vessels), such as the impact on of potential food sources through overfishing. This research has led DOC to propose the MMSZ which will have a significant impact on local's travel and enjoyment of the Bay of Islands by marine vessel.
- *Failure to adequately consider alternatives*: DOC has failed to consider other interventions that would be less costly on the local community but would assist in achieving the desired objectives, such as imposing a requirement for all vessels to stay 400m away from all dolphins, regardless of whether they are licensed commercial vessels or private unlicensed vessels.
- *Lack of transparency*: DOC has failed to fulfil its duty to be transparent by not disclosing any engagement and consultation with local, private commercial dolphin tourism operators in the development of the proposed MMS and MMSZ. Although there is no clear evidence that commercial operators were consulted before the publication of the proposal, DOC's proposal to exclude commercial operators from the 400m restriction and to propose the MMSZ outside of the typical area that commercial dolphin tour operators commonly operate (and where the dolphins are typically sighted) suggests that they have been consulted prior to publication. This information should be disclosed to the public to allow the public to assess whether the proposed MMS is designed to be in the public interest.

In response to the key questions of DOC's proposal:

- I **oppose the proposed MMSZ**. While I agree that an MMSZ may be appropriate in assisting dolphin populations to recover, the proposal would be more effective if it included areas where dolphin populations have been sighted and there is a higher number of vessel movements. The MMSZ does not meet this criteria. Any reconsideration of the



location of the proposed Bay MMSZs should also consider the impact on local marine vessels (particularly small domestic boats).

- DOC should consider alternative interventions that may achieve the same objectives, whilst imposing lower costs on the local community. Specifically, by imposing a 400m restriction on all marine vessels, increasing enforcement, and considering ways to support improvements to the local fish population (such as imposing restrictions on commercial fishing that may negatively impact this population).
- The proposal **should be amended** by:
  - Removing the Bay from the MMSZ - Any proposed MMSZ should *exclude* areas that the June 2020 Report indicates that there is lower dolphin intensity and the April 2016 report indicates there is low vessel traffic. The evidence used to justify the current proposal strongly suggests that the proposed MMSZ is not frequented by dolphin populations and as such would not achieved the desired objectives of an MMSZ and therefore the costs imposed on local residents, primarily through restrictions placed on marine vessel travel, are not justified.
  - Considering alternative measures that would achieve the same aims without imposing costs (see above).
- **Further evidence is required** for me to determine whether I **agree or disagree** with how you have characterised the problem and the objectives of the proposed solution. Further evidence is required to demonstrate that the proposed intervention would achieve its objectives. However, my current view is that the proposal has:
  - overstated the benefits of the proposal by proposing the MMSZ in an area where DOC's research indicates there is low level of interaction between dolphin populations and marine vessels and excluding areas where there is a higher level of interaction with marine vessels, and
  - underestimated the costs of the proposal for local residents in terms of their enjoyment of the area (my proposal to improve the public benefit of the DOC's proposal is outlined above).

My rationale for DOC removing the proposed MMSZ is outlined in greater detail below.

#### **Review of rationale for proposed MMSZ**

Based on a review of the DOC consultation proposal, the June 2020 Report, and the April 2016 Report, I understand that the rationale for establishing the proposed MMSZ is that there is a decline in the bottlenose dolphin population. The research author's view is that the population decline is due to the fact that dolphins engage in a greater proportion of "energy expenditure activities" (i.e. socialising and milling) and a lower proportion of "energy acquisition activities" (i.e. resting, foraging and diving). As the research indicates that the presence of marine vessels is positively correlated with an increase in energy expenditure activities, the author concludes that it is necessary to establish the MMSZ in order to restrict all marine vessels to travelling to 5 knots and to impose a 400m setback restriction on private vessels.

At face value, the rationale for the intervention seems sensible. However, the research used to support the intervention does not consider alternative explanations for the decline of the bluenose dolphin population (other than interaction with vessels). If the MMSZ did not impose significant costs on the local population, then I would be supportive of DOC trialling an MMSZ in this area.

However, given that it does impose a significant burden on their enjoyment of the Bay of Islands and private marine vessel travel, I think further evidence is required.

#### *Assessment of benefits*

The June 2020 TriOceans Report (June 2020 Report hereafter), which is used to justify the proposed MMSZ recommends that , “exclusion zones must be placed in areas with a combination of high vessel traffic and high dolphin density, to minimize disturbance on the full range of behaviours.” Both the June 2020 report and the April 2015 DOC Report (April 2016 Report hereafter) indicate that the proposed MMSZ does not meet these requirements. Instead, the MMSZ includes areas where there is lower dolphin density and low vessel traffic (as shown by the maps below from the report).

Map 1. The proposed Te Pēwhairangi (Bay of Islands) marine mammal sanctuary



**Figure 1: Proposed MMS and MMSZ (shown in hatched blue)**

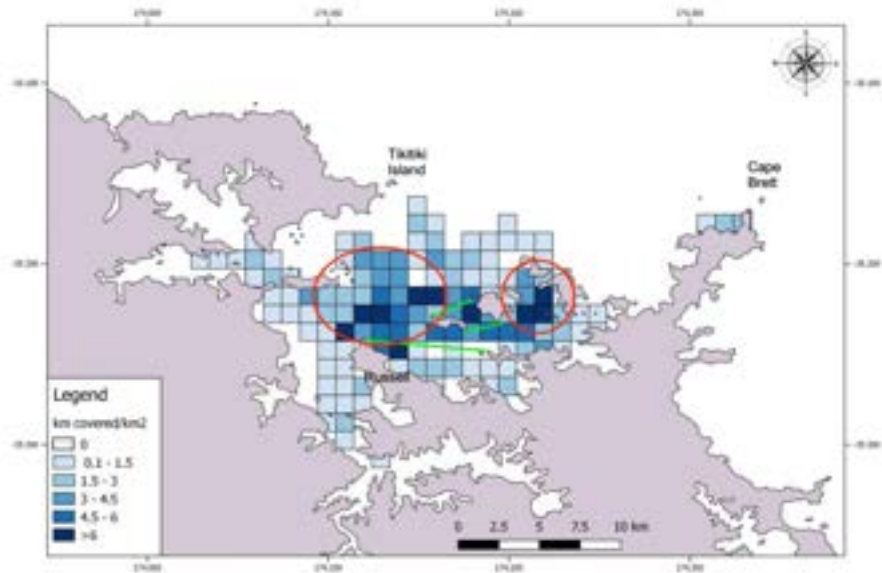


Figure 2: Exclusion of high dolphin density areas and inclusion of low dolphin density areas – June 2020 Report

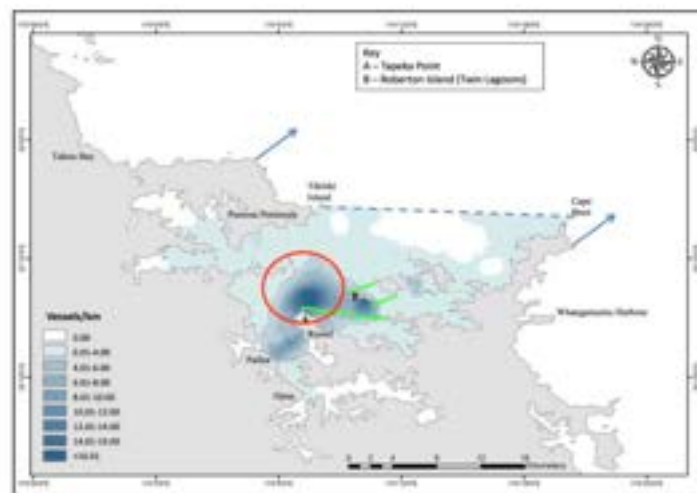


Figure 39: Vessel point density weighed by km effort on encounter between December 2012 and April 2015, in Bay of Islands waters, New Zealand. Contours realised by generating individual new vessel points during encounter corrected for its encounter effort. Blue dotted line represents harbour boundaries for the BoI.

Figure 3: Exclusion of high dolphin density areas and inclusion of low dolphin density areas – April 2016 Report

The area covered by the MMSZ is heavily populated with local residents, the bulk of which own or rent their own small domestic vessels to access the Bay of Islands or to make necessary trips across to Russell. The red circles on Figure 2 above indicate the areas where high dolphin populations have been recorded; the proposed MMSZ **does not** include the area where there is a greatest dolphin density. The density mapping in Figure 2 is consistent with my own anecdotal experience of encounters with dolphins in the BOI over the past 30 years, which is that they are generally found in deeper waters outside the proposed MMSZ and the highest density areas are in the Te Rāphiti Inlet to the South east of Motorua Island and to the west of Urupukapuka Island. In contrast, sightings of dolphins between Jack and Jill's Bay and Orakawa are limited, as are sightings along the east coast of the land running from Jack and Jill's Bay to Long Beach. Imposing the Bay MMSZ will therefore provide no benefits for the bottlenose dolphin population who are largely located outside of this area.

The proposal significantly undermines the potential benefits by explicitly excluding commercial sightseeing operators from maintaining a 400 metre distance from dolphins. There is no evidence to suggest that sightseeing operators operating within 400 metres of dolphins is any less impactful than privately owned marine vessels. The proposal is therefore discriminatory, favouring commercial sightseeing operators over local residence without any clearly stated rationale.

#### *Assessment of costs*

The consultation states, that the proposed MMS will have "some impact on maritime vessel movement/speed in the sanctuary area." DOC has significantly underestimated the cost on the local boat and property owners.

The proposed 5 knot speed limit directly impacts me, my family and wider family by curtailing our access to the BOI. As stated by my family in other submissions, the distance from Jacks Bay to Whangawahine Point is 2.1 nautical miles. If required to travel at a speed of no more than 5 knots it will take us 25 minutes to get to the imaginary line between Whangawahine Point and Tapeka Point, each time I venture into the greater BOI.

The proposed MMSZ is also situated right in the middle of an area that has been designated as a water skiing zone, with a designated ski lane in Dicks Bay. The proposal will curtail these activities without any evidence that imposing these costs will be beneficial.

#### *Failure to consider alternatives*

- **Reducing commercial fishing quotas in the surrounding region** - The decline in the dolphin population has also coincided with a reduction in the available fish catch for the recreational fisher in the BOI. There is a wide acceptance that this has been influenced by commercial fishermen operating inside the waters of the greater BOI. Despite this known fact, the major intervention that has been proposed is the implementation of a MMSZ, which has no causal link to arresting the decline in the population of dolphins in the BOI.
- **Impose and enforce a 400m restriction in all areas of the BOI for all vessels** (without imposing speed restrictions in a dedicated MMSZ) – This would reduce energy expenditure activities across the entire Bay of Islands, increasing benefits and decreasing costs on local residents and marine vessels.

- **Further education programmes** – DOC should also consider further investment in education programmes, which I would be in favour of. The local boat owners are already aware of the issues surrounding dolphins and ways of protecting them. The real issues come with casual visitors to the BOI who are uninformed of the regulations, of not only the proposed MMSZ, but even the rules of the sea. How will this proposed MMSZ deal with casual visitors who are generally unaware of the impact of their behaviours on the natural environment and on the dolphins.

**Conclusion**

I oppose the proposed MMS as currently drafted on the grounds it will not provide the stated benefits and imposes significant costs on the local population. DOC should reconsider the current proposal, and return with a proposal for more targeted measures that also take in to consideration alternatives, such as imposing a 400m restriction in areas of the BOI and considering measures to promote the return of a healthy local fish population.

Yours sincerely,

David Kempthorne

*Contact details*

Name: David Kempthorne

Email: [REDACTED]

Address: [REDACTED]

Telephone: [REDACTED]

**WS-BOIMMS-144335**

Te Pēwhairangi (Bay of Islands) marine mammal sanctuary  
proposal submission form

By HAND



## Your details

Your name: rio greening  
 Organisation (if applicable): NHK - Waitangi  
 Street address: [REDACTED]  
 Suburb: [REDACTED]  
 City: [REDACTED]  
 Region: [REDACTED]  
 Email address: [REDACTED]  
 Phone number: [REDACTED]

Are you whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area?

Yes  No

If you answered yes, please provide details (eg, which hapū and/or iwi do you affiliate to):

Te ~~Waitangi~~ hapū NHK - Waitangi

Which group(s) best describes your interest:

- Northland / Te Pēwhairangi Bay of Islands community member  
 Whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area  
 Recreational maritime vessel operator  
 Commercial maritime vessel operator  
 Local business owner  
 Local community group  
 Member of the New Zealand general public  
 Science and research  
 Environmental groups  
 Other (please specify): tangata whenua, ngapuhi

## Official Information Act 1982

Please note that any submission you make will become public information and that anyone can ask for copies of all submissions under the Official Information Act 1982.

The Official Information Act states that we must make information available unless there is a good reason for withholding it and provides a list of such reasons in sections 6, 9 and 18. If you think there is a good reason to withhold specific information, please state this in your submission. A good reason may include commercial confidentiality or that it is personal information. Note that any decision that is made by DOC to withhold information can be reviewed by the Ombudsman, who may require the information to be released.

I would like specific information in my submission withheld.

Please state the reasons for wanting specific information in this submission withheld.



### Your submission

You can provide any feedback on the proposed marine mammal sanctuary you would like. However, answering the following questions may assist in making your submission:

1. Do you support or oppose the proposed marine mammal sanctuary?  
If so, why, or why not?
2. Do you believe the proposal should be changed or amended?  
If so, what changes would you propose, and why?
3. Do you agree with how we have characterised the problem, objectives, and impacts?  
If not, how would you change it?



Yes! I support proposal but would need to have a co, government for the sec 4 to give effect to Act arit. 2 treaty of waitangi to exercise Kaitiakitanga - under 1852 Constitution Act <sup>sec</sup> that the Sec 71 has not case to have effect? from 1986 Constitution as a treaty commitments? as the views of whānau, hapū, of Te Pūwhairangi working in Partnership.  
The three major vessel groups within the B.O.I. should be a fourth as maori customary were not recreational from a history point of view as said before the treaty! claims of past.  
Options allow us through this proposal would help from our view in time & if established there need to have a Kaitiaki Component as to why things have not change in this spaces for a long time with out us this will not work thank you for your proposal Ka pai  
Nga mihi  
rio

Yes! to support the objectives outlined on page 11 of the Public Consultation Document. A Marine Mammal Sanctuary specific to the Pūwhairangi is the best option to address the issues outlined in this document. Also it was supported by a collection of hapū in the area and their Kaitiakitanga, as long as the togeta whānau kaitiakitanga carries on, - Ka pai.  
Mauri Ora - Arnold Pounsell - Ngā Hapū Kaitiakitanga



**WS-BOIMMS-144356**

**From:** Bob Drey [REDACTED]  
**Sent:** Monday, 17 May 2021 11:34 am  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary  
**Subject:** Proposed Dolphin Sanctuary in the Bay of Islands

Greetings

I wish to write in support of the proposed Dolphin Sanctuary in the Bay of Islands because of my concerns around the decline of the resident population there and the lack of visitation by a transient population, mostly in response to boating activity in the Bay.

I do, however, have some concerns about the details of this proposal. It is both unwise and unsafe to require sailing vessels to lower their sails in response to these sanctuaries. Most sailing boats travel at 5 kts or less much of the time and the sails provide stability, especially in higher winds. The situation is different for sailing vessels under power and these should obviously meet the proposed requirements for other types of craft.

I have a particular concern about the need for enforcement. My observations out on the water are that commercial craft with paying passengers will do whatever is necessary to please their customers by maneuvering them in close proximity to dolphin pods. This applies to all commercial passenger boats and not just those licensed to do so. Of course, many private recreational boats do the same. Without an effective, on the water, enforcement presence the proposed Dolphin Sanctuary may do more harm than good by engendering a disrespect for the rules on the basis that if "they" can get away with it, then so can I.

Thank you for receiving my submission.

Kind regards

Bob Drey

**WS-BOIMMS-144338**

BAY OF ISLANDS

MARINE SUBMISSION TO THE

MAMMAL SANCTUARY

19 May 2021

My name is Terry Dunn, I was the previous owner / operator of Great Escape Yacht Charters for 25 years and I am a passionate sailor and recreational user of the waters in the Bay of Islands.

I am totally opposed to the proposed marine mammal sanctuary, not because of the overall objective of marine mammal protection, but that the approach of limiting vessel movement is based on no documented evidence that proves that marine traffic is detrimental to Dolphin mortality rates or that marine traffic in the Bay of islands area has been the primary factor of the diminishing resident Dolphin population.

The 2 areas that we do have documented evidence on is:

- A. Dolphins are very intelligent beings.
- B. Any environment where food stocks are diminishing or limited will affect the overall ecology of the area and hence the food chain.

It is well known that food stocks in the BOI are suffering from overfishing.

Both mussels and Scallops were virtually nonexistent in the Bay over the last 2 years and there is currently a Rahui over shell fish gathering in the northern Bay of Islands.

Dolphins are very intelligent and it does not need any marine research to realize that if food stocks are limited, they will move somewhere else and yet none of the research shows or records Dolphin numbers outside the bay as a comparison.

The resident Seal population in the Bay of Islands area has also declined over the last 10 years and vessel interaction with them is minimal.

The current Marine Mammal Maritime regulations 1992 are already well adequate in controlling unnecessary vessel movement or provocation around Dolphins and in fact this new regulation will contravene that regulation by allowing exempted permitted operators to still interact, so what is this proposed change really trying to achieve, better protection for licensed Dolphin watch operators?

The only way to move forward in marine mammal protection to create a marine environment encouraging to mammals, and that is to limit commercial and recreational fishing in the Bay of Islands area by:

- A. Exclusively designated no fishing areas ie reserves
- B. No fishing in the larger bay area during the Snapper spawning season.

With reference to Ms. Kat Peters report, when questioned she stated, “she was requested to look at the interaction between vessels and mammals and the effect of fish stocks was not required as part of her research”.

Statements like, “dolphins are addicted to bow riding” show no respect to Dolphin’s intelligence and research should have observed that sometimes Dolphins like to play and other days they are on a fishing mission and not interested in vessels or interaction of any kind.

THEY CAN DECIDE!

I believe that before this report was even started the results were to be directed down a certain road irrespective of what other issues were really relevant.

But in saying this I also believe that dolphins are harassed by a small group of boat operators ie: motorboats, jet skis that are often observed interacting excessively.

Surely a regulation should target this problem area rather than a sailing vessel passing through and that a dolphin feels it wants to interact with.

95% of sailing vessels would travel within the 5 to 6 knot range and generally do not spin around or erratically change course, changing sails on a larger yacht requires far more effort than turning the steering wheel and pushing the throttle on a motorboat.

I believe the department has acknowledged the declining population and have come up with a shortcut solution. If they put the money and resources that are going to be spent in administering this new regulation into fast tracking a marine reserve area/sanctuary through fishing control the efforts would be far more beneficial in the long term.

I would hope that the Department of conservation would now make a sound effort to preserve the ecology of the bay of Islands rather than a half-baked plan to pass the blame onto the easiest area to attack.

Yours sincerely

[Redacted signature block consisting of four horizontal bars]

**WS-BOIMMS-144341**

Jochen Zaeschmar  
Ecocruz Bay of Islands



Paihia, 18 May 2021

**Submission: Te Pēwhairangi/Bay of Islands Marine Mammal Sanctuary Proposal**

Tēnā koutou

As a long-term resident of the Bay of Islands who has spent much of the last 22 years on the water, I have witnessed the decline in the number of bottlenose dolphins firsthand. Additionally, as both, a non-permitted commercial boat operator and a marine scientist who studies marine mammals, I have good insights into the various aspects of this complex issue. I appreciate the time and effort that has gone into the creation of the discussion document and I agree that the current level of protection is inadequate, given the continuously low numbers of bottlenose dolphins within Te Pēwhairangi. Therefore, I support the proposal in principle but I think that in its present form it is premature and requires further work to meet its stated objectives.

There has been a surprising lack of consultation with stakeholders in the planning stage of the proposed sanctuary. Many of us would have welcomed the opportunity to share our views and experience. While I value and appreciate the role and input of Ngā Hapū o te Pēwhairangi I feel that many other voices have not been heard. There is a wealth of knowledge and experience in New Zealand in regard to bottlenose dolphin research and the design of marine mammal protection measures. It is surprising that a proposal of this scope is being presented without any collaboration or independent review from scientific experts beyond Tri Oceans and/or the local Department of Conservation, in particular those with long-standing track records of bottlenose dolphin research in Te Pēwhairangi and other regions of Aotearoa. I recommend greater collaboration and independent review to maximise research outcomes.

The proposal raises many questions that require greater consultation. Following are a few examples but it is not an exhaustive list:

- 1. Designated safe zones.** Considering the latest research (TriOceans 2020), the designated safe zones do not appear to represent the most critical habitat for bottlenose dolphins in the area. Only 8.3% (n = 3) of the 36 sightings were made within one of the two proposed safe zones (and no sightings were made in the other), leaving 91.7%, (n = 33) of sightings outside of these proposed areas. Instead, the report clearly shows that the greatest number of bottlenose dolphin sightings was recorded within the area between Tapeka Point, the eastern point of Moturoa Island and the western point of Motuarohia/ Robertson Island (an area locally referred to as 'the triangle'). Previous research (e.g., Constantine 2002, Hartel et al. 2014) further indicates that preferred habitat within Te Pēwhairangi is not static but changes over time. Consequently, a more fluid approach to habitat protection may be required to avoid imposing restrictions in areas where they are not required whilst simultaneously foregoing increased protection in critical areas.
- 2. The continuation of commercial permits.** The proposal clearly identifies vessel disturbance as the main driver of dolphin decline in Te Pēwhairangi. Consequently, I question the rationale to continue to permit commercial tour boats to interact closely with marine



mammals. I recommend that all commercial permits be revoked to ensure that the same regulations can be applied to all stake holders.

- 3. Consider additional drivers of decline.** As a false killer whale researcher who has been documenting the species' occurrence of northeastern New Zealand since 1995, I have noticed a significant drop in sightings north of Tutukaka since 2007. We are currently examining oceanographic factors and long-term weather patterns to identify possible connections with the observed shift in habitat use. Incidentally, we regularly encounter groups of coastal bottlenose dolphins south of Tutukaka. Consequently, it is possible that similar factors influence bottlenose dolphin presence in Te Pēwhairangi and these should be investigated.

To be clear, these suggestions do not negate the need for changes to the current management approach of bottlenose dolphins in Te Pēwhairangi. As stated above, I strongly support increased protection of bottlenose dolphins in the area. However, proposed measures need to have a proven track-record of succeeding. Given the data presented, a wider scope with greater sampling effort and larger sample sizes are needed to conclusively show the drivers of decline and to clearly identify species specific solutions. Most importantly, the entire process needs to be more transparent with greater engagement of stake holders and experts. Consequently, I encourage the Department of Conservation to re-assess this proposal.

Ngā mihi nui

Jochen Zaeschmar

**WS-BOIMMS-144344**

Name: Dean Wright

Street Address:

Email:

Phone:

Kaitiakitanga in proposed sanctuary area? No

Groups describe me best:

Recreational maritime vessel operator

Northland community member

I don't require my submission to be withheld

**Do you support or oppose the proposed marine mammal sanctuary? If so, why, or why not?**

I support it

Ever since we heard Cat Peters talk in Kerikeri some years ago about the plight of the dolphins in the BOI we have changed our behaviour when out on the boat around them. If we see them we give them space and don't pursue them for a closer look. We never attempt to swim with them now. All things we did in the past prior to Cat's talk.

A huge thank you to Cat, Hapu and DoC for all the work getting the proposal to this stage - science work, awareness raising of the problems faced by the dolphins and all the planning that has gone into this. It's much appreciated.

This sanctuary will be high profile and a bit controversial. I think this is a good thing, this will help make people sit up and realise there is a real problem. If we can get folk to dial down their obsession with dolphins and learn to give them more space it will be a total win for them.

**2. Do you believe the proposal should be changed or amended? If so, what changes would you propose, and why?**

Yes I think there's some areas that could be considered for change:

What is happening to the seal population? Are they declining too?

Including seals in this proposal creates some practical problems in following the law. In Opito Bay we have a seal that visits every now and then, he feeds under the moored boats. The 400m rule would mean people can't swim on the beach with seals present. And the boat ramp would come to a grinding halt. It's so busy here in Opito Bay in the summer months. This is often when the seal visits and it can stay for days. It will cause practical problems, is it worth clouding the much needed protection for the bottlenose population with seal rules?

There are other examples of seals at Bird Rock, the Dog, Cape Brett light that will also create practical problems for tourism operators, charter fishermen, dive operators etc. I'd like to know more about the health of the local seal population.

We want these new regs to have total buy in. If people think this part is a bit of a nonsense they may take the vital dolphin protection less seriously.

We often see the dolphins in the middle ground now perhaps there is more tucker there, was this area considered for a safe zone?

Can we afford to have commercial operators doing Dolphin Watching in the Bay of Islands any longer? Personally I'd like to see all permits phased out over time so we don't send a dual message - it's OK for those guys to do it but Joe public has to follow a different set of rules. It should be one rule for all - except the other essential services you outline in the document.

**3. Do you agree with how we have characterised the problem, objectives, and impacts? If not, how would you change it?**

Yes I agree, but I have one question.

How much food is available for bottlenose compared to 20 years ago? Is this also a factor?

All the best, this is a real opportunity to get meaningful protection in the Bay – no easy thing!

Cheers  
Dean

**WS-BOIMMS-144347**

## Submission on Marine Mammal Sanctuary proposed for Bay of Islands

My name is Chris Richmond. I have lived in the BOI since 2006 and spend much time kayaking, sailing and diving in its wondrous waters. I also work with Living Waters- BOI in trying to restore catchment functioning to minimise the anthropogenic sediment and nutrients that contaminate both freshwater and coastal waters, thereby degrading habitat quality for our marine mammals and other marine biota.

I support in principle the proposed marine mammal sanctuary and most of the controls planned. However, for these rules to be effective they must be clearly credible and widely supported by the affected communities, because compliance will be largely voluntary, supplemented by some peer-pressure and a tiny amount of law enforcement, given the limited resources available to DOC. Accordingly, those provisions that are likely to be unfair, ineffective, unnecessary or regularly breached should be abandoned or deferred until after the 3 year review period has enabled an assessment of whether the trialled controls have been effective and accepted. These issues are:

**Kekeno / New Zealand fur seals.** Under the present proposal (Gazette Notice of Intention), vessels and people would be required to keep a 400-meter distance from all marine mammals, including kekeno. For example, this means that embarking or disembarking at Rākaumangamanga/Cape Brett Landing would not be possible if there are seals present in the adjacent channel (which is a daily occurrence between March and December and increasingly at other times, too).

It would also impose a requirement on snorkelers, swimmers and kayakers to remove themselves, even if they could see the seals at 400m. While DOC staff have argued that marine mammal observer attention might switch from dolphins to seals as relative populations change, the transitory interactions most people are able to have with seals are unlikely to appeal to the extent of seeking any repeats

**Requested action:** Exclude kekeno from the current initial proposal. However, the 3 year review offers the opportunity to impose appropriate controls on seal contact if the possible issue is demonstrated to cause adverse effects on seals.

**Maintaining a 400-meter distance from marine mammals.** The proposal states that *"If your vessel is not in compliance with this (i.e. – you become aware that there are marine mammals within 400m of your vessel) you are required to take all reasonable measures to stop and allow animals to pass to 400m away"*. This measure may cause considerable uncertainty. Four hundred meters is not an easy distance to estimate for most people, especially on the water. The term *reasonable measures* is open to much personal interpretation to the point that it may become meaningless. Additionally, there are several passages and thoroughfares in Te Pēwhairangi that are narrower than 800 meters. These areas would be impassable if dolphins were present in them. Under the current definition, it is unclear whether proceeding through such areas despite the known presence of marine mammals would be considered a reasonable measure or not. The requirement to stop a sailing vessel within 400m of a marine mammal is disproportionate to the effect on that marine mammal, especially for sailing vessels racing or transitting through the Bay. One of

the key impacts of vessel transit recently identified by researcher Dr Simon Childerhouse (DOC/Cawthron Institute) is that of intense underwater acoustics disrupting or deafening cetaceans.

**Requested action:** The Marine Mammal Protection Regulations currently stipulate that non-permitted commercial vessels must not deviate from their course to interact with marine mammals and they are not allowed to target or knowingly interact with them. Further they are required to either stop or slow to a no-wake speed within 300 meters of any marine mammal. These regulations have been widely promoted by DOC in the Northland and Auckland regions (and presumably elsewhere) and there is an awareness of their existence. They can be promoted further by simply calling for vessels to give marine mammals extra space. We recommend that these rules be applied to all vessels, commercial or private. In addition, we suggest that that vessels under power, whether motoring or motorsailing be required to switch off their noisy and wake-enhancing motors within 300m of any dolphin pod in the Bay of Islands.

**Prohibition on swimming (i.e., being in the water) within a 400m distance of marine mammals within the boundaries of the marine mammal sanctuary.** As above, many people will have difficulty to accurately judge a distance of 400m on the water. The proposal identifies swimming with marine mammals as *“one of the activities causing the most negative effects on bottlenose dolphins in Te Pēwhairangi (Bay of Islands)”* and further states that *“not allowing any swimming with dolphins would [...] also address aggressive boat navigation when trying to get close to the dolphins.”* However, the proposal omits to consider the effects of shore-based swimmers or those from moored vessels, which are likely to have a significantly lower impact. Given the proposed zero tolerance rule in regard to swimming with marine mammals, this regulation appears unreasonable under its current definition.

**Requested action:** Shore-based swimmers and those from moored vessels should be exempt from the prohibition of swimming within 400m of a marine mammal, because of the impracticability of long-distance snorkelers and swimmers exiting the water when approached by dolphins and seals.

**Lack of a holistic approach to marine mammal protection.** The measures in the current proposal are restricted to more stringent regulations of vessel interactions with marine mammals in Te Pēwhairangi. While boat disturbance is a known stressor to marine mammals, additional factors may affect habitat suitability, including prey quality and quantity, and sedimentation. It is unsatisfactory that no research to date has assessed the variety and abundance of preferred bottlenose dolphin prey within Te Pēwhairangi. A change in habitat use by bottlenose dolphins has been reported, with dolphins spending more time in the less protected waters of the middle ground of Te Pēwhairangi. Given the considerable amount of boat traffic in the area, it appears difficult to attribute this shift to anthropogenic disturbance alone and suggests that prey abundance may also be a factor. Consequently, any measures to improve bottlenose dolphin habitat within the area should incorporate all factors

that could contribute to the observed decline. It is disappointing, that DOC have categorically ruled out support for any restrictions to current fishing regulations (as declared by Hon. Kiri Allan at the meeting held at the Paihia Pacific Resort Hotel on February 25, 2021) in connection with the sanctuary proposal. This is despite Counsel for the Minister of Conservation lodging on 14 May 2021 the Environment Court Appeal evidence of its DOC expert marine protected area witness, which includes the statement that the fishing restrictions sought by BOIMP in the BOI may have benefits for bottlenosed dolphins through improved foraging opportunities.

**Requested action:** DOC should take a precautionary and holistic approach to marine mammal protection within Te Pēwhairangi and actively support and advocate for all restrictions and factors that may improve habitat quality. This means advocating for protective restrictions outside of those those provisions administered by DOC

Apart from these issues, the proposal appears to be well thought through and well consulted with most iwi/hapu/marae parties and the interested public. I look forward to seeing its refinement and implementation.

Chris Richmond

[Redacted]

[Redacted]

[Redacted]



**WS-BOIMMS-144350**

**From:** Ngati Kawa Taituha [REDACTED]  
**Sent:** Tuesday, 18 May 2021 4:44 pm  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary  
**Subject:** MMS Submission

Kia ora,

Ko Ngati Kawa Taituha tenei. Ko Ngati Rahiri, Ngati Kawa me Te Matarahurahu oku Hapu. E noho ana matou ki te Takutaimoana O Pewhairangi.

I support the proposal in its current form as it clearly outlines the rules that are designed to protect our marine mammals and provides a legal tool to penalize recreational vessels who breach and harass our taonga.

Under the current regime things are unenforceable in the court as there are too many grey areas with the rules which is having a detrimental effect on our species population and contributing to the harmful behaviour of recreational vessels.

Education is also an important part of the rescue plan so I support that Hapu are resourced and trained to be on the enforcement team and to provide matauranga Maori to help the community understand our culture, history, heritage, holistic world view which will help build long term relationships with all users of the Moana.

The MMS needs to reassure the commercial operators that the big culprits are the recreational vessels so this proposal is targeting a specific group that is creating a majority of the harm and so this kaupapa is designed to better manage the issue we are experiencing and they need to trust or have faith in the process that they can review as well in a few years to see if its having a positive impact on behavioral change. It's at a critical point where we need to act. Doing nothing is not an option. If submitters object I hope they have a solution to offer as a way forward.

Mauri ora  
Ngati Kawa

Ph. [REDACTED]

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**WS-BOIMMS-144353**

**Te Pēwhairangi (Bay of Islands) marine mammal sanctuary  
proposal submission form**

**Your details**

Your name: Patricia King  
 Organisation (if applicable): \_\_\_\_\_  
 Street address: \_\_\_\_\_  
 Suburb: \_\_\_\_\_  
 City: \_\_\_\_\_  
 Region: \_\_\_\_\_  
 Email address: \_\_\_\_\_  
 Phone number: \_\_\_\_\_

Are you whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area?

Yes  No

If you answered yes, please provide details (eg, which hapū and/or iwi do you affiliate to):

Ngāti Kūta

**Which group(s) best describes your interest:**

- Northland / Te Pēwhairangi Bay of Islands community member  
 Whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area  
 Recreational maritime vessel operator  
 Commercial maritime vessel operator  
 Local business owner  
 Local community group  
 Member of the New Zealand general public  
 Science and research  
 Environmental groups  
 Other (please specify): \_\_\_\_\_

**Official Information Act 1982**

Please note that any submission you make will become public information and that anyone can ask for copies of all submissions under the Official Information Act 1982.

The Official Information Act states that we must make information available unless there is a good reason for withholding it and provides a list of such reasons in sections 6, 9 and 18. If you think there is a good reason to withhold specific information, please state this in your submission. A good reason may include commercial confidentiality or that it is personal information. Note that any decision that is made by DOC to withhold information can be reviewed by the Ombudsman, who may require the information to be released.

I would like specific information in my submission withheld.

**Please state the reasons for wanting specific information in this submission withheld.**

WWW.doc.govt.nz/boimms.

### Your submission

You can provide any feedback on the proposed marine mammal sanctuary you would like. However, answering the following questions may assist in making your submission:

1. Do you support or oppose the proposed marine mammal sanctuary?  
If so, why, or why not?
2. Do you believe the proposal should be changed or amended?  
If so, what changes would you propose, and why?
3. Do you agree with how we have characterised the problem, objectives, and impacts?  
If not, how would you change it?

I support the Marine Mammal Sanctuary, in principle.

I would like to see all existing marine mammal viewing permits to be put on hold until the dolphins increase in numbers to an acceptable level. Therefore they should not be exempt from Restriction 2, or exempt from Speed Limits within the Sanctuary.

The wellbeing of the mammals is also in the interests of the tour operators, so we all need to forfeit for long term benefits. All of which, as you say, will result in a future Sustainable Visitor experience.

My other area of concern, is how will this co-governance be managed? Hapu, like yourselves, do not have the ability to engage without financial help, whether that is in the form of Kaitiaki Rangus or otherwise. I would encourage engagement with the Coastline hapu to help monitor and ensure compliance, on a daily basis. I would like to see further engagement with hapu on these matters.

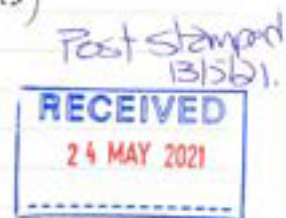
Patricia King  
Patricia King (Ngati Kuta hapu) 19/5/21

**WS-BOIMMS-144359**

**Te Pēwhairangi (Bay of Islands) marine mammal sanctuary  
proposal submission form**

**Your details**

Your name: JAMES AND TERRI POTTER (HARANG)  
 Organisation (if applicable): -  
 Street address: [REDACTED]  
 Suburb: [REDACTED]  
 City: [REDACTED]  
 Region: [REDACTED]  
 Email address: [REDACTED]  
 Phone number: [REDACTED]



Are you whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area?

Yes  No

If you answered yes, please provide details (eg. which hapū and/or iwi do you affiliate to):

**Which group(s) best describes your interest:**

- Northland / Te Pēwhairangi Bay of Islands community member  
 Whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area  
 Recreational maritime vessel operator  
 Commercial maritime vessel operator  
 Local business owner  
 Local community group  
 Member of the New Zealand general public  
 Science and research  
 Environmental groups  
 Other (please specify): \_\_\_\_\_

**Official Information Act 1982**

Please note that any submission you make will become public information and that anyone can ask for copies of all submissions under the Official Information Act 1982.

The Official Information Act states that we must make information available unless there is a good reason for withholding it and provides a list of such reasons in sections 6, 9 and 18. If you think there is a good reason to withhold specific information, please state this in your submission. A good reason may include commercial confidentiality or that it is personal information. Note that any decision that is made by DOC to withhold information can be reviewed by the Ombudsman, who may require the information to be released.

I would like specific information in my submission withheld.

Please state the reasons for wanting specific information in this submission withheld.

### Your submission

You can provide any feedback on the proposed marine mammal sanctuary you would like. However, answering the following questions may assist in making your submission:

1. Do you support or oppose the proposed marine mammal sanctuary?  
If so, why, or why not?
2. Do you believe the proposal should be changed or amended?  
If so, what changes would you propose, and why?
3. Do you agree with how we have characterised the problem, objectives, and impacts?  
If not, how would you change it?

We support the proposed marine mammal sanctuary.

We believe that the proposal should include an ability to be amended in the future to reflect the success & failure of the sanctuary aims.

As recent, long-term caretakers for private owners on one of the islands in the Bay of Islands, we observed the decline of Bottlenose and Common dolphin and we know that the operators of dolphin watching vessels also observed the decline yet continued their activities constrained only by unenforced regulations. The reasons for the decline in dolphin numbers is in dispute but the proposed sanctuary and its rules can only help the creatures.

We feel it would benefit all marine life, the coastline and people seeing the Bay of Islands marine environment, if the proposed 5 knot speed limit areas were increased to include the whole area between the southern islands and the mainland shore. This might seem draconian to many boat owners and coastal property owners but if the health of our marine environment, including marine mammals, is truly our concern, then speed restrictions will be seen as a minor inconvenience.



**WS-BOIMMS-144362**



BAY OF ISLANDS MARITIME PARK INC.

an incorporated society and registered charity (CC42063)

**Submission from Bay of Islands Maritime Park, Inc  
A proposal to establish a marine mammal sanctuary in Te Pēwhairangi  
(Bay of Islands) Public consultation document Tuhinga take kōrero**



Fish Forever, Working Group of Bay of Islands Maritime Park, Inc

- [info@fishforever.org.nz](mailto:info@fishforever.org.nz)
- 15 Pukewhau Rd, Opito Bay RD1, Kerikeri

As the primary group dedicated to the protection and restoration of the marine environment in the Bay of Islands, the Fish Forever Working Group of Bay of Islands Maritime Park (BOIMP) commends Te Papa Atawhai/ the Department of Conservation (DOC) and the individuals and organisations involved in the creation of the Te Pēwhairangi/Bay of Islands Marine Mammal Sanctuary Proposal and we collectively support the proposed sanctuary in principle. However, we believe that for marine protection to be effective, regulations and restrictions need to be both workable and enforceable. To this end we propose the following amendments to the current proposal:

1. **Kekeno / New Zealand fur seals.** Under the present proposal, vessels and people are required to keep a 400-meter distance from all marine mammals, including kekeno. For example, this means that embarking or disembarking at Rākaumangamanga/Cape Brett Landing would not be possible if there are seals present in the adjacent channel (which is a daily occurrence between March and December and increasingly at other times, too). Vessels would not be able to pass through the Hole in the Rock at Motukokako/Piercy Island if there are kekeno present on or around The Dog (which is often the case). There are several other examples from a wide range of places within Te Pēwhairangi (e.g., Tapeka Point, Doves Bay, Opuā, Cape Wiwīki and Harakeke Island). The kekeno population appears to be steadily increasing which suggests that the issue will be of growing relevance in the future. The apparent population increase further indicates that Te Pēwhairangi currently provides adequate habitat for kekeno and that no additional protective measures are required to ensure the long-term presence in the area. The strategy to have all encompassing regulations without exceptions to facilitate more effective

communication and comprehensions of the proposed measures is understandable. However, there is sufficient public awareness of the distinction between pinnipeds and cetaceans and excluding kekeno from the proposal is unlikely to cause confusion. While DOC staff argue that marine mammal observer attention might shift from dolphins to seals as relative populations change, the actual practice of this is unproven and improbable.

**Requested action:** Exclude kekeno from the current initial proposal. However, the 3 year review offers the opportunity to impose appropriate controls on seal contact if the hypothesized issue is demonstrated to cause adverse impacts on kekeno.

2. **Maintaining a 400-meter distance from marine mammals.** The proposal states that *“If your vessel is not in compliance with this (i.e. – you become aware that there are marine mammals within 400m of your vessel) you are required to take all reasonable measures to stop and allow animals to pass to 400m away”*. This measure may cause considerable uncertainty. Four hundred meters is not an easy distance to estimate for most people, especially on the water. The term *reasonable measures* is open to much personal interpretation to the point that it may become meaningless. Additionally, there are several passages and thoroughfares in Te Pēwhairangi that are narrower than 800 meters. These areas would be impassable if dolphins were present in them. Under the current definition, it is unclear whether proceeding through such areas despite the known presence of marine mammals would be considered a reasonable measure or not. The requirement to stop a sailing vessel within 400m of a marine mammal is disproportionate to the effect on that marine mammal, especially for sailing vessels racing or transiting through the Bay. One of the key impacts of vessel transit recently identified by researcher Dr Simon Childerhouse (DOC/Cawthron Institute) is that of intense underwater acoustics disrupting or deafening cetaceans.

**Requested action:** The Marine Mammal Protection Regulations currently stipulate that non-permitted commercial vessels must not deviate from their course to interact with marine mammals and they are not allowed to target or knowingly interact with them. Further they are required to either stop or slow to a no-wake speed within 300 meters of any marine mammal. These regulations have been widely promoted by DOC in the Northland and Auckland regions (and presumably elsewhere) and there is an awareness of their existence. They can be promoted further by simply calling for vessels to give marine mammals extra space. We recommend that these rules be applied to all vessels, commercial or private. In addition, we suggest that that vessels under power, whether motoring or motorsailing be required to switch off their noisy and wake-enhancing motors within 300m of any dolphin pod in the Bay of Islands.

3. **Prohibition on swimming (i.e., being in the water) within a 400m distance of marine mammals within the boundaries of the marine mammal sanctuary.** As above, many people will have difficulty to accurately judge a distance of 400m on

the water. The proposal identifies swimming with marine mammals as “one of the activities causing the most negative effects on bottlenose dolphins in Te Pēwhairangi (Bay of Islands)” and further states that “not allowing any swimming with dolphins would [...] also address aggressive boat navigation when trying to get close to the dolphins.” However, the proposal omits to consider the effects of shore-based swimmers or those from moored vessels, which are likely to have a significantly lower impact. Given the proposed zero tolerance rule in regard to swimming with marine mammals, this regulation appears unreasonable under its current definition.

**Requested action:** Shore-based swimmers and those from moored vessels should be exempt from the prohibition of swimming within 400m of a marine mammal, because of the impracticability of long-distance snorkelers and swimmers exiting the water when approached by dolphins and seals.

4. **Any vessel with an existing marine mammal viewing permit under the Marine Mammals Protection Act 1978 would be exempt from proposed restriction 2 (to Maintain a 400m distance from any marine mammal).** Vessels with existing marine mammal viewing permits have been largely attributed to the initial decline of bottlenose dolphins in Te Pēwhairangi (Constantine 1999). They are currently among the largest vessels, with the largest engines to frequent the area on a daily basis. Given the proposal’s unequivocal emphasis on the detrimental effects of vessel disturbance on the dolphins frequenting the area, it seems contradictory to provide exemptions for these operations. It also contravenes the proposal’s aim to provide “clear and unambiguous rules.” Lastly, it may significantly lessen public support for the sanctuary as the need for greater distance regulations will be harder to justify if there are exemptions for these large vessels.

**Requested action:** Vessels with existing marine mammal permits under the Marine Mammals Protection Act 1978 should NOT be exempt from proposed restriction 2.

5. **Lack of independent review and collaboration of the research and the resulting processes.** The proposed marine mammal sanctuary constitutes a significant change for users of the area. As such it is of paramount importance that the proposed measures are based on conclusive results, both to justify the resulting restrictions but more importantly to ensure the long-term well-being of marine mammals within Te Pēwhairangi. The proposed sanctuary is largely based on research synthesised in two reports (Peters and Stockin 2016 and TriOceans 2020). Given the close association between DOC and TriOceans, it is of concern that the initial research (Peters and Stockin 2016), the follow-up research (TriOceans 2020), the design of the proposed sanctuary and its regulation, the review of the submissions and the future research to assess the effectiveness of the proposed measures have or will be conducted by one or both of these closely linked entities. Additionally, the TriOceans 2020 report does not appear to have undergone any peer review and there does not appear to have been any scientific collaboration or review of the sanctuary proposal

by other institutions with long histories of bottlenose dolphin research in Te Pēwhairangi and other parts of Aotearoa such as the University of Auckland or the University of Otago. The TriOceans 2020 report's findings appear to be based on 36 encounters of bottlenose dolphins between June 2019 and March 2020; a small sample size for a species that can be encountered daily within Te Pēwhairangi. Consequently, there is a potential for bias which is of concern, especially when dealing with a subject matter of this magnitude. There is a need for greater transparency of the relationship between DOC and TriOceans, and the work that TriOceans is conducting on behalf of DOC.

**Requested action:** The proposal document (or the reports that it is based on) should undergo independent peer review. Future research on bottlenose dolphins should be conducted by or in collaboration with institutions with long-standing datasets and research histories on bottlenose dolphins in the region.

6. **The consequences of non-compliance are omitted.** The proposal is unclear about the way non-compliance is defined and managed. It states a zero-tolerance approach to swimming with marine mammals but does not provide any description or details of what such an approach entails. The magnitude of potential fines will have significant effects on public opinion on the proposal and should be disclosed.

**Requested action:** The proposal should state clearly how non-compliance is defined and managed.

7. **Lack of a holistic approach to marine mammal protection.** The measures in the current proposal are restricted to more stringent regulations of vessel interactions with marine mammals in Te Pēwhairangi. While boat disturbance is a known stressor to marine mammals, additional factors may affect habitat suitability, including prey quality and quantity, and sedimentation. It is unsatisfactory that no research to date has assessed the variety and abundance of preferred bottlenose dolphin prey within Te Pēwhairangi. A change in habitat use by bottlenose dolphins has been reported, with dolphins spending more time in the less protected waters of the middle ground of Te Pēwhairangi. Given the considerable amount of boat traffic in the area, it appears difficult to attribute this shift to anthropogenic disturbance alone and suggests that prey abundance may also be a factor. Consequently, any measures to improve bottlenose dolphin habitat within the area should incorporate all factors that could contribute to the observed decline. It is disappointing, that DOC have categorically ruled out support for any restrictions to current fishing regulations (as declared by Hon. Kiri Allan at the meeting held at the Paihia Pacific Resort Hotel on February 25, 2021) in connection with the sanctuary proposal. This is despite Counsel for the Minister of Conservation lodging on 14 May 2021 the Environment Court Appeal evidence of its DOC expert marine protected area witness, which includes the statement that the fishing restrictions sought by BOIMP in the BOI may have benefits for bottlenosed dolphins through improved foraging opportunities.

**Requested action:** DOC should take a precautionary and holistic approach to marine mammal protection within Te Pēwhairangi and actively support and advocate for all

restrictions and factors that may improve habitat quality. This means advocating for protective restrictions outside of those those provisions administered by DOC

**WS-BOIMMS-144365**

**From:** Cynthia Matthews [REDACTED]  
**Sent:** Tuesday, 18 May 2021 4:33 pm  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary  
**Subject:** proposed marine mammal sanctuary, Bay of Islands

My submission is as follows

I support this proposal in its entirety.

I have watched the dolphin population diminishing as the number of boats in the Bay of Islands appeared to increase, at least prior to Covid. I saw dolphins too often with boats close to them and witnessed a dolphin mother carrying the carcass of her dead calf.

Cynthia Matthews  
[REDACTED]

--

Cynthia Matthews



**WS-BOIMMS-144368**

**From:** Peter Busfield [REDACTED]  
**Sent:** Tuesday, 18 May 2021 4:21 pm  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary  
**Subject:** Proposed Bay of Islands Marine Mammal Sanctuary will have negative effect on recreational boating and employment in the Far North

To Department of Conservation

The New Zealand marine industry consists of over 1,200 companies nationwide employing over 8000 skilled personnel. The industry we represent designs, builds, stores, sells and services recreational and commercial vessels up to 120 metres in length. It is a major contributor to the NZ economy with \$2.4 billion in sales, of which 25% or \$600,000,000 is in exports making this industry one of the largest manufacturing sectors in NZ outside of primary manufactured food sector. The Far North region with its bespoke boating cruising grounds of the Bay of Islands attracts recreational boats from all over NZ and is also the first major point of contact for the over 600 foreign flagged yachts visiting to NZ from another country. This provides business to the local marine and related industries and this is demonstrated by the large marine industry hub at Opuā's, Bay of Islands marina complex.

The NZ marine industry uses local and imported material, adds value to it by way of design, research and development, and then through use of a high skilled workforce builds boats and marine equipment to a world class level. In fact, there are many areas in which the NZ marine industry leads the world - be it in America's Cup race boats, Sailmaking, Spar making, boat refits, waka building, amphibious boats and electrically driven vessels, to name a few. Many of the specialist NZ boat building and related skills are utilised in the Far North, particularly in the Opuā marine hub.

A key component and enabler of the development of the NZ marine industry over the last 25 years has been the industry led apprenticeship training program. Not only has this provided the industry with an ongoing supply of skilled personnel but the NZ Marine Industry Association-led NZ Marine & Composites Industry Training Organisation ITO training program has given young people in the Far North the confidence to enter the work force and learn skills that give them the opportunity for a good vocation for life. We are pleased to see many young Maori people entering the work force through the strong boatbuilding and related trades and apprenticeship opportunities in the Opuā marine cluster and wider Far North region.

Regarding the proposed rules on recreational boating **requiring vessels to stop if they are within 400m of marine mammals:**

**This is not practical or safe for recreational boating.**

There are many sailing regattas run by several yacht clubs in the Bay of Islands and the proposed requirement for a yacht to stop sailing or reduce speed if a mammal is within 400 m is not at all practical.. If this proposal becomes a requirement then yacht racing will not take place in the Bay of Islands. Our organisation, through the Russell Boating Club, hosts the annual New Zealand Millennium Cup superyacht regatta in the Bay of Islands and if this DOC proposed rule is adopted it will be impossible to host this regatta there by depriving the local region of significant income spent by the visiting superyacht owners, family, friends and crew. Many recreational yachts, launches,

trailer power boats and canoes are used by the boating public from all around the country in the the Bay of Islands in the December to February summer period. The DOC proposed rule would we believe be a safety hazard for these many boats which are already in a relatively confined area - for example, dolphins can arrive at a moving vessel with no warning and if the vessel has to stop when the vessel is passing a lee shore it could end up drifting onto the rocks or if a vessel is approaching another vessel and cannot manoeuvre to change course as required under international navigation rules due to the arrival of dolphins then this could cause a serious accident putting lives at risk.

In summary we believe that if the proposal is implemented without considerable change it will significantly reduce the boating activity in the Bay of Islands and there by significantly reduce the marine industry business in the Far North region. This would mean a reduction in employment and apprenticeship training in the region.

We are supportive of maintaining an environment where mammals are protected and especially so in areas where the boating public are co users of the water ways and would be happy to engage with the Department of Conservation to work with you to find a solution that achieves the desired outcome without sacrificing the recreational boater and the related industry /employment they provide to the Far North region.

Kind Regards,

**Peter Busfield**

**Executive Director**  
NZ Marine Industry Association

**CEO**  
NZ Marine Export Group

85 Westhaven Drive, Auckland  
Mobile: [REDACTED] Tel: [REDACTED]  
E-mail: [REDACTED] Web: [www.nzmarine.com](http://www.nzmarine.com)



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**WS-BOIMMS-144380**

Te Pēwhairangi (Bay of Islands) marine mammal sanctuary *By carrier.*  
 proposal submission form

**Your details**

Your name: SIMON COE  
 Organisation (if): [REDACTED]  
 Street address: [REDACTED]  
 Suburb: [REDACTED]  
 City: [REDACTED]  
 Region: [REDACTED]  
 Email address: [REDACTED]  
 Phone number: [REDACTED]

Are you whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area?  
 Yes  No

If you answered yes, please provide details (eg. which hapū and/or iwi do you affiliate to):

**Which group(s) best describes your interest:**

- Northland / Te Pēwhairangi Bay of Islands community member
- Whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area
- Recreational maritime vessel operator
- Commercial maritime vessel operator
- Local business owner
- Local community group
- Member of the New Zealand general public
- Science and research
- Environmental groups
- Other (please specify):



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I would like specific information in my submission withheld.

Please state the reasons for wanting specific information in this submission withheld.

### Your submission

You can provide any feedback on the proposed marine mammal sanctuary you would like. However, answering the following questions may assist in making your submission:

1. Do you support or oppose the proposed marine mammal sanctuary?  
If so, why, or why not?
2. Do you believe the proposal should be changed or amended?  
If so, what changes would you propose, and why?
3. Do you agree with how we have characterised the problem, objectives, and impacts?  
If not, how would you change it?

I DO SUPPORT THE PROPOSED MARINE  
SANCTUARY

THE PROPOSAL SHOULD NOT BE CHANGED  
YES I AGREE WITH HOW WE HAVE  
CHARACTERISED THE PROBLEM

THE MAMMAL SANCTUARY SHOULD  
BE SET UP TO PROTECT THE  
MAMMALS FROM BOATS GETTING TOO  
CLOSE + SPEED LIMIT SHOULD  
BE SET AT 5MPH

**WS-BOIMMS-144383**





**Submission to  
Department Of Conservation  
on  
Te Pēwhairangi (Bay of Islands) Marine Mammal  
Sanctuary Proposal**

**Date: 18 May 2021**



Tourism Industry Aotearoa (TIA) welcomes the opportunity to comment on the Department of Conservation Proposed Marine Mammal Sanctuary in Bay of Islands.

EXECUTIVE SUMMARY

1. TIA is supportive of a strengthened response to managing the bottlenose dolphin population in the Bay of Islands. The demise in dolphin numbers is very concerning and it would be a tragedy if this species were to become locally extinct.
2. This is a complex situation, however. The Bay of Islands is a highly popular destination for boating and fishing activities. It is a significant challenge to find the right solution to preserving and growing the local dolphin population while also enabling commercial and recreational activity to continue and prosper in a sustainable manner.
3. TIA supports the concept of Marine Mammal Sanctuaries to protect and enhance marine life around New Zealand. While approximately 30% of New Zealand's land area is protected via Public Conservation Land systems less than 1% of our sea areas are provided with similar protection.
4. We believe the focus of the proposal should be on the species rather than the whole marine system. A strong concern from operators is that the restrictions would apply to all marine mammals in the restricted zone including dolphins, whales, and seals. This is seen as unnecessary.
5. The proposals need to pass the reasonableness test. Beachgoers, divers, paddleboarders, jetski operators, ocean swimmers and kayak operators will all need to be aware of the requirement to keep 400m from marine mammals in undertaking these activities in the water, in accordance with this requirement. This seems unworkable and runs the risk of high non-compliance.
6. Operators are also concerned that the proposals will have major impacts on key maritime events for the region. Under the proposal many, if not all, of these events would not be able to proceed.
7. A greater focus on private vessels is required and this will require a strong focus on educating the public about good practice when dolphins are sighted. Increased education is an important part of any management strategy.
8. Further research is required. There appears to be no information available on the impact of possible over-fishing on food stocks in the region and its effect on bottlenose dolphin behaviour. Research in other areas of the country has also indicated that run off due to increased farming and forestry activity can significantly affect behaviours of marine mammals.
9. Operators have suggested that it would be more beneficial to develop an integrated marine protected area strategy that covers the wider Bay of Islands region and works in partnership with tourism operators, as well as hapu, and DOC. TIA supports this approach.

## INTRODUCTION

10. Tourism Industry Aotearoa (TIA) is the peak body for the tourism industry in New Zealand. With over 1300 members, TIA represents a range of tourism-related activities including hospitality, accommodation, adventure and other activities, attractions and retail, airports and airlines, transport, as well as related tourism services.
11. The primary role of TIA is to be the voice of the tourism industry. This includes working for members on advocacy, policy, communication, events, membership and business capability. The team is based in Wellington and is led by Chief Executive Chris Roberts.
12. During the development of this submission, we have engaged with TIA members operating in the Northland region for their views and perspectives.
13. Any enquiries relating to this paper should in the first instance be referred to TIA Industry Advocate Lori Keller by emailing [Lori.Keller@tia.org.nz](mailto:Lori.Keller@tia.org.nz) or by phone on 021 086 85356.

## TIA RESPONSE TO THE PROPOSAL

14. TIA is supportive of a strengthened response to managing the bottlenose dolphin population in the Bay of Islands. The demise in dolphin numbers is very concerning and it would be a tragedy if this species were to become locally extinct. We also acknowledge the urgency with which stronger action must be taken, with researchers forecasting that the local population could be extinct as soon as 2022.
15. This is a complex situation. The Bay of Islands is a highly popular destination for recreational boating and fishing, plus there is also significant commercial boating and sailing activity, including water transport operations. It is also worth noting that pre-COVID cruise ships frequently visited the area. It is a significant challenge to find the right solution to preserving and growing the local dolphin population while also enabling commercial and recreational activity to continue and prosper in a sustainable manner.
16. The situation appears to take on more urgency through a lack of action over the previous decade, combined with quickly reducing dolphin numbers. DOC commissioned Massey University to undertake a report into the responses of bottlenose dolphins to vessel activity between 2012 and 2015. Seven years after that research was commissioned, restrictions were placed on the small number of permitted commercial operators in 2019 (these included banning morning encounters and swim-with activities, plus reducing encounter times to 20 minutes). In 2020 DOC commissioned TriOceans to undertake a research project on the impacts of vessel activity on bottlenose dolphins in the Bay of Islands.
17. TIA supports the concept of Marine Mammal Sanctuaries (MMS) to protect and enhance marine life around New Zealand. While approximately 30% of New Zealand's land area is protected via Public Conservation Land (PCL) systems, less than 1% of our sea areas are provided with similar protection. As with PCL there will be tensions

between human activity and the preservation of the natural environment including the wildlife. However, these tensions can be reduced, and workable solutions achieved with strong engagement and understanding between the different stakeholders.

18. The following are a series of amendments to the proposals for the Bay of Islands Marine Mammal Sanctuary (BOIMMS) that we believe will support both a more workable solution as well as a higher chance of success in preserving and regenerating the local bottlenose dolphin population.

*The focus should be on the species rather than the whole marine system.*

19. A strong concern from operators is that the restrictions would apply to all marine mammals in the restricted zone including dolphins, whales, and seals. This is seen as unnecessary as seal populations are growing plus it makes the proposals unworkable. For example, seals often locate themselves near shores or frequent popular diving sites such as Deep Water Cove and therefore as soon as they are within 400m of an activity this activity would have to cease.

20. We recommend that the proposals are modified to focus on the specific issue of protecting bottlenose dolphins rather than all marine mammals which are already covered by the Marine Mammal Protection Regulations 1992. The wider the reach of these restrictions the more unmanageable it could become. If people understand that the dolphins are the priority protected species it provides a higher chance of compliance and enables a strengthened response to the particular issues.

21. There are already adequate regulations in place to manage activity in a Marine Mammal Sanctuary (MMS). The Marine Mammal Protection Regulations 1992 (MMPR) regulate vessels in terms of their numbers, behaviour and distances around marine mammals. The MMPR requires commercial vessels to maintain a distance of 300m from marine mammals. The introduction of a '400m no approach rule' safe navigation of vessels seems unmanageable. This includes a spectrum of vessels from small kayaks navigating the coastline that encounter seals, to large vessels (cruise ships) having to stop when dolphins might cross their bow wave unexpectedly.

*The proposals need to pass the reasonableness test*

22. Everyone who swims, dives or enters the water would be prohibited from being in the water with any marine mammal within the boundaries of the marine mammal sanctuary. Beachgoers, divers, paddleboarders, jetski operators, ocean swimmers and kayak operators will all need to be aware of the requirement to keep 400m from marine mammals in undertaking these activities in the water, in accordance with this requirement.

23. It's unclear what this might mean for swimmers and people on a beach. Should a dolphin or seal be sighted within 400m of the beach people would have to leave the water and possibly the vicinity of the beach. This seems to border on farcical and runs the risk of high non-compliance that could negatively impact on other more reasonable control measures. If one rule doesn't make sense then other rules would also be questioned.

24. Likewise the requirement for speed for all vessels is to be restricted to five knots at all times in the two 'marine mammal safe zones' seems overly restrictive. Vessels under sail will have considerable challenges maintaining or reducing to only five knots and the areas impose a major restriction on where sailing will be possible. It is a major undertaking to stop a vessel under sail, dropping sails. It may not be practical or safe to do. Holding course may be a safer and less impactful option for the dolphins and vessel operator.

25. Operators have also expressed concern that the proposed MMS will have major impact on key maritime events for the region, such as the Bay of Islands Sailing Week, Coastal Classic, Tall Ships Race, and Brecca swim. Under the proposals many, if not all, of these events would not be able to proceed.

*A stronger focus on educating the public is required*

26. TIA would support DOC in a strong educational approach to changing public behaviour. In 2019, DOC implemented new restrictions in the Bay of Islands to help mitigate the effects of vessel and human interaction on dolphins. These restrictions, largely focussed on commercial tourism operators who were quick to comply with these changes.

27. A greater focus on private vessels is now required and this will require a strong effort to educate the public about good practice when dolphins are sighted. Increased education is an important part of any management strategy. TIA is a strong advocate for education campaigns as the first response to managing significant issues. We've seen this approach work well as part of the response package to industry issues such as freedom camping and visiting drivers. While a regulatory/punitive approach is necessary, education should be used strongly first and then fines for those who choose not to comply. We would like DOC to implement a detailed education, and subsequent punitive action approach over the next two summers. Outcomes of this effort would be measured and results made publicly available. Implementation would involve education officers at key entry points to the Bay of Islands waters (e.g. boat ramps), and on-water patrol vessels providing education and, as necessary, fines.

*Further research is required*

28. TIA recognises the efforts undertaken by DOC to investigate the decreasing bottlenose dolphin population in the Bay of Islands including research projects. However we believe a wider context is required to understand and mitigate the decline of bottlenose dolphins. There appears to be no information available on the impact of possible over-fishing on food stocks in the region and its effect on bottlenose dolphin behaviour. Several sources have expressed their concern that the lack of food is leading to changed behaviour in the dolphins, making them more stressed as food sources reduce and they must hunt further afield.

29. Research in other areas of the country (notably Raglan Harbour) has also indicated that run off (due to increased farming and forestry activity) can significantly affect behaviours of marine mammals. TIA would like to see any proposal for a Marine Mammal Sanctuary be the result of a multi-lateral approach to research, along with a wide consultation process.

30. We are concerned that the BOIMMS restrictions as proposed will have little or no impact on the dolphin population. Operators have suggested that it would be more beneficial to develop an integrated marine protected area strategy that covers the wider Bay of Islands region and works in partnership with tourism operators as well as hapu and DOC. We understand that such a strategy has been discussed among regional and local stakeholders and is strongly supported. TIA also supports this approach.

FOLLOW UP PROCESS

31. TIA wishes to participate further in any follow-up process, including any formal meetings, to ensure that the potential impacts on tourism are adequately represented.



**WS-BOIMMS-144386**



18 May 2021

Emailed to: [boimms@doc.govt.nz](mailto:boimms@doc.govt.nz)

**Submission:** A proposal to establish a marine mammal sanctuary in Te Pewhairangi (Bay of Islands)

This submission is made on behalf of the membership of the New Zealand Marine Sciences Society (NZMSS). It is made in good faith in my role as President of the NZMSS and in accordance with the Code of Ethics and Rules of the Royal Society of New Zealand.

In general, NZMSS supports the proposal to establish a marine mammal sanctuary in Te Pewhairangi (Bay of Islands).

Our detailed submission is attached.

Please contact me at the email address provided below for any further information regarding this submission.



Kathy Walls

President  
New Zealand Marine Sciences Society

Address for service:  
Email: [president@nzmsp.org](mailto:president@nzmsp.org)



**Submission:** A proposal to establish a marine mammal sanctuary in Te Pewhairangi (Bay of Islands)

The New Zealand Marine Sciences Society

The New Zealand Marine Sciences Society, known as “NZMSS”, was formed in 1960 as a constituent of the Royal Society of New Zealand, to encourage and assist marine science and related research across a wide range of disciplines in New Zealand and to foster communication among those with an interest in marine science.

NZMSS is a professional science body and a non-profit organization. We identify emerging issues through annual conferences, annual reviews, a listserv and our website <https://nzmsp.org/>. NZMSS membership covers all aspects of scientific interest in the marine environment and extends to the uptake of science in marine policy, resource management, conservation and the marine business sector. We speak for members of the Society on matters of interest on marine research in New Zealand and we engage with other scientific societies as appropriate. Our current membership comprises over 200 members.

Our submission is consistent with the Royal Society of New Zealand Code of Ethics and Rules, in particular principles 2.1 Integrity and professionalism, 4.1 Compliance with the law and relevant standards, and 10.1 Protection of the environment ([www.royalsociety.org.nz/organisation/about/code](http://www.royalsociety.org.nz/organisation/about/code)).

NZMSS supports the Department of Conservation on its proposal to establish a marine mammal sanctuary in Te Pewhairangi (Bay of Islands).

**1. General comments**

In general, NZMSS supports the proposal to establish a marine mammal sanctuary in Te Pewhairangi (Bay of Islands). We recommend some extensions to the proposed marine mammal sanctuary, as outlined below.

**2. Specific comments**

We recommend extending the proposed regulations throughout the Bay of Islands (and beyond for marine mammal species that spend a high proportion of their time outside the bay), and to commercial tour operators as well as recreational vessels. The proposed regulations may need to be modified to make this practical. For example, slowing down to 5 knots and moving away from marine mammals, may be more practical than stopping the vessel and waiting for the marine mammals to move away. In another example, it will be impractical to wait for seals hauled out ashore to move away. It may be more practical to implement the proposed regulations for cetaceans, in the first instance, and then implement modified regulations for pinnipeds.

Long-term sightings data for bottlenose dolphins (Hartel et al. 2014) indicate that marine mammal impacts should be managed in the whole Bay of Islands, as dolphins use most of the bay and habitat use is variable over time. We recommend a precautionary decision at this stage, with review after 3 years.

NZMSS further recommends extending the marine mammal sanctuary regulations to other key impacts on marine mammals. The proposal and supporting information mention cumulative impacts but apply this only to the cumulative impact of multiple approaches by boats and swimmers. Another key impact is fishing. New Zealand bottlenose dolphins have

been caught in gillnet and trawl fisheries. The official data (Dragonfly 2021) list three deaths of marine mammals in trawl nets in the Northland and Hauraki Gulf area, all bottlenose dolphins. New Zealand's reports to the International Whaling Commission during 2016-2020 include fisheries bycatch of eight bottlenose dolphins, ten common dolphins, two orca, one pilot whale and one unidentified dolphin in the area east of Northland, south to Cape Colville (IWC 2021). Trawling is unlikely to be a problem inside the Bay of Islands, but marine mammal populations using the bay are at risk of trawl bycatch outside the confines of the Bay of Islands. Marine mammals are at risk of gillnet bycatch inside and outside the Bay of Islands. The existing ban on gillnets in a small part of the Bay of Islands should be extended to cover all Bay of Island waters.

### 3. Summary and recommendations

Most marine mammal species using the Bay of Islands range well beyond the confines of the sanctuary area as proposed.

Key impacts on marine mammals include interactions between boats, swimmers and fishing.

Accordingly, NZMSS recommends that the proposed Te Pewhairangi marine mammal sanctuary be extended to include marine mammal habitat outside the Bay of Islands and to include consideration of other key impacts such as fishing.

### References

- Dragonfly 2021. Bycatch data from Ministry for Primary Industries, available from Dragonfly Consulting website: <https://psc.dragonfly.co.nz/>
- Hartel EF, Constantine R, Torres LG. 2014. Changes in habitat use patterns by bottlenose dolphins over a 10-year period render static management boundaries ineffective. Aquatic Conservation: Marine and Freshwater Ecosystems, DOI: 10.1002/aqc.2465
- IWC 2021. International Whaling Commission, website of National Progress Reports: <https://portal.iwc.int/progressreportspublic/report>

**WS-BOIMMS-144389**

Dr Krista Hupman (PhD)

18/05/2021

Kaikoura Marine Mammal Foundation

[REDACTED]

Email: [REDACTED]

Phone: [REDACTED]

To whom it may concern,

I have been a Marine Mammal Biologist within New Zealand since 2010. I have a number of concerns regarding the proposed Bay of Islands Marine Mammal Sanctuary, which are highlighted below.

1) I am unsure why the Bay of Islands is being considered for a marine mammal sanctuary as opposed to other areas within New Zealand. For example, the Hauraki Gulf in Auckland and Kaikoura both have high boat-usage, a number of resident marine mammal species and species which are considered of high conservation value (i.e. Threatened species). In addition, threatened species in both these regions have been shown to have population declines (i.e. Bryde's whales in the Hauraki Gulf and Hector's dolphins in Kaikoura). I believe a nation-wide review of marine mammal hotspots / areas of Threatened species is required to ensure that marine mammal sanctuaries are placed in the most appropriate and effective locations, rather than only considering the Bay of Islands.

2) If the Bay of Islands is to be considered as a marine mammal sanctuary, then other areas within the marine mammals species range should also be considered for protection. For example, bottlenose dolphins within the Bay of Islands also occupy the Hauraki Gulf. Therefore, the only way to protect this species throughout its range would be to protect all areas in which it occupies.

3) In addition to developing a marine mammal sanctuary in the Bay of Islands it would be prudent to complete advocacy programs to protect marine mammals throughout New Zealand. This would include appropriate signage at public boat ramps and boat user training.

4) If the marine mammal sanctuary is developed it should also include a robust compliance framework. In many areas across New Zealand, protection measures for marine mammals outlined in the Marine Mammal Protection Act and Marine Mammal Protection Regulations are not monitored or enforced due to DOC's limited capacity for on water compliance. This needs to be addressed in a proactive way to ensure the sanctuaries rules are abided by and that marine mammals are protected within this region.

5) I am unsure why the marine mammal sanctuary is being proposed for all marine mammal species which occupy the Bay of Islands. For instance, New Zealand fur seals are a recovering species, in which their populations are increasing, not declining. Yet the marine mammal sanctuary will apply the same rules to this species as bottlenose dolphins, which are declining. While I understand applying a blanket rule to all species is a way to simplify the process, robust scientific information to substantiate these protection measures should be provided as to ensure the transparency of any regulations which are being applied.

In conclusion, while I support the further protection of marine mammals across New Zealand, I do have concerns as to the process being applied to select the Bay of Islands as a marine mammal sanctuary, and the additional measures we should be taking to ensure that any such sanctuaries are

successful. I appreciate your consideration of these concerns and am available for any further consultation required.

Respectfully,



Dr Krista Hupman

**WS-BOIMMS-144395**

**From:** Catherine Peters  
**Sent:** Tuesday, 18 May 2021 3:58 pm  
**To:** Philip Duffey; Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary  
**Subject:** Fwd: MMS submission from Ngati Kuta

Sent from Workspace ONE Boxer

----- Forwarded message -----

**From:** Huri Rewha [REDACTED]  
**Date:** 18/05/2021 3:55 pm  
**Subject:** MMS submission from Ngati Kuta  
**To:** Catherine Peters <cpeters@doc.govt.nz>, Bronwyn BauerHunt <bbauerhunt@doc.govt.nz>  
**Cc:** fluer.corbett@doc.govt.nz, Bronna Brown [REDACTED], Glenys Papuni [REDACTED], Anya Hook [REDACTED], Puti Corbett [REDACTED], Moka & Hinerangi Puru [REDACTED], Junior Witehira [REDACTED]  
Ngati Kuta have asked me to submit to the the Marine Mammal Sanctuary proposal from a customary perspective.

1. Marine mammals are a toanga species as coastal fisher people. They remind us of our family unit as protectors. They have been known to guide our people home when at sea. They are revered and precious to us.
2. We are fisher people with a history of fishing families. It was our way of life. We lived in isolation up until 1976 when the road was cut in. This changed the way our close knit Te Rawhiti community lived. Our traditional way of life changed. We still maintain those same tikanga principals and values our old people lived by today. We their children are their legacy.
3. Those same principals and values we apply in today's world. Our hunter gather notion was well understood by them. We consume only what we need for survival allowing nature to fulfil its purpose of replenishment and the cycle of life.
4. We as Maori have always understood natural law as a reason, culturally sensitive and observant to the rights of nature. That is respect for the sea, coastal environs, fauna and flora, our customs and traditions and customary lore. respect for the natural law theory and the rule of law transpiring from it. Also Te Tiriti O Waitangi and its covenants.
5. We are currently making submissions to the Northland Regional Coastal Plan for protection measures of our fauna and flora below the waves. Our submissions focuses on care and protection from damaging fishing methods. Currently a number of agencies manages different parts of the BOI each with their own by-laws. Ngati Kuta also has a gazetted customary right which it shares with other Hapu. It is these rights under customary lore that we must protect as whanau/hapu
6. Our sea grass beds around the inner BOI are important to Maori and our dolphins. These are breeding grounds for mackerel and piper, where eggs are laid, crustations, shellfish live and are a food source for small fish. It is these sea grass beds that are a main food source for other species including dolphins. We see no conflict with our submission to stop bottom dredging within the inner BOI, it is in fact a benefit to maintain a healthy eco system for the dolphins and

Orca who come right in to feed on stingrays nesting in the sea grass beds, schools of mackerel and piper.

7. We agree with the rules outlined in the MMS sanctuary proposal. With the exception that shore based swimmers are exempt from the 400 metre rule. However in the event that mammals are inside the 400 meter rule they are to get out of the water.
8. We also agree to have our Kaitiaki trained as Mammal Rangers and Environment Managers as observers to supervise the BOI area. As a customised role with observations, supervision, research, safety on both land (including the islands) and fauna/flora care and protection at it's core.
9. The Te Rawhiti Community is currently fundraising for a new fire station. It is their wish to combine the fire service with a coast guard service and civil defence all housed in one facility. The same assets and Kaitiaki could be deployed to work across a number of disciplines to care and protect what we have in our BOI rohe that is precious to all of us. This would require capital for equipment, structure, funding, training and specialists deployment from time to time.
10. Currently agencies each look after their own. We say it could be afforded out of savings arising from adhoc deployments when we have Kaitiaki Rangers based in Te Rawhiti trained and resourced to carry out a lot of this work on behalf of those agencies, on land, on water and in Ariel. This would help DOC, Min Fish, NRC, FENZ, Search & Rescue, MMS supervision, Customary Fishing, First Aid.and Civil Defence matters.

Thank you for our submission and can I get acknowledgement that our submission has been received and we can talk to it if required.

Robert Willoughby  
Ngati Kuta Hapu ki Te Rawhiti



**WS-BOIMMS-144398**

# AUCKLAND CONSERVATION BOARD

*Te Rūnanga Papa Atawhai o Tāmaki Makaurau*

Board File Ref: ACB-2019

18 May 2021

Department of Conservation  
34 Landing Road  
Kerikeri 0230

Submitted via email: boimms@doc.govt.nz

## **Submission – Te Pēwhairangi (Bay of Islands) Marine Mammal Sanctuary**

The Auckland Conservation Board has statutory roles in overseeing the implementation of conservation strategies and plans for areas within the Board's jurisdiction, as well as advocating its interests in statutory and other planning processes. In this latter capacity, the Board wishes to provide the following submission on the proposal to establish a Marine Mammal Sanctuary in Te Pēwhairangi (Bay of Islands) as a means to provide greater protection to marine mammals in the area, given recent scientific evidence of the impact of human activities on the wellbeing of these marine mammals.

The Auckland Conservation Board has particular concern in this matter as some marine mammal individuals and social groups observed in the Bay of Islands are also commonly observed to visit the wider Hauraki Gulf. This suggests that the Bay of Islands form part of a wider natural home range that these marine mammals utilise at different times.

There is a large body of evidence globally that on-water human interactions with cetaceans, especially targeted tourism activities, consistently have a negative impact on whales and dolphins. The concerns raised in the Bay of Islands, with the documentation of significant problems in dolphin populations associated with more intense human interactions, is entirely consistent with that well-described phenomenon.

These pressures are in combination with other stressors. For example, it is likely that whales and dolphins in the region are already under stress because of changes in their food resources, i.e., a decline in smaller pelagic fishes. This is consistent with the massive increase in the commercial harvest of smaller pelagic fishes in north eastern New Zealand over the last 30 years, and mass mortality events of pilchards in the 1990s.

### **SERVICED BY**

DEPARTMENT OF CONSERVATION  
TĀMAKI MAKAURAU AUCKLAND  
Private Bag 68908, Newton, Auckland 1141, New Zealand  
Telephone (09) 307 9279 | Email [aucklandconservationboard@doc.govt.nz](mailto:aucklandconservationboard@doc.govt.nz)

DOC-6663837

The Auckland Conservation Board supports the establishment of a marine mammal sanctuary in the Bay of Islands in an effort to reduce the negative effects of the stresses associated with human interactions with the marine mammals in the area.

Yours faithfully



**Chair – Auckland Conservation Board**

**WS-BOIMMS-144401**



18 May 2021

Department of Conservation  
34 Landing Road  
Kerikeri 0230

Level 6  
Eagle Technology House  
135 Victoria Street  
Te Aro  
Wellington 6011

**FISHERIES INSHORE NEW ZEALAND SUBMISSION ON:  
"PROPOSED TE PĒWHAIRANGI (BAY OF ISLANDS) MARINE MAMMAL SANCTUARY"**

1. Thank you for the opportunity to consult on the proposed marine mammal sanctuary in Te Pēwhairangi (Bay of Islands).

**Fisheries Inshore New Zealand**

2. Fisheries Inshore New Zealand Ltd (FINZ) is the Sector Representative Entity for inshore finfish, pelagic and tuna fisheries in New Zealand.
3. Our role is to represent the policy and operational interests of the industry, working with Crown agencies such as Fisheries New Zealand, the Department for Conservation (DOC), and the Ministry for the Environment, liaising with environmental and other organisations and participating in collaborations to inform and assist in the management of fisheries resources and the wider aquatic environment.
4. We are committed to sustainable utilisation of our fisheries and any wider fishing activity while supporting the conservation and sustainability of wider marine biodiversity. Key outputs of FINZ are the development of, and agreement to appropriate policy frameworks, processes, and tools to assist the sector to minimise our impacts on the associated ecosystems and work positively with other fishers and users of the marine space where we carry out our harvesting practices.

**Background**

5. The Acting Minister of Conservation is proposing to declare a marine mammal sanctuary (MMS) in Te Pēwhairangi (Bay of Islands). This new MMS is proposed under section 22 of the Marine Mammals Protection Act 1978.
6. Several area-based restrictions are already in place for the commercial fishing sector operating within Te Pēwhairangi. The restrictions:
  - Prohibit commercial fishing in Te Puna Mātaitai (2013)
  - Prohibit all commercial fishing for scallops (2004)
  - Prohibit all commercial bottom trawling, bottom pair trawling and Danish seining (2004)
  - Prohibit purse seine fishing within Te Puna Mātaitai, Te Rawhiti Inlet, and from Wairoa Bay and Wahihi Bay up the Waikare Inlet (2004) and in the Te Puna Mātaitai (2013)
  - Prohibit all commercial fishing (except rock lobster under permit) within Te Rawhiti Inlet from 1 Oct to 30 Apr (2004)
  - Prohibit commercial set netting year-round within Te Puna Mātaitai, around Cape Wiwiki, Cape Brett, and Okahu Island, and within Te Rawhiti Inlet between 1 Oct to 30 Apr (2004). Set nets <1000m can be used between 1 May to 30 Sep within Te Rawhiti Inlet, and year-round between Wairoa Bay and Wahihi Bay up the Waikare Inlet
  - Prohibit all commercial use of box nets, teichi nets, Dutch seine and lampara nets within Te Rawhiti Inlet, and from Wairoa Bay and Wahihi Bay up the Waikare Inlet (2004)

**Our Submission**

7. Overall, commercial finfish fishing intensity in the area is limited. Information collected by FINZ for the Northland Regional Council Coastal Plan proceedings indicates that fishing in Te Pēwhairangi averages less than 125 events per annum. We consider the proposed restrictions will have minimal impact on commercial fishing activities in the MMS.

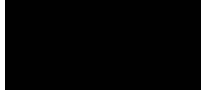
8. We have accordingly focused our submission on the need for a more holistic approach to managing the bottlenose dolphins in Te Pēwhairangi, whilst including the potential effects on our inshore finfish fisheries.
9. Whilst we acknowledge the concern of the declining numbers of bottlenose dolphins frequently using the Bay of Islands, we consider the terminology of a “subpopulation” as used by DOC throughout the consultation document to be misleading.
10. Previous research shows the Te Pēwhairangi dolphins are interconnected with the wider north-eastern population<sup>ii</sup>, and that some of those dolphins visit the area frequently and/or infrequently<sup>iii</sup>. We see no justification for the labelling of the dolphins present in Te Pēwhairangi as a subpopulation when they do not appear to be a resident population. We do not accept the methodology used to calculate the abundance is appropriate for a visitor-based dolphin presence.
11. We acknowledge the increased vessel presence in the area appears to be influencing a change in the frequency of dolphins visiting Te Pēwhairangi. We question whether, given the dolphins present may not be a ‘subpopulation’, the reduced numbers could truly be a threat for localised extinction or merely a response to excessive anthropogenic pressure. Any potential effects of this localised decline on the wider north-eastern coastal ecotype bottlenose are completely omitted from the consultation document. We suggest that before there is any representation of the Te Pēwhairangi dolphins as a subpopulation, an independent scientific review of the population status be undertaken.
12. While vessel traffic is evidently altering dolphin behaviour within Te Pēwhairangi, coastal populations of bottlenose dolphins are also exposed to a range of anthropogenic threats<sup>iv</sup>. Water quality has previously been identified as a limiting factor for bottlenose dolphin populations<sup>v</sup>, thus it may be beneficial to investigate environmental drivers of habitat use by these dolphins too. This may help identify cumulative anthropogenic impacts the dolphins may be facing.
13. We acknowledge the need to improve protection measures and better manage anthropogenic pressures on the bottlenose dolphins frequently visiting Te Pēwhairangi and have highlighted further areas of concern in the proposal below.
14. Key issues in the proposed MMS identified by FINZ:
  - **The regulations must be workable.**  
The current proposed statutory regulation of maintaining a 400m distance from any marine mammal present within the boundaries of the sanctuary may be operationally unachievable, given the range of weather (i.e., poor visibility and nocturnal operations) and diversity of vessels operating (most vessels, particularly smaller vessels may struggle to identify all marine mammals from a 400m distance) in Te Pēwhairangi.
  - **The regulations must be enforceable.**  
Enforcement of the statutory regulation regarding 400m viewing distance will be extremely difficult and there is no clear indication within the proposal of how this will be achieved.
  - **Penalties for non-compliance must be clearly stated.**  
Consequences of non-compliance to the regulations are absent from the proposal. Our members would appreciate clarification of the magnitude of potential penalties.
  - **Clarity is required on the operational impacts of the proposal.**  
The Marine Mammal Protection Regulations (1992) currently allow non-permitted vessels (including commercial fishing vessels) to slow to a non-wake speed within 300m of any marine mammal, which permits the approximate operating speed of inshore finfish fishing vessels. The proposal offers no clear indication of the operational impacts and, specifically whether commercial fishing vessels may:
    - operate fishing gear within the 5-knot dolphin safe zones.
    - continue setting and hauling fishing gear if any marine mammal approaches within 400m.
  - We are surprised to see that even given poor compliance by permitted vessels<sup>vi</sup>, and direct correlations between number of viewing trips and decline in dolphin abundance in the past<sup>viii</sup>, vessels with an existing marine mammal viewing permit under the Marine Mammals Protection Act (1978) are to be exempt from the proposed restriction 2.

- We would have expected to see some reduction in the aggregate number of viewing trips by permitted vessels given these vessels intentionally seek a close proximity to the dolphins and place daily pressure on the dolphins. We would consider that the number of permits issued should be frozen, or if possible reduced, and limits be placed on the number of viewings a permitted vessel can annually undertake.
- The proposal does not address the need for increased educational effort for recreational fishers and other stakeholders to minimise their impacts on the dolphins.

Development of appropriate management and monitoring frameworks for a MMS in Te Pēwhairangi

15. We see the development of management and monitoring strategies to minimise all anthropogenic impacts on the frequent user group of dolphins in Te Pēwhairangi as being critical to the management of the wider bottlenose population.
16. We consider that:
  - The focus of the process should be the effective management of the bottlenose dolphin frequenting Te Pēwhairangi, with clearly defined strategies to achieve larger conservation goals. An independent peer-review process of the current scientific documents would assist this process.
  - Collaborative processes should be initiated (in appropriate circumstances with appropriately mandated representation) to ensure all sectors are suitably engaged, concentrating on the management of this taonga species.
  - Management strategies should be adaptable, comprehensive, easy to understand, and practical for all marine users in this space. These strategies and subsequent regulations need to be clearly communicated to all stakeholders involved.
  - Enforcement strategies, and an associated penalty regime need to be developed and implemented.
17. We support the proposal in principle and view it as being an early indication of DOCs thoughts for collaboration with wider stakeholders, including the inshore finfish fishing sector more so than a definitive and ready-to-use proposal.
18. We are available and committed to working constructively with Department of Conservation and other stakeholders to develop a holistic, collaborative, comprehensive and committed appropriate management response. We would request that DOC set up a multi-stakeholder workshop to initiate development of a more appropriate management plan.

Rosa Edwards,  
Fisheries Manager,  
Fisheries Inshore New Zealand



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<sup>i</sup> <https://www.doc.govt.nz/globalassets/documents/conservation/marine-and-coastal/fishing/area-based-restrictions-hi-res.pdf>

<sup>ii</sup> Tezanos-Pinto G, Baker CS, Russell K et al. (2009) A world-wide perspective on the population structure and genetic diversity of bottlenose dolphins (*Tursiops truncatus*) in New Zealand. *Journal of Heredity*, 100, 11–24

<sup>iii</sup> Constantine, R., Brunton, D., & Dennis, T. (2004). Dolphin-watching tour boats change bottlenose dolphin (*Tursiops truncatus*) behaviour. *Biological Conservation*, 117, 299–307.

<sup>iv</sup> Hartel, E. F., Constantine, R., & Torres, L. G. (2014). Changes in habitat use patterns by bottlenose dolphins over a 10-year period render static management boundaries ineffective. *Aquatic Conservation: Marine and Freshwater Ecosystems*, 25(5), 701–711. <https://doi.org/10.1002/aqc.2465>

<sup>v</sup> Bossley, M. I., Steiner, A., Rankin, R. W., and Bejder, L. (2017). A long-term study of bottlenose dolphins (*Tursiops aduncus*) in an Australian industrial estuary: Increased sightings associated with environmental improvements. *Marine Mammal Science* 33:277-290.

<sup>vi</sup> Pirota, E., Laesser, B.E., Hardaker, A., Riddoch, N., Marcoux, M., Lusseau, D., 2013. Dredging displaces bottlenose dolphins from an urbanised foraging patch. *Mar. Pollut. Bull.* 74, 396e402. <https://doi.org/10.1016/j.marpolbul.2013.06.020>

<sup>vii</sup> <https://www.doc.govt.nz/globalassets/documents/conservation/marine-and-coastal/bottlenose-responses-dolphin-vessel-activity-northland.pdf>

<sup>viii</sup> Constantine, R., Brunton, D. H., & Dennis, T. (2004). Dolphin-watching tour boats change bottlenose dolphin (*Tursiops truncatus*) behaviour. *Biological Conservation*, 117(3), 299–307. <https://doi.org/10.1016/j.biocon.2003.12.009>



**WS-BOIMMS-144404**

Te Pēwhairangi (Bay of Islands) marine mammal sanctuary  
proposal submission form

By HAND



## Your details

Your name: rio greening  
 Organisation (if applicable): NHK - Waitangi  
 Street address: [REDACTED]  
 Suburb: [REDACTED]  
 City: [REDACTED]  
 Region: [REDACTED]  
 Email address: [REDACTED]  
 Phone number: [REDACTED]

Are you whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area?

Yes  No

If you answered yes, please provide details (eg, which hapū and/or iwi do you affiliate to):

Te ~~Waitangi~~ hapū NHK - Waitangi

Which group(s) best describes your interest:

- Northland / Te Pēwhairangi Bay of Islands community member  
 Whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area  
 Recreational maritime vessel operator  
 Commercial maritime vessel operator  
 Local business owner  
 Local community group  
 Member of the New Zealand general public  
 Science and research  
 Environmental groups  
 Other (please specify): tangata whenua, ngapuhi

## Official Information Act 1982

Please note that any submission you make will become public information and that anyone can ask for copies of all submissions under the Official Information Act 1982.

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I would like specific information in my submission withheld.

Please state the reasons for wanting specific information in this submission withheld.

### Your submission

You can provide any feedback on the proposed marine mammal sanctuary you would like. However, answering the following questions may assist in making your submission:

1. Do you support or oppose the proposed marine mammal sanctuary?  
If so, why, or why not?
2. Do you believe the proposal should be changed or amended?  
If so, what changes would you propose, and why?
3. Do you agree with how we have characterised the problem, objectives, and impacts?  
If not, how would you change it?



Yes! I support proposal but would need to have a co, government for the sec 4 to give effect to Act arit. 2 treaty of waitangi to exercise Kaitiakitanga - under 1852 Constitution Act <sup>sec</sup> that the Sec 71 has not case to have effect? from 1986 Constitution as a treaty commitments? as the views of whānau, hapū, of Te Pūwhairangi working in Partnership.  
The three major vessel groups within the B.O.I. should be a fourth as maori customary were not recreational from a history point of view as said before the treaty! claims of past.  
Options allow us through this proposal would help from our view in time & if established there need to have a Kaitiaki Component as to why things have not change in this spaces for a long time with out us this will not work thank you for your proposal Ka pai  
Nga mihi  
rio

Yes! to support the objectives outlined on page 11 of the Public Consultation Document. A Marine Mammal Sanctuary specific to the Pūwhairangi is the best option to address the issues outlined in this document. Also it was supported by a collection of hapū in the area and their Kaitiakitanga, as long as the togeta whānau kaitiakitanga carries on, - Ka pai.  
Mauri Ora - Arnold Pounsell - Ngā Hapū Kaitiakitanga

**WS-BOIMMS-144410**

Te Pēwhairangi (Bay of Islands) marine mammal sanctuary  
proposal submission form



**Your details**

Your name: Paul KERNEY  
 Organisation (if applicable): \_\_\_\_\_  
 Street address: \_\_\_\_\_  
 Suburb: \_\_\_\_\_  
 City: \_\_\_\_\_  
 Region: \_\_\_\_\_  
 Email address: \_\_\_\_\_  
 Phone number: \_\_\_\_\_

Are you whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area?

Yes  No

If you answered yes, please provide details (eg, which hapū and/or iwi do you affiliate to):

**Which group(s) best describes your interest:**

- Northland / Te Pēwhairangi Bay of Islands community member  
 Whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area  
 Recreational maritime vessel operator  
 Commercial maritime vessel operator  
 Local business owner  
 Local community group  
 Member of the New Zealand general public  
 Science and research  
 Environmental groups  
 Other (please specify): \_\_\_\_\_

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I would like specific information in my submission withheld.

Please state the reasons for wanting specific information in this submission withheld.



**WS-BOIMMS-144413**

**From:** Patrick Murphy [REDACTED]  
**Sent:** Tuesday, 18 May 2021 10:48 am  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary

I am a professional ferry skipper in the BOI. I say No to this proposal. To me the conclusion of the "study" was already decided. The current rules are adequate but insisted on or well enough publicised. Low fish stocks inside the Bay might be a factor. And as those with many years working as dolphin tour guides have said, there is an aggressive, territorial pod protecting their patch here. I say a definite No!



**WS-BOIMMS-144416**

**Te Pēwhairangi (Bay of Islands) marine mammal sanctuary  
proposal submission form**



**Your details**

Your name: Era Bowden

Organisation (if applicable):

Street address:

Suburb:

City:

Region:

Email address:

Phone number:

Are you whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area?

Yes  No

If you answered yes, please provide details (eg. which hapū and/or iwi do you affiliate to):

**Which group(s) best describes your interest:**

- Northland / Te Pēwhairangi Bay of Islands community member
- Whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area
- Recreational maritime vessel operator
- Commercial maritime vessel operator
- Local business owner
- Local community group
- Member of the New Zealand general public
- Science and research
- Environmental groups
- Other (please specify):

**Official Information Act 1982**

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I would like specific information in my submission withheld.

Please state the reasons for wanting specific information in this submission withheld.

**Your submission**

You can provide any feedback on the proposed marine mammal sanctuary you would like. However, answering the following questions may assist in making your submission:

1. Do you support or oppose the proposed marine mammal sanctuary?  
If so, why, or why not?
2. Do you believe the proposal should be changed or amended?  
If so, what changes would you propose, and why?
3. Do you agree with how we have characterised the problem, objectives, and impacts?  
If not, how would you change it?

1) Yes I support it. It's urgently needed  
2) No I believe it is good  
3) Yes

**WS-BOIMMS-144419**

Te Pēwhairangi (Bay of Islands) marine mammal sanctuary  
proposal submission form



**Your details**

Your name: Lauren Frias

Organisation (if applicable):

Street address:

Suburb:

City:

Region:

Email address:

Phone number:

Are you whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area?

Yes

No

If you answered yes, please provide details (eg, which hapū and/or iwi do you affiliate to):

**Which group(s) best describes your interest:**

Northland / Te Pēwhairangi Bay of Islands community member

Whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area

Recreational maritime vessel operator

Commercial maritime vessel operator

Local business owner

Local community group

Member of the New Zealand general public

Science and research

Environmental groups

Other (please specify):

**Official Information Act 1982**

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I would like specific information in my submission withheld.

Please state the reasons for wanting specific information in this submission withheld.

**Your submission**

You can provide any feedback on the proposed marine mammal sanctuary you would like. However, answering the following questions may assist in making your submission:


1. Do you support or oppose the proposed marine mammal sanctuary?  
If so, why, or why not?
2. Do you believe the proposal should be changed or amended?  
If so, what changes would you propose, and why?
3. Do you agree with how we have characterised the problem, objectives, and impacts?  
If not, how would you change it?

We need to pay attention to the safety of our dolphins. We support the proposed marine mammal sanctuary and do anything to save the dolphins.

**WS-BOIMMS-144422**

**Te Pēwhairangi (Bay of Islands) marine mammal sanctuary  
proposal submission form**

**Your details**

Your name: James and Janet Frater  
 Organisation (if applicable): private landowner Opunga Cove  
 Street address:   
 Suburb:   
 City:   
 Region:   
 Email address:   
 Phone number:

Are you whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area?

Yes  No

If you answered yes, please provide details (eg. which hapū and/or iwi do you affiliate to):

**Which group(s) best describes your interest:**

- Northland / Te Pēwhairangi Bay of Islands community member  
 Whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area  
 Recreational maritime vessel operator  
 Commercial maritime vessel operator  
 Local business owner  
 Local community group Eastern Bay of Islands Preservation Society  
 Member of the New Zealand general public  
 Science and research  
 Environmental groups  
 Other (please specify): \_\_\_\_\_

**Official Information Act 1982**

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The Official Information Act states that we must make information available unless there is a good reason for withholding it and provides a list of such reasons in sections 6, 9 and 18. If you think there is a good reason to withhold specific information, please state this in your submission. A good reason may include commercial confidentiality or that it is personal information. Note that any decision that is made by DOC to withhold information can be reviewed by the Ombudsman, who may require the information to be released.

I would like specific information in my submission withheld.

Please state the reasons for wanting specific information in this submission withheld.



**Our Submission: Te Pewhairangi (Bay of Islands) Marine Mammal Sanctuary:**

Our names are James (Jim) and Janet Frater. My (Jim's) wider family has owned the Opunga Cove property for over 100 years. This Cove currently lies within the proposed Marine Mammal Sanctuary. We consider that we have been exemplary owners from a conservation viewpoint and have covenanted a portion of our land under the Queen Elizabeth 2 National Trust. I (Jim) am Treasurer of the Eastern Bay of Islands Preservation Society, which is making a separate submission.

Opunga Cove and the adjacent bays, Orokawa and Te Hue (Assassination Cove) are extremely popular anchorages for the boating public and on some occasions during the summer period there could be over 100 pleasure vessels anchored there overnight. Even into late autumn there are often over 20 boats anchoring overnight or for longer periods. The bays are noted as good anchorages particularly in storm conditions on websites such as the Opua Marina (used by people hiring boats) as vessels can move from one side of the bay to the other depending on the wind direction.

In answer to the specific questions posed in the proposal document our comments are as follows:

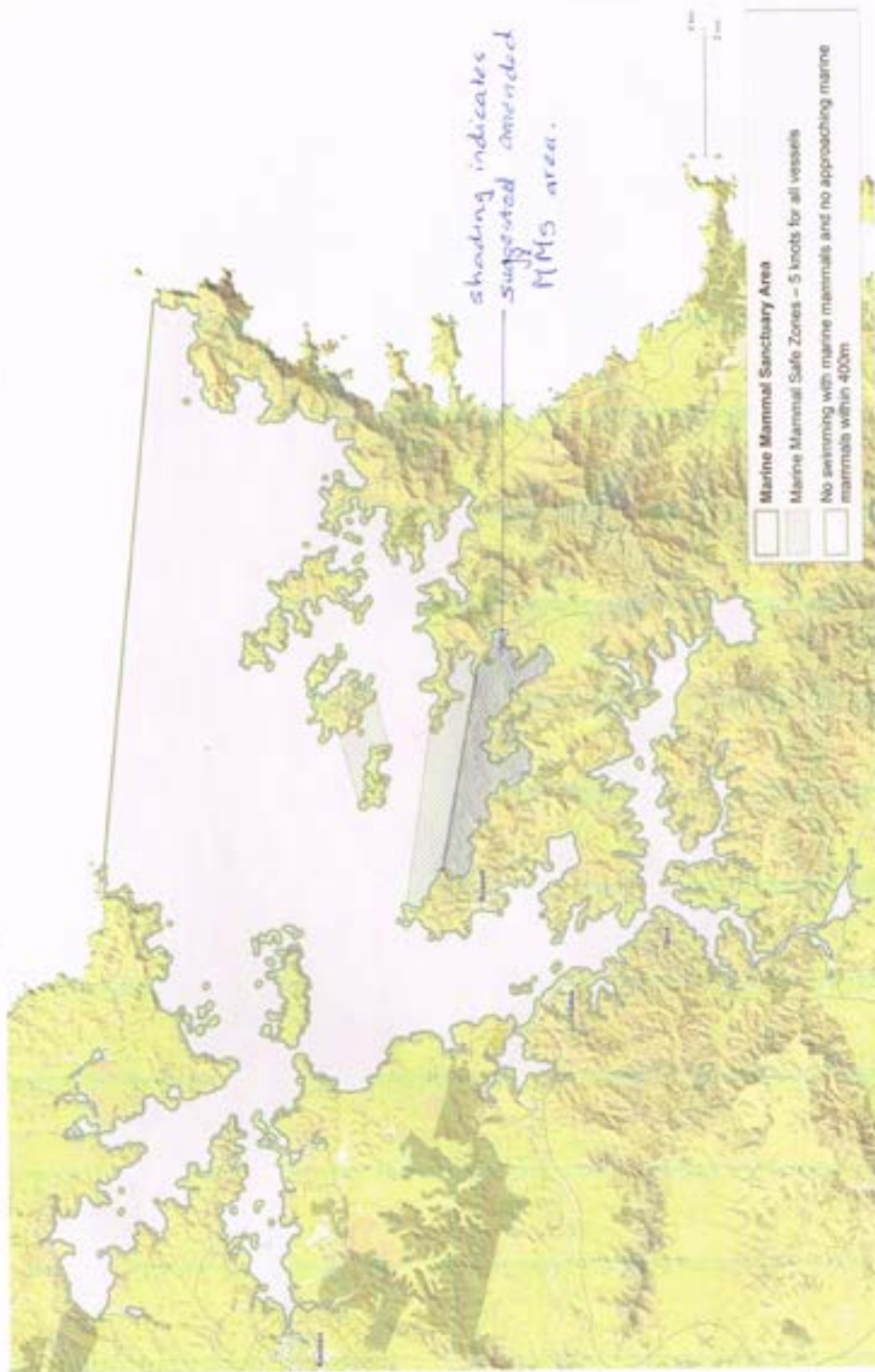
- 1) In general we support the establishment of a Marine Mammal Sanctuary. We too have noticed the decline in numbers of bottlenose dolphins and agree that something beyond the current regulations is needed.
- 2) We do have a problem with the size of the proposed sanctuary, being all the area within the line from Tapeka Point to Whangaiwahine Point. This is a very large area especially when compared with the other area proposed between Motuarohia and Moturua.
- 3) We would like to know how the very low speed limit of 5 knots would be policed and enforced on a daily basis? In the evenings and mornings there can be large numbers of vessels traversing the proposed sanctuary area to reach the islands and recreational fishing areas. With the proposed speed limit of 5 knots, it would take a vessel 3 to 4 times longer to leave and return to a safe anchorage from the MMS boundary than it does at present. Almost all boats large and small, including yachts under sail, normally travel at much greater speeds than 5 knots. Would a maximum speed up to 10 knots be preferable and increase compliance?

Our suggested solution to the MMS area issue would be to reduce it slightly so as to let pleasure boats have reasonable access to the Orokawa area with the low speed restriction applying to a shorter distance. This could be achieved by making the northern boundary of the MMS a straight line from the Point just North of Long Beach (Oneroa) to the Southern Point of Opunga (Kuha). The accompanying map shows this proposed amendment.

Our solution to the issue of numbers of boats would be to encourage boat owners and hirers to anchor overnight in other areas of the Bay of Islands. This would need to be publicized locally in the Boat Clubs, Hire Companies, local media outlets including Russell Radio and websites.

**Jim & Janet Frater: 18 May 2021**

Map 1. The proposed Te Pēwhairangi (Bay of Islands) marine mammal sanctuary



**WS-BOIMMS-144428**

## Submission to the Department of Conservation on a proposal to establish a marine mammal sanctuary in Te Pēwhairangi (Bay of Islands) May 2021

### My local experience with dolphins and seals

I have lived in the Bay of Islands for 16 years and have observed a significant decline in dolphin numbers within the Bay over that time. When we first arrived we frequently observed them within inner Bay of Islands including Te Wahapu Bay and the Waikare Inlet while kayaking. We would also see them in the Waikare Inlet from onshore and from our moored yacht. Today I virtually never see dolphins in the inner Bay of Islands, even though my kayaking activity has not significantly changed. In addition there were often large groups in the outer Bay of Islands. Today these groups are smaller and we see them far less frequently. As with kayaking it is not our level of activity in the outer Bay of Islands that has changed. Rather it is the dolphin abundance.

I have been freediving / distance snorkelling in the Bay of Islands when dolphins have approached me. They are usually within about 10m when I see them as I am typically looking into the water not to the surrounding landscapes and seascapes. On all occasions when I have been approached in the Bay they have swam with me for a few moments and then left. It would have been impractical to get out of the water at these times as the nearby shoreline was steep and rocky. While snorkelling I have on a few occasions noticed dolphins in the distance leaping out of the water. The dolphins have not swum close enough for me to see them in the water. Again it would have been impractical for me to exit the water even if they were within 400m which is very difficult to estimate at water level. I should emphasise exiting to the shore safely or the moored boat I am staying on whenever a marine mammal is within 400m would be impractical because the shore where I free-dive/ snorkel is usually steep and rocky and the moored boat can be up to 10 km away. That assumes that I even see the marine mammal.

I have seen seals in the water and on land while freediving/ distance snorkelling in the Bay of Islands. The seals either ignore me (especially when they are on land) or will “swim past” close to me several times while I am in their “patch”. This close “swim-past” behaviour is particularly common for juvenile males. Once I swim on past their “patch” the seals do not follow and so the interaction time is typically short. Seals are far more common in some other areas of New Zealand. I have found their behaviour is much the same in those other locations although I have had smaller seals trying to get onto my sea kayak. That behaviour is risky for the kayaker and I move on quickly.

### Noise and cetaceans

It is well documented that anthropogenic noise adversely affects cetaceans. Motorised vessels are a significant part of the problem<sup>1</sup>. The increasing levels of noise associated with ports, recreational boats and pile driving can cause temporary and permanent deafness in whales and dolphins<sup>2</sup>.

<sup>1</sup> Clement, D 2020. Kaipara Ltd. offshore sand extraction: marine mammal assessment of effects. Prepared for Kaipara Ltd. Cawthron Institute, Nelson. 44p.  
[https://www.aucklandcouncil.govt.nz/ResourceConsentDocuments/CST60343373\\_S92%20Response\\_Marine%20Mammals%20Ass%20of%20Effects%20\(Cawthron%20Inst\).pdf](https://www.aucklandcouncil.govt.nz/ResourceConsentDocuments/CST60343373_S92%20Response_Marine%20Mammals%20Ass%20of%20Effects%20(Cawthron%20Inst).pdf). This report observed that the effects on cetaceans of the proposed offshore dredging noise in the Pakari/ Mangawhai area would be much less than the numerous vessels travelling through the area on daily basis.

<sup>2</sup> <https://www.nzherald.co.nz/nz/cawthron-institute-concerned-over-lack-of-rules-around-underwater-noise/IJR7NGF6GPEA7PNCOLSX5LSQRQ/>

Simon Childerhouse from Cawthron Institute has been reported as saying that this noise pollution interferes with whale and cetacean communication, could cause stress, leading to declining birth rates<sup>3</sup>. Hydrophones recording during the 2020 level 4 COVID lockdown were able to establish a natural sounds baseline for pre- European settlement times in the Hauraki Gulf. In the Hauraki Gulf it was recreational vessels that made most of the noise and Dr Matt Pine of VUW&UoA has predicted that the forecast increase in recreational boats over the next twenty years may mean that the Hauraki Gulf becomes too noisy for marine mammals and even fish<sup>4</sup>.

I personally observed changes in fish behaviour resulting from the lockdown. When New Zealand moved from level 4 to level 3 New Zealanders were allowed to swim and use non-powered vessels for two weeks before powered vessels were also allowed. I snorkelled/ free-dived the outer coast around Tapeka covering at least 6km of shoreline and all the outer rocks on the first day on level 3 lockdown when I entered the water at 8am before anyone else. I continued to snorkel for at least 2 hours on many days following. That first day was amazing with fish behaving completely differently to usual resulting from a combination of no fishing activity and no boat disturbance and noise. Spear fishers and shore fisher activity saw a stepped return to wary fish behaviour and the removal of those snapper who had come inshore. With the return of the abundant motorised boats fish behaviour had returned to normal. It was likely that this time would have been very different for the dolphins. We were not able to view that change.

It would be useful to address the noise component of dolphin disturbance more directly, even if this does require a change to the Marine Mammals Protection Act 1978. One change to the sound scape could be to reduce or remove the motor/prop noise from commercial vessels that partake in dolphin watching and outer Bay of Islands sightseeing. For example, in Norway regulations require the country's UNESCO-World Heritage protected fjords to be free from cruise and ferry emissions no later than 2026<sup>5</sup>. This requirement may be extended to other areas in Norway. Such provisions both help to reduce emissions and noise.

In the short term it would seem logical to focus on reducing physical and noise disturbance. The proposed provisions seeking that vessels keep 400m away from marine mammals should focus primarily on motorised craft as this would bring the most overall benefits. I suggest that commercial and other vessels turn off their engines within 300m of marine mammals as part of the requirement to stop or slow to a no-wake speed. It would not be sensible to require sailing vessels to lower their sails (which may require motor use to point into the wind so that sails can be dropped). Boats would, however, need to be able to use their motors to prevent vessel and shore collisions.

The proposed seawall establishment at Paihia is likely to generate more underwater noise as did the previous prolonged pile driving in Opuia associated with the marina expansion and associated works. It would be sensible to monitor for dolphins around any underwater and pile driving works. If dolphins come within 400m or possibly a greater distance then works should stop until the dolphins have moved away.

---

<sup>3</sup> As above

<sup>4</sup> As above

<sup>5</sup> Hermundsgard, H. (2019). Norway challenges the cruise industry to operate emission free. *Maritime Impact*.

### Specific Points

#### *Kekeno/ New Zealand fur seals*

Under the present proposal, vessels and people are required to keep a 400-meter distance from all marine mammals, including kekeno. Applying these controls to seals is unnecessary and not practical for distance snorkelers/ free divers as previously discussed. The kekeno population in the Bay of Islands appears to be slowly increasing and so there does not seem to be any requirement to include them within the regulations, at least not at this stage.

#### *Maintaining a 400m distance from marine mammals for vessels*

400m is not an easy distance to estimate, especially for kayakers which are very close to water level. As previously stated this measure should focus on motorised vessels as this would address both the physical presence and noise components of disturbance. I suggest that commercial and other vessels turn off their engines within 400m of marine mammals as part of the requirement to stop or slow to a no-wake speed. It would not be sensible to require sailing vessels to lower their sails (which may require motor use to point into the wind so that sails can be dropped). Boats would, however, need to be able to use their motors to prevent vessel and shore collisions.

#### *Prohibition on swimming within 400m of marine mammals*

As stated earlier it is difficult to accurately judge a distance of 400m when you are in the water. The proposal identifies swimming with marine mammals as “*one of the activities causing the most negative effects on bottlenose dolphins in Te Pēwhairangi (Bay of Islands)*” and further states that “*not allowing any swimming with dolphins would [...] also address aggressive boat navigation when trying to get close to the dolphins.*” I suggest that this be amended to only apply to those swimming directly with dolphins from a mobile (or temporarily anchored) boat. This should not apply to shore or moored vessel based swimmers or distance snorkelers/ free divers. As discussed above this is likely to have minimal impact and immediately getting out of the water is likely to be impractical. Shore-based swimmers/ distance snorkelers and free divers and those based on moored vessels should be exempt from the prohibition of swimming within 400m of a marine mammal.

#### *Vessels with marine mammal permits*

Vessels with marine mammal viewing permits should be included within provisions to reduce physical and noise disturbance effects. These vessels are typically large and so it is likely that each has a larger impact. This may need to be done in a staged way such as first requiring the motors to be turned off within 400m unless the vessel is at risk of collision with the shore or another vessel. It is recognised that these vessels can allow many people to view marine mammals with one vessel. However, if there are no dolphins left to view that will impact on their business.

From: Victoria Froude

[REDACTED]

**WS-BOIMMS-144431**

NEW ZEALAND

# CONSERVATION AUTHORITY

## TE POU ATAWHAI TAIAO O AOTEAROA

### Te Pēwhairangi (Bay of Islands) Marine Mammal Sanctuary Proposal

SUBMISSION FROM THE NEW ZEALAND CONSERVATION AUTHORITY

Date	18 May 2021
To	Department of Conservation
Name of organisation	New Zealand Conservation Authority
Contact Person	Dr Rick McGovern-Wilson, Executive Officer
Postal address	PO Box 10420, Wellington 6143
Telephone	[REDACTED]
Email address	<a href="mailto:nzca@doc.govt.nz">nzca@doc.govt.nz</a>

#### The New Zealand Conservation Authority

1. The New Zealand Conservation Authority (the Authority) was established under the Conservation Act 1987, with members appointed by the Minister of Conservation. It is an independent statutory body with a range of functions, but primarily acts as an independent conservation advisor to the Minister, and the Director-General of Conservation. The Authority also has a growing advocacy role regarding matters of national significance relating to conservation.
2. Marine biodiversity is a matter of national importance; the NZCA has consistently identified marine protection in its strategic priorities, and has developed marine principles that address governance, conservation and protection, and sustainable use of the marine environment.
3. The Authority has a range of powers and functions under the Conservation Act 1987 and other conservation-related legislation. Section 6C(2)(c) of the Conservation Act allows the Authority to "advocate the interests of the Authority at any public forum or in any statutory planning process".
4. Following the logic of the above powers and functions, the NZCA makes this submission on the public consultation document: *A proposal to establish a marine mammal sanctuary in Te Pēwhairangi (Bay of Islands)*.

#### Our marine environment is our Aotearoa

5. The Authority's marine principles<sup>1</sup> stress the essentialness of the sustainable management of the marine environment to the health of marine biodiversity. The Authority have been persistent in upholding these principles through its advocacy and advisory role.

<sup>1</sup> <https://www.doc.govt.nz/about-us/statutory-and-advisory-bodies/nz-conservation-authority/policies/marine-principles/>



6. The consultation document explores the issue that “the bottlenose dolphin population is declining in Te Pēwhairangi (Bay of Islands), where uniquely high levels of interactions with people and vessels are affecting all marine mammals”. The Authority note this as an issue, yes, but also a symptom of inadequate management of human activity in the area, and a result of a longstanding improper prioritisation of recreational and commercial use before conservation.
7. In 2020, there were fewer than 30 bottlenose dolphins, less than 10% of their population numbers 20 years earlier. The establishment of a Marine Mammal Sanctuary is long overdue, and the stark reality that a breeding season should pass where no new calves were born before this action is being taken is disappointing.

### The NZCA’s submission

8. **The NZCA supports** the establishment of the proposed marine mammal sanctuary in Te Pēwhairangi, and the objectives of the proposal to limit activities that are known to negatively affect the bottlenose dolphins in Te Pēwhairangi, namely, the speed of vessels, the proximity of vessels to marine mammals, and people attempting to interact in the water with marine mammals at close quarters.
9. **The NZCA supports** the involvement of hapū kaitiaki rangers in the management of the sanctuary; however, the consultation document provides inadequate information about how the critical steps of day-to-day management, monitoring, and compliance will work, and how future co-management arrangements will be facilitated.
10. **The NZCA notes** that:
  - a. There is a need for monitoring to take place to establish the effectiveness of the approaches being taken. Given the state of the population and the need for evidence informed decision making, it is critical that the best information possible is available to evaluate the effectiveness of the protection measures. The NZCA urges that this monitoring is not delayed, but progressed from the inception of the sanctuary.
  - b. The consultation document has little reference to the communication strategies for public understanding. It will be critical that effective education and appropriate information is supplied to all communities that are likely to be affected by the establishment of the Marine Mammal Sanctuary.
  - c. The Department will need to consider how compliance will be evaluated and enforced. Additional steps should be considered should the sanctuary, as it is proposed, prove ineffective.
  - d. There is a need for a review of the Marine Mammals Protection Regulations 1992. The consultation document makes it clear that these regulations do not adequately address the protection of marine mammals, in this case particularly with respect to people and vessel interactions.
11. While the current sanctuary proposal is focused on Te Pēwhairangi, marine mammal and human interactions are of concern more widely in the New Zealand region, and a wider analysis and review are needed.

**WS-BOIMMS-144434**

Te Pēwhairangi (Bay of Islands) marine mammal sanctuary proposal submission form



Your details

Your name: BONNY CRAVEN (hand delivered)
Organisation (if applicable):
Street address:
Suburb:
City:
Region:
Email address:
Phone number:

Are you whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area?
[X] Yes [ ] No

If you answered yes, please provide details (eg, which hapū and/or iwi do you affiliate to):

Which group(s) best describes your interest:

- [X] Northland / Te Pēwhairangi Bay of Islands community member
[X] Whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area
[ ] Recreational maritime vessel operator
[ ] Commercial maritime vessel operator
[ ] Local business owner
[X] Local community group
[X] Member of the New Zealand general public
[ ] Science and research
[X] Environmental groups
[ ] Other (please specify): MAC-01-01-002, Wai 421, 869,

Official Information Act 1982

Please note that any submission you make will become public information and that anyone can ask for copies of all submissions under the Official Information Act 1982.

The Official Information Act states that we must make information available unless there is a good reason for withholding it and provides a list of such reasons in sections 6, 9 and 18. If you think there is a good reason to withhold specific information, please state this in your submission. A good reason may include commercial confidentiality or that it is personal information. Note that any decision that is made by DOC to withhold information can be reviewed by the Ombudsman, who may require the information to be released.

[ ] I would like specific information in my submission withheld.

Please state the reasons for wanting specific information in this submission withheld.

### Your submission

You can provide any feedback on the proposed marine mammal sanctuary you would like. However, answering the following questions may assist in making your submission:

1. Do you support or oppose the proposed marine mammal sanctuary?  
If so, why, or why not?
2. Do you believe the proposal should be changed or amended?  
If so, what changes would you propose, and why?
3. Do you agree with how we have characterised the problem, objectives, and impacts?  
If not, how would you change it?

As Kaitiaki of Te Whiu Hapu, I support the proposed Marine Mammal Sanctuary on behalf of our hapu living at Mataa, Karaka, Kowhara, Maori freehold land in the Te Puna Inlet, Kerikeri.

As claimants of WAI 2660, 869, 421, we want full participation along with other Wai claimants, hapu, in the proposed sanctuary.

We tautoko you with the problems, objectives and impact on the overall environment affecting mammals, fish, shellfish etc.

**WS-BOIMMS-144437**

18 May 2021

Submission concerning

***A proposal to establish a marine mammal sanctuary  
in Te Pēwhairangi***

**I strongly support the *main intent* of Te Pēwhairangi (Bay of Islands) marine mammal sanctuary: to ensure that human interaction with dolphins is less deleterious to the mammals' social and physical well-being.**

But I am concerned that there may be unintended negative consequences which could/should be averted by modifying the proposal a little.

1. The requirement to keep 400 m away from kekeno (NZ fur seals) – even when they are not in the water – severely (and unnecessarily?) limits boating and fishing at certain points around the Bay of Islands. Might the rules concerning distances-from-kekeno in the Bay of Islands align with the rest of the country (20 m?) ?
2. And the 400 m rule – even for dolphins – may be overly restrictive. For example, Te Pēwhairangi has many passages narrower than 800 m wide – and these would be impassable if dolphins were present. Slowing to a no-wake speed, and keeping a wide berth, may be sufficient.

**Nevertheless, I commend the Department of Conservation and the individuals and organisations involved in the creation of Te Pēwhairangi/Bay of Islands Marine Mammal Sanctuary Proposal and I support the proposed sanctuary in principle.**

John Booth 

**WS-BOIMMS-14440**



17 May 2021

Submission concerning

***A proposal to establish a marine mammal sanctuary  
in Te Pēwhairangi***

The Eastern Bay of Islands Society Inc was formed in 1975 and is particularly involved with preservation and conservation of native biodiversity in the eastern Bay of Islands.

**The Society strongly supports the *main intent* of Te Pēwhairangi (Bay of Islands) marine mammal sanctuary: to ensure that human interaction with dolphins is less deleterious to the mammals' social and physical well-being.**

But we are concerned that there may be unintended negative consequences which could/should be averted by modifying the proposal a little.

1. The requirement to keep 400 m away from kekeno (NZ fur seals) – even when they are not in the water – severely (and unnecessarily?) limits boating and fishing at certain points around the Bay of Islands. Might the rules concerning distances-from-kekeno in the Bay of Islands align with the rest of the country (20 m?) ?
2. And the 400 m rule – even for dolphins – may be overly restrictive. For example, Te Pēwhairangi has many passages narrower than 800 m wide – and these would be impassable if dolphins were present. Slowing to a no-wake speed, and keeping a wide berth, may be sufficient.

**Nevertheless, Eastern Bay of Islands Society commends the Department of Conservation and the individuals and organisations involved in the creation of Te Pēwhairangi/Bay of Islands Marine Mammal Sanctuary Proposal and we support the proposed sanctuary in principle.**

**Sandra Scowen  
Chair**

per John Booth [REDACTED]





# WS-BOIMMS-144449: 1



# WS-BOIMMS-144449: 2

## Oyster-waste cleanup in doubt

Pollution fears amid claims of silt problems

By Mike Barrington and Lindy Laird

NEW BRUNSWICK — A \$25 million oyster waste recycling project is claimed to be causing pollution, prompting southern oystermen and oystermen in the northern part of the state.

Now the recycling project has been put on hold, as oyster growers worry about it more it being successful.

James Clark, of Oyster, said the need to take his grandchildren to beaches nearby the Bay area oyster growers will stop the recycling project in the Walker's Bay that polluted coastal waters in the west of Waukegan and Zionsville.

The plan was to build a plant to take in shell, but the water is now so muddy that oysters are the mainstay now," she said.

Robert Hester, chief — a local



*Working Waukegan - Waukegan Inlet Co. - March 2012 - 2013*

**UNDER REVIEW** The Walker Oyster Waste Recovery large digger drops shell and oyster shells into a washing tunnel that uses 8000 litres of water hourly to flush silt back into the sea.

Waukegan Oyster Waste Recovery (OWWR) was formed last year after clearing half of the barge stopping work on March 6 after clearing half of the It was the first time such a cleanup method had been tried

PHOTOGRAPH BY CLARK

**WS-BOIMMS-144449: 3**





**WS-BOIMMS-144449: 4**

reviewed.

Janet Clark, of Opuia, said she had to take her grandchildren to beaches outside the Bay over summer because silt from the recycling project in the Waikare Inlet had polluted coastal waters as far west as Waitangi and Tapeka Pt.

“Dolphins used to come in here to feed, but the water is now so cloudy they couldn’t see the mullet they eat,” she said.

Project Oyster Shell — a joint venture between central and local government, regional economic development body Northland Inc and oyster farmers — aims to recover up to 6400 tonnes of waste shell and 300 tonnes of waste timber from 24 Waikare Inlet oyster farms closed over the past decade due to water-quality issues.

The Government is providing \$2.1 million from its Waste Minimisation Fund for the project and stakeholders are contributing

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**WS-BOIMMS-144449: 5**

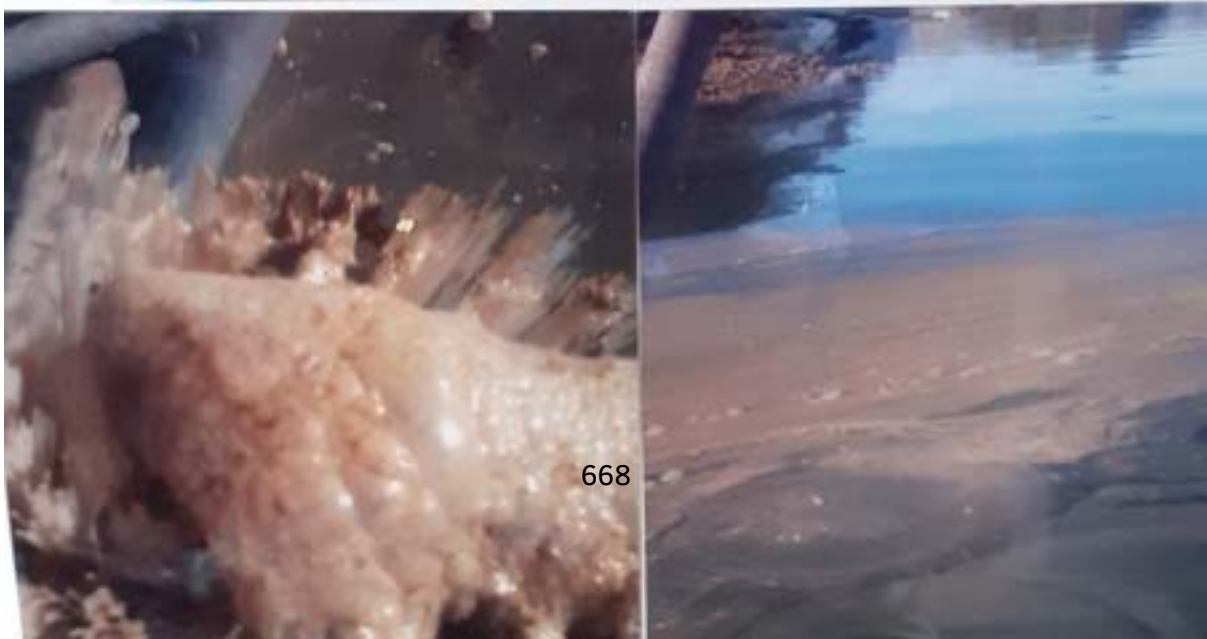






## WS-BOIMMS-144449: 6

Kino Inlet (Ben Wallens) Oyster farm  
- processing consistently resuspends  
silt that the WQWR spread.





# WS-BOIMMS-144449: 7

**Jared Bothwell**

---

**From:** Janet Clark [REDACTED]  
**Sent:** Monday, 17 May 2021 1:06 pm  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary  
**Subject:** Marine Mammal Sanctuary  
**Attachments:** 20210517\_121209.jpg; 20210517\_121319.jpg; 20210517\_121223.jpg; 20210428\_123142.jpg; 20210517\_123440.jpg; 20210517\_123120.jpg

Name: Janet Debra Clark

Phone Number [REDACTED]

Address [REDACTED]

Residential: [REDACTED]

I support the MMS in part as it is about the dolphin's health safety and their future wellbeing.

I believe the proposal needs to be amended to include the state of the waters in the receiving harbour because of extreme degradation of these waters with resuspended silt due to dredging, eg Opuā Marina, private property resource consents to dredge, intensive Oysterfarming with nearly 30 rebuilt farms using the highest treated toxic timber on the market also the processes they use, high-pressure hoses washing down oyster plastic mesh bags and tumblers resuspending masses of silt (dreadful noise pollution) continually, Littke inlets, massive farms fast large barges with massive Outbiard motors. Not inviting for dolphins

NRC are aware of this and have been for years as we have been proactive calling their hotline, emailing, sending photo to, Paul Maxwell the Nrc Consenting Officer and also their monitors over the years without any satisfaction.

We find the system of monitoring their own consents biased and extremely detrimental to the environment.

There were regular pods of dolphins in these inlets feasting on fat mullet and eels especially in the winter months until the Waikare Oyster Waste Recovery (WOWR) they deemed successful but was in actual fact a absolute disaster.

They ( Total Dredging ) dredged up 10years of settled sediment on derelict farms dredging and tumbling with a massive turbine the shell timbers, asbestos etc directly into these recieving waters, coupled with Marina Stage 2, which also dramatically altered the water flow, all this and other consented dredging have since seen the disappearance of the dolphins.

WOWR was 2012/13 then followed later by Marina Stage 2.

We have lived with boat access only to our home on the awa, Waikino Inlet for over 35 years.

We have a intimate relationship with our awa and are also seeing other species of marine and birdlife here disappear and invasive marine pests move in. This is just so unhealthy, it's heartbreaking.

We need independent water testing and experts to examine this dire situation on the Taumarere, Waikino and Waikare Inlets of Opuā.

We sadly predicted that if nothing was done the dolphins would be affected.

Photos attached to support my submission.

I believe added to this we need a moratorium placed over the Harbour as its being exploited and the environment can not cope any longer and is collapsing under this pressure.

I believe you've identified there's a problem and have made a starting point, but to be effective these other amendments would need urgent addressing as they have been swept under a mat for years and until something is done to address this i see little hope on the horizon for the dolphins.



# WS-BOIMMS-144452

**Jared Bothwell**

---

**From:** Rob Macdonald [REDACTED]  
**Sent:** Monday, 17 May 2021 5:30 pm  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary  
**Subject:** Submission

To Whom It May Concern

I would like to take this opportunity as both a recreational boatie and a landowner adjacent to the proposed effected area to oppose the submission.

Is it not possible/likely that there are any number of temporary factors that could have led to the present situation with the dolphin numbers.

Dolphins have been very prevalent in the Bay of recent times and more so than in earlier years when I was cruising the BOI which I have done for the last 60 years.

Dolphins are a very intelligent mammal that in my opinion engage with us on their terms not the reverse.

I would have thought that reducing speed limits if there are deeper underlying issues around dolphin populations is a reasonably broad brush and possibly ineffective restriction.

Regards,

**Rob Macdonald** Director | Crockers Property Group  
DDI [REDACTED] | E [REDACTED] | W [crockers.co.nz](http://crockers.co.nz)

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**Crockers Property Group**  
525 Mansfield Road, Epsom, Auckland 1023  
PO Box 74054, Greenlane, Auckland 1546  
| 09 630 8890 | 09 630 8898  
Experience. The Crockers Difference.

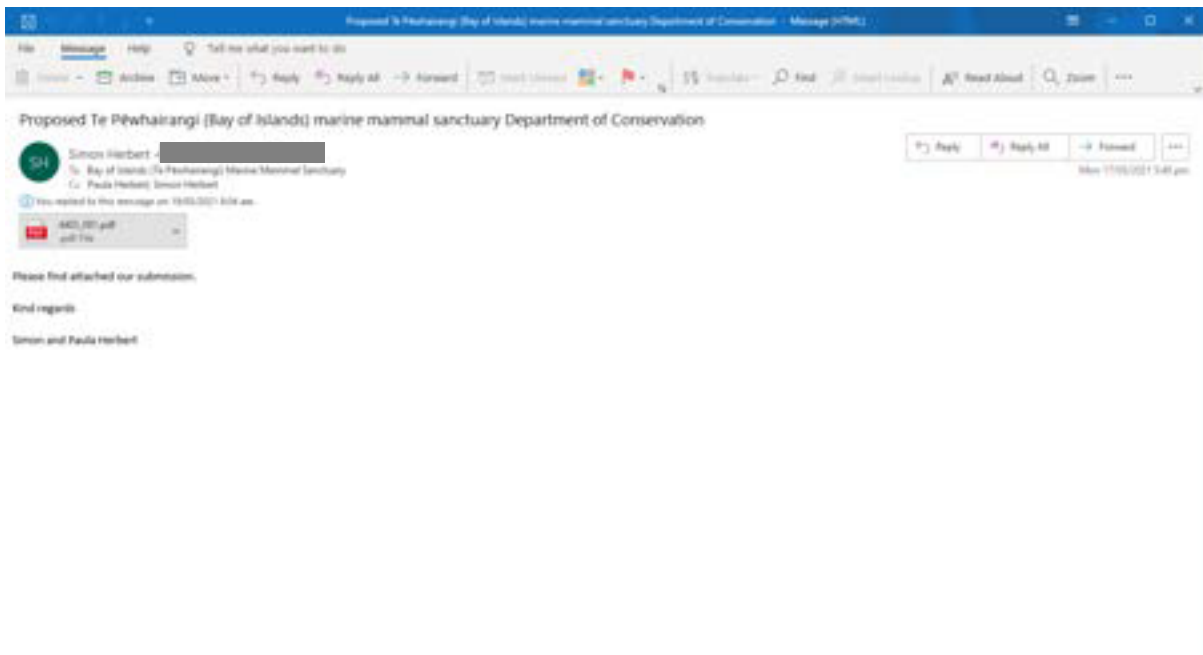


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# WS-BOIMMS-145455: 1



**WS-BOIMMS-145455: 2**

**Te Pēwhairangi (Bay of Islands) marine mammal sanctuary  
proposal submission form**

**Your details**

Your name: SIMON & PAULA HERBERT

Organisation (if applicable): \_\_\_\_\_

Street address: \_\_\_\_\_

Suburb: \_\_\_\_\_

City: \_\_\_\_\_

Region: \_\_\_\_\_

Email address: \_\_\_\_\_

Phone number: \_\_\_\_\_

Are you whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area?

Yes  No

If you answered yes, please provide details (eg. which hapū and/or iwi do you affiliate to):

**Which group(s) best describes your interest:**

- Northland / Te Pēwhairangi Bay of Islands community member
- Whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area
- Recreational maritime vessel operator
- Commercial maritime vessel operator
- Local business owner
- Local community group
- Member of the New Zealand general public
- Science and research
- Environmental groups
- Other (please specify): \_\_\_\_\_

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I would like specific information in my submission withheld.

Please state the reasons for wanting specific information in this submission withheld.



**Your submission**

You can provide any feedback on the proposed marine mammal sanctuary you would like. However, answering the following questions may assist in making your submission:

1. Do you support or oppose the proposed marine mammal sanctuary?  
If so, why, or why not?
2. Do you believe the proposal should be changed or amended?  
If so, what changes would you propose, and why?
3. Do you agree with how we have characterised the problem, objectives, and impacts?  
If not, how would you change it?

PLEASE SEE ATTACHED SUBMISSION.

17 May 2021

Proposed Te Pēwhairangi (Bay of Islands) marine mammal sanctuary  
Department of Conservation,  
34 Landing Road, Kerikeri 0230

**Submissions on the proposed Marine Mammal reserve in the Bay of Islands**

Thank you for the opportunity for submitting on the proposed Marine Mammal Reserve for the Bay of Islands (the *Reserve*).

We support the Reserve subject to modifications. Bottlenose dolphins and other marine mammals are in decline and require further protection than is currently provided to ensure their future survival in the Bay of Islands.

However, the restrictions must also be effective and protect the rights of recreational users of the Bay of Islands. It is **not reasonable to impose ineffective or other unreasonable restrictions on the use of the sea for New Zealanders**, and in particular the waters of the Bay of Islands.

The Marine Mammal Safe Zones (5 knot for all vessels) must be modified to apply to the areas where bottlenose dolphins interact mostly with vessels – especially permitted and unpermitted commercial vessels.

We agree this area should include the first zone (Roberton to Moturua) referred to in the Reserve.

**We submit that the second zone should be changed to an area in which there is a greater population of bottlenose dolphins.** From reading the Peters and Stockin 2016 report and the TriOceans 2020 report (together the *Reports*), there is little evidence in either of the Reports, of marine mammal activity in the proposed second zone to the south of line from Tapeka Point to Motuarohia Island.

We submit that if a second zone is considered to be required by the Minister, that area should be to the east of the proposed first zone, towards Deep Water Cove, where there is an established greater population of bottlenose dolphin activity.

In addition, in either zone, **we submit that the 5 knot restriction should not apply to recreational vessels.** The Reports make it clear that the most interaction with, and therefore the most disturbance of bottlenose dolphins is from commercially licenced vessels – particularly those permitted to allow passengers to swim with dolphins.

There is no evidence in either of the Reports that recreational vessels exceeding 5 knots have any effect on the bottlenose dolphins. Prior to gazetting the Reserve, the Minister must have proper evidence that the objectives of the Reserve will be met by the conditions of it. We submit there is no such evidence in relation to the speed of recreational vessels and that therefore the proposed 5 knot restriction should not apply to them.

In relation to the exemption for vessels with existing marine mammal viewing permits from the proposed 400m rule, this is clearly wrong. The Reports make it clear that the most interaction with dolphins of all classes of vessels, is by those permitted vessels, and as difficult as it would be for those operators to lose those rights, there is no point in establishing the Reserve if those operators

are excluded from the restrictions that are to apply to all others.

In support of these submissions, please see below extracts from the 2016 report:

*Indeed, the BoI has a comparably high level of commercial swimming-with-dolphin activities targeting this species. Presently, there are three operators (Fullers Great Sights, Explore NZ and Carino Sailing and Dolphin Adventures) that hold permits under the MMPR (1992) to commercially interact with marine mammals and swim with bottlenose dolphins. These operators cumulatively offer up to ten trips per day that are permitted to view and/or swim with bottlenose or common dolphins in BoI waters.<sup>1</sup>*

Also

*In addition, a fourth operator in Tutukaka (Dive Tutukaka) is running a dive operation and is permitted to view marine mammals that they mainly encounter en route to the dive sites, and to swim with common or bottlenose dolphins. Collectively, these operators may exert a high human disturbance levels on dolphin populations in the region.<sup>2</sup>*

And also

*Permitted vessels spent significantly more time with dolphin groups (range=0-138, median=62.5, n=5,752) than un-permitted commercial vessels (range=0-48, median=29, n=5,403) (Kruskal-Wallis: h=39.63, df=2, p<0.001). Private vessels spent significantly less time with dolphin groups (range=0-45, median=16, n=6,274) than permitted (Kruskal-Wallis: h=29.43, df=2, p=0.013) and un-permitted vessels (Kruskal-Wallis: h=27.04, df=2, p=0.018). Private vessels spent the least time with dolphins in all seasons with 18 continuous minutes in spring/summer (range=0-45, n=4,185) and 9 continuous minutes in autumn/winter (range=0-14, n=2,089). Vessel interactions were observed in high densities areas (>8.01 per km effort) near Tapeka Point, Robertson Island, and between Paihia and Russel harbours (Figure 39). The heavy vessel traffic areas of Tapeka Point and Robertson Island overlap with high density use areas for bottlenose dolphin.<sup>3</sup>*

In addition, we would like to make the following points in relation to the second zone proposed south of the line from Tapeka Point to Motuarohia Island:

- Permitted operations have only been excluded from this zone since 2019. Insufficient time has been given to measure the outcome of this exclusion.
- The majority of boating traffic transiting the Bay of Islands to Russell does so to the north of this zone. There is no evidence of vessel traffic transiting through the proposed safe zone area at speed. Local traffic is light and limited largely to properties on the coast who are aware of the issue and behave in a responsible manner.

<sup>1</sup> Page 16 Peters & Stockin 2016 – Responses of bottlenose dolphins to vessel activity in Northland, New Zealand

<sup>2</sup> Page 17 Peters & Stockin 2016 – Responses of bottlenose dolphins to vessel activity in Northland, New Zealand

<sup>3</sup> Page 78 Peters & Stockin 2016 – Responses of bottlenose dolphins to vessel activity in Northland, New Zealand

- I have only once seen dolphins (these were common not bottlenose dolphins) in this area of the Bay of Islands and I have personally spent most of the summer, and a great deal of other seasons in the area for 35 years. On the other hand, I have seen dolphins dozens of times in the eastern parts of Bay towards Deep Water Cove.

We submit the Gazette Notice should be amended accordingly to:

1. delete or change the area described in paragraph 2(b);
2. change the map accordingly referred to in paragraph 3;
3. change paragraph 5(2) to refer to "commercial" operators only;
4. Delete paragraph 7 exempting vessels with a marina mammal viewing permit;

S E and P M Herbert



# WS-BOIMMS-145458

**Jared Bothwell**

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**From:** anne chiaroni [REDACTED]  
**Sent:** Monday, 17 May 2021 8:39 pm  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary  
**Subject:** Proposed Bay of islands marine mammal sanctuary

Anne Chiaroni  
Resident  
[REDACTED]

I support the proposal to establish a marine mammal sanctuary in the Bay of Islands.

Anne Chiaroni



# WS-BOIMMS-145464

**Jared Bothwell**

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**From:** Judith Watson [REDACTED]  
**Sent:** Monday, 17 May 2021 10:21 pm  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary  
**Subject:** In support of the proposal to establish a marine mammal sanctuary in Te Pēwhairangi (Bay of Islands).

Judith Watson  
[REDACTED]

I support the proposal for a marine mammal sanctuary as outlined by the document.

Over the years, it has been very noticeable as someone who lives and sailing in the bay that the marine and mammal marine life has been dwindling.

This year there seemed to be an increased number of potable motor boats as well as jet skis that seem to have little or no respect for the wild life in the bay.

I applaud any protection of this already fragile and special environment.

Sent from my iPad



**WS-BOIMMS-145467: 1**

Richard Ham

[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED] (two underscores)  
[REDACTED]

I am not part of any group that exercise kaitiakitanga in the proposed area  
I am a local community member as well as a commercial and recreational vessel operator.

To the Minister,

Submission to the Marine mammal sanctuary Bay of Islands,

This submission is against the proposed Sanctuary,

Definitions:

High speed ship: 20 – 35 metres in length overall or that carry more than 50 passengers and operate at 20 knots or more within restricted waters

Broaching: When a sailing or power vessel loses directional control when travelling with a following sea. The vessel turns sideways to the wind and waves and in more serious cases may [capsize](#) or [pitchpole](#).

Under way:(of a vessel) A vessel is under way when not at [anchor](#), made [fast](#) to the shore, or [aground](#). This definition has legal importance in the [International Regulations for Preventing Collisions at Sea](#).

The proposed sanctuary will heavily impact all those who work and recreate on the water within the Bay of Islands.

The department proposes to close a significant common water space to the general public. This will affect water users in the same way as a proposed marine farm or oil rig would restrict access to a piece of public water that then could not be sailed, fished, water skied or worked on.

This represents one of the larger restrictions to the freedom of movement of New Zealand citizens in recent years, in an area of law which traditionally sees a high degree of personal freedom. The department needs to show that this intervention will be worth the cost to other users, many or most of whom are not interested in interacting with marine mammals, yet will still be grossly affected.

This proposal is designed to create the equivalent of a maritime exclusion zone in a circle at least 800 metres across centred on a marine mammal or group. The combined effect of this over all marine mammals in the bay, will likely create the largest maritime exclusion zone in the country. The proposal also seeks to create

one of New Zealand's largest speed restricted area and likely the largest outside of Auckland.

While the discussion document has stated that the MMS will not affect vessels transiting or anchoring, there has been no attempt to achieve this made in the proposal. Presumably then transiting and anchoring are OK when done at least 400 metres clear of marine mammals.

In practice this will mean that as marine mammals move then those vessels that are complying with the law are constantly having to up sticks and shift around to keep clear of those mammals. Leading to a ridiculous dance around the bay. A circle of this size has the potential push all high speed marine traffic into a channel only 200 metres across at Tapeka point. The Mammals would only need to spread out a little to close the Bay to all marine traffic, all this in an area that is already very heavily trafficked and already sees more than its fair share of issues. (see appendix 1)

Based on where marine mammals are regularly sighted. This is likely to restrict access to at least four popular fishing spots, as well as several popular spear fishing locations, diving locations and one world famous landmark. This also has the potential to restrict or close ferry operations within the bay in one case likely for several months of the year. (see appendix 2)

It is likely to heavily restrict yacht racing within the bay. This will necessarily come with a steep financial cost as these activities are popular draw cards to the bay and bring large volumes of visitors each year. Charter fishing started tourism within the bay and is remains a good earner for the area. Bay of islands sailing week is New Zealand's largest sailing event each year and probably one of the countries largest sporting events by number of participants.

When looking at a cost benefit analysis one would have to conclude that the cost is high.

The proposed legislation will need to be shown to be effective, safe, fair and legal.

Unfortunately as things stand I do not believe that they do.

### **Effective**

There is no point in reducing the rights and freedoms of New Zealand citizens to instigate an intervention, if that intervention is unlikely to be effective. The Department is proposing to create a new law to solve a problem largely (although not entirely) caused by people not following the existing law. Indeed knowledge of or following of maritime laws within New Zealand is particularly poor, and the Bay of Islands is certainly no different in this respect.

All Maritime enforcement within New Zealand is plagued by the same three issues of law, or lack of, in that New Zealand has no requirement to have any form of licence to drive a private vessel, that same private vessel does not require to be

registered and there is no direct easily enforced requirement for the master of said private vessel to be sober.

In practice this means that if a private vessel is signalled to stop by an enforcement officer their first course of action should be to run – their vessel cannot be reliably identified. If by chance they cannot run, no bother, on to step two, lie about who you are – with no licence, there is no requirement to have any form of identification on them.

It should be obvious but a lack of sobriety does tend to make the first two issues worse...

This proposed law essentially hopes that masters of private vessels know enough that they are aware the MMS exists – but not so much that they know that they can safely ignore it!

This same lack of any form of compulsory education in the marine sphere means that a comfortable half of the boating population do not appear to know something as simple as which side of the road to drive on. As cars to pass go, this is pretty low. However a casual glance at any busy channel will demonstrate this fact for itself. Indeed there was a collision earlier this year in the Bay, which appears to have been caused by this exact lack of knowledge.

If all maritime education within New Zealand up to this point has been unable to achieve something as simple as ensuring that traffic travels on the correct side of channels. A law has been around in some form or another for approximately the last 3000 years! What chance anything newer and more complex?

It is also to be noted that probably the vast majority of the private vessels in the bay during peak times are not local residents making communication with those people even more difficult.

Costs for marine enforcement are high so enforcement agencies regularly try to avoid doing so by writing new and different laws (DOC is hardly alone in this). However it only needs to be considered what would happen on the road if traffic police decided to stop driving about to realise why this will not work in isolation.

Given the very low level of on water enforcement of currently any type I suggest that an increase in this (even though expensive), is likely to see the greatest effectiveness of any intervention – even with the issues in current law.

### **Safe**

I have several safety concerns with this proposal. Firstly a restriction on water space in a high traffic area (Tapeka Point) is nearly guaranteed to cause problems it will squeeze traffic into a much smaller area mixing fast and slow vessel types many or most of whom do not have a good understanding of rules of the road.

Secondly, the bay has its largest swells coming from the north west. For most traffic headed out to the eastern bay from Opuā, Paihia or Russell on a bad day this generally isn't too much of a problem.

It is possible to keep in shelter until Kororareka (Russell) point, head into the bad weather and large waves briefly until Tapeka point. Then turn hard right to put the waves off your back left and accelerate to match the speed of the waves for comfort and to avoid broaching until passing to the south of Oturori (Capstan) rock. At that point you should be in shelter again and free to cruise the eastern islands. (see appendix 3)

This Proposal would remove that route option or at least significantly increase the risk of broaching to those vessels using it.

Thirdly, late afternoons in the bay will generally see large traffic volumes heading home from the eastern islands usually cutting the corner at the eastern end of Motuarohia (Robertson) island heading due west until cutting the corner again at Tapeka point. At the same time vessels who arrived into Opuā later in the day are doing the same route in reverse heading out for the first night of their holiday. This area also remains a very popular fishing spot and many vessels are stationary either anchored or drifting in the same vicinity.

All through the later part of the summer season calm weather means strong reflections off the water, so a westerly course and severe sunstrike means that most of the inbound boats cannot see where they are going!

This is a particular hazard in the bay and one that new commercial skippers to the area or transitioning to different vessels or high speed ships are routinely warned about.

Any new Professional Skipper will be taught to not head directly into the sun for hopefully obviously reasons, we don't drive over water we can't see. This means choosing a course around 15 degrees one side or the other of the sun. If possible it is much preferred to put the sun to the left of your course as it means anyone coming at you out of the sun is the give way vessel.

In practice Skippers of High speed ships are routinely needing to transit this same area inbound from inside the eastern islands and so will usually do one of two things depending on traffic volumes in each spot.

They could keep well east of Motuarohia heading towards Long beach passing either side of Oturori rock. Until they get a gap in the traffic turning to the north west (putting the sun to their left) as they pass through the line of traffic. This means that the traffic out of the sun needs to give way to them and the traffic from behind is unlikely to be able to keep up with them.

Alternatively they could pass between Motuarohia and Moturua Islands in a north westerly direction This can be a really good option as it is generally less trafficked and with an island close on the west, both gives some shade from the sun off the water and also guarantees no boat will be coming from that direction.

This proposal is will restrict access to both of those options giving high speed ship masters the unpleasant choice between safety and schedule.

(see appendix 4, proposed 5 knot boundaries in blue, recreational vessel traffic in red, approx sunstrike angles in yellow and recommended routes for high speed ships in black and green)

### **Fair**

Punishments for breaches of the proposed legislation have not as yet been mentioned. Current punishments for breaching conditions in existing marine mammal sanctuaries or maritime exclusion zones are fairly harsh. Presumably for practical reasons and to ensure compliance that would be intended to be the case here as well.

This poses some issues given both who the new law is designed to target and also the ambiguity over ability to communicate these proposed changes to a nationwide audience and also some ambiguity over location and visibility of the animals to be avoided.

Any new law cannot be deemed to be fair if it is impossible for the targeted group to comply with. This proposed law is targeting recreational vessel masters and the masters of non permitted commercial vessels.

Marine education is, as a rule spectacularly ineffective in this country. Major national TV and print media campaigns return a retention rate amongst the boating public of between 1 and 22 percent. Unless the department is intending to run New Zealand's largest ever marine advertising campaign it seems highly unlikely that they will be able to reach more than a fifth of their target audience. Many of whom do not necessarily believe that message is relevant to them as they were not wishing to interact with marine mammals in the first place.

It is reasonable to punish offenders who breach the exclusion zone for an oil rig for instance, as it is quite obvious and I presume covered in signs warning of the zone. Marine mammals are different however.

The average recreational vessel master actually drives their vessel less than 50 hours per year (some estimates as low as 10) most have less than 5 years experience. By comparison learner drivers on the road in New Zealand are recommended to have at least 120 hours of driving experience before progressing to their restricted licence.

It is likely that most recreational boat skippers have around the same experience as the average learner driver. Indeed we see many of the exact same issues on the water as are present with learner drivers on the road. A learner on the road tends to look only quite close in front of them, so gets surprised by developing situations. They also struggle to evaluate give way situations or collision risk.

We have the same issues on the water. Recreational vessel masters are also generally looking very close to the boat, in a world where high speed vessel interactions are typically resolved outside of 1 kilometre distance ( $\frac{3}{4}$  nautical mile). Frequently recreational vessel masters have not even noticed our vessel until 300 – 400 metres sometimes as close as 200 metres. This is a vessel with 206 square metres of side profile! So not exactly sneaking about.

What chance do they really have of spotting a dorsal fin of half a square metre or less in profile at the length of 4 rugby fields? It is literally outside their cognitive field.

Added to this issue is that when amateurs look for dolphins they are generally looking for something that looks like a picture of a dolphin out of the water (who'd have thought), or possibly if they are more experienced they might look for a dorsal fin. Real dolphins are rarely spotted in this way, dolphins spend a majority of their time underwater. What professionals are looking for is generally unusual splashes, spouts, bird activity and particular behaviours from other boats. The 2020 research that at least in part informed this proposal has a good description of this.

The result of this is that commercial clients trying to spot dolphins (with similar experience to recreational boat skippers), despite having a significant eye height advantage over those in a recreational vessels, are unlikely to be able to spot said dolphins at 200 metres even when told of their presence and pointed in the right direction!

Indeed I have frequently observed recreational vessel pass within 40 metres of a pod of dolphins (sometimes straight over top) apparently oblivious to their presence. Do we seriously intend to criminalise a lack of experience or observational ability?

Even for those of us who work on this sphere professionally it is by no means guaranteed that it could always be possible to comply with the law. Dolphins and Whales live for the most part under the water and can be difficult to spot particularly on a bad day.

From a practical standpoint for the professional skipper dealing with marine mammals in a constantly changing and usually unclear environment in can be very easy to unknowingly breach the proposed law without realising or even sighting the animals.

It would be nearly impossible for any sufficiently high mileage skipper whether commercial or recreational to avoid being caught in a compromising position by a determined stalker using "got-cha" tactics. Context is everything. Simply being in the same place as a marine mammal should not be enough to constitute guilt.

It seems at the least unfair to penalise people for a law they are likely to be unaware of and cannot comply with, it is also probably not legal.

## **Legal**

Laws should be created that are able to be followed to their letter, they require some nuance and skill in their creation. They should be created by a group representative of the community that they affect in as transparent a way as possible. While the attempt towards simplicity is to be commended, I am reminded of the saying about how it takes a lot of work to make this look so easy. That work unfortunately does not appear to have been done in this case.

A law that is not possible to follow to its letter is unlikely to be legal in its effect and is certainly not ethical. It also seems likely that these proposed changes would not comply with the provisions of New Zealand's Bill of Rights.

This proposed law purports to protect marine mammals from excessive interaction which the research has shown is coming from fairly specific vessel behaviour. The law as written however has been designed to cover the general public with as broad a brush as humanly possible. There has been no attempt to target on those interacting or even just those under way.

While the courts have a place in our legal system clearing up edge cases and the unforeseen. That is not the case in this situation where the law has been deliberately designed to catch everything, giving enforcement officers huge power to then choose arbitrarily who they try to prosecute, throwing cases at the courts to see what sticks.

Perhaps the bigger concern is that this is more likely to be used by enforcement officers as an informational advantage, to fine and bully the general public for situations that would never survive a trip through the courts. Indeed this proposal appears to be designed with that in mind.

It would seem that fair enforcement of this change is liable to be problematic. Any new law must be tighter than what has so far been presented if it is not to be affected by personal vendettas or business interests. Particularly if as I believe is the case it is to be enforced by (clearly less experienced) volunteers.

It is not without good reason that the terms waterfront or playground politics have come to mean more or less the same thing. Therefore any new law must to be seen to be robust and defensible, if it is not to be used unwittingly as a tool of the unscrupulous to advance their own ends.

I am also concerned about the process used in this case to create this new law. While I am sure that this process is undoubtedly suitable in the case of previous marine mammal sanctuaries. To date these have been in fairly out of the way locations and affecting few people, most of whom are interested in acoustic survey.

That is not the case in this situation where we have a great number of stakeholders and this intervention represents a potentially quite sizeable change to the utility of the area.

This would suggest that a strong and robust process should be called for.



Fortunately New Zealand has good robust ways to create new law through either government or local bills through Parliament or probably more relevant in this case a local bylaw through Council. It is interesting to note that these routes were not considered.

The Bylaw option seems to offer significant promise and has the potential to solve many issues at the same time. Not only would any new law go through a more usual and robust process it would join an already significant body of maritime bylaws.

While this option would also require DOC officers to also be enforcement officers for the council I suspect that this should not be too hard to achieve in practice and offers significant benefits in terms of enforcement budgets able to be shared. Increasing total enforcement as each party would also be able to support the other. This situation already exists between other departments in other parts of New Zealand.

Bylaws already exist registering all jet skis within Northland. Rolling registration out to all vessels would dramatically improve the effectiveness of any proposed new law as all vessels would then be identifiable.

### **Conclusions**

This is by far the longest submission I have ever written and I have chosen to keep it down to only 4 topics, I could easily have gone further however I like to maintain the pretence that I have a life outside of this. The reason for that is that this proposal is by far the shortest I have ever dealt with - the last one I submitted on was over 1600 pages.

Obviously you get to 1600 odd pages by doing your homework making sure that all possible problems have been considered and hiring consultants to check their area's of expertise within your proposal. That clearly has not happened in this case.

It is possible I concede that there may be out there somewhere a piece of Swiss cheese with more holes than this proposal has – but I am yet to see it!

The Bay of Islands Bottlenose Dolphin population is the most studied in the country with studies back to at least 1997, 23 years ago and DOC's assertion is that it has been gradually declining over that time, so really not a surprise. The suggestion that this intervention needs to be pushed through with great speed in a less democratic fashion than usual seems a bit off.

Indeed this whole process reminds me of that one kid in primary school who would turn up late not having done their homework wanting to cut corners and get everyone else to do their work for them. That wasn't acceptable then – it isn't now either.

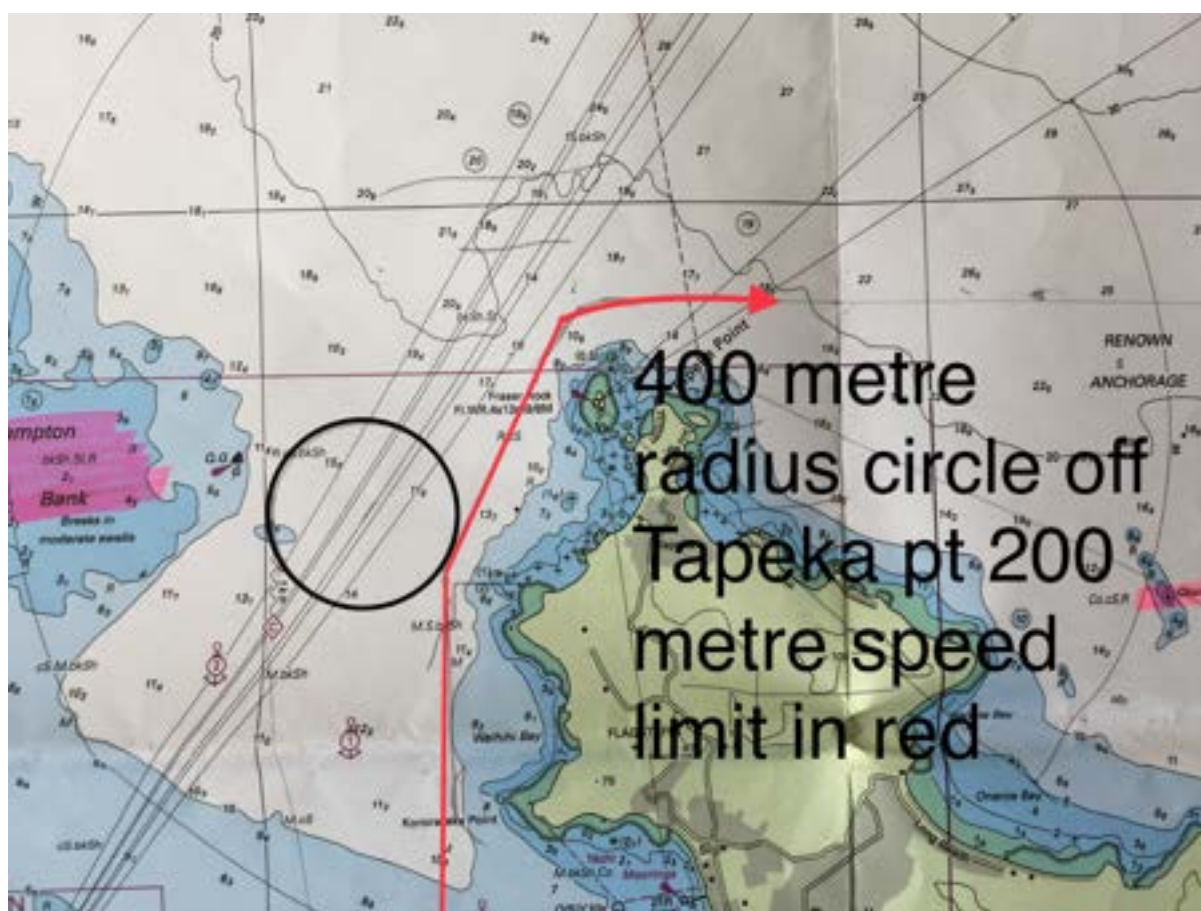
This proposal cannot be allowed to pass under its current guise. I do not believe that it will work or that it is safe, fair or legal and does not appear to have even considered the impact on other water users.

My recommendation is that this proposal is thrown out in its entirety and a new one drafted in its place through the medium of local bylaws. This new proposal should be written in a nuanced fashion as possible affecting as few other users as possible. This should be written to target only those causing a problem instead of anyone in a vicinity - or like we normally do in other words.

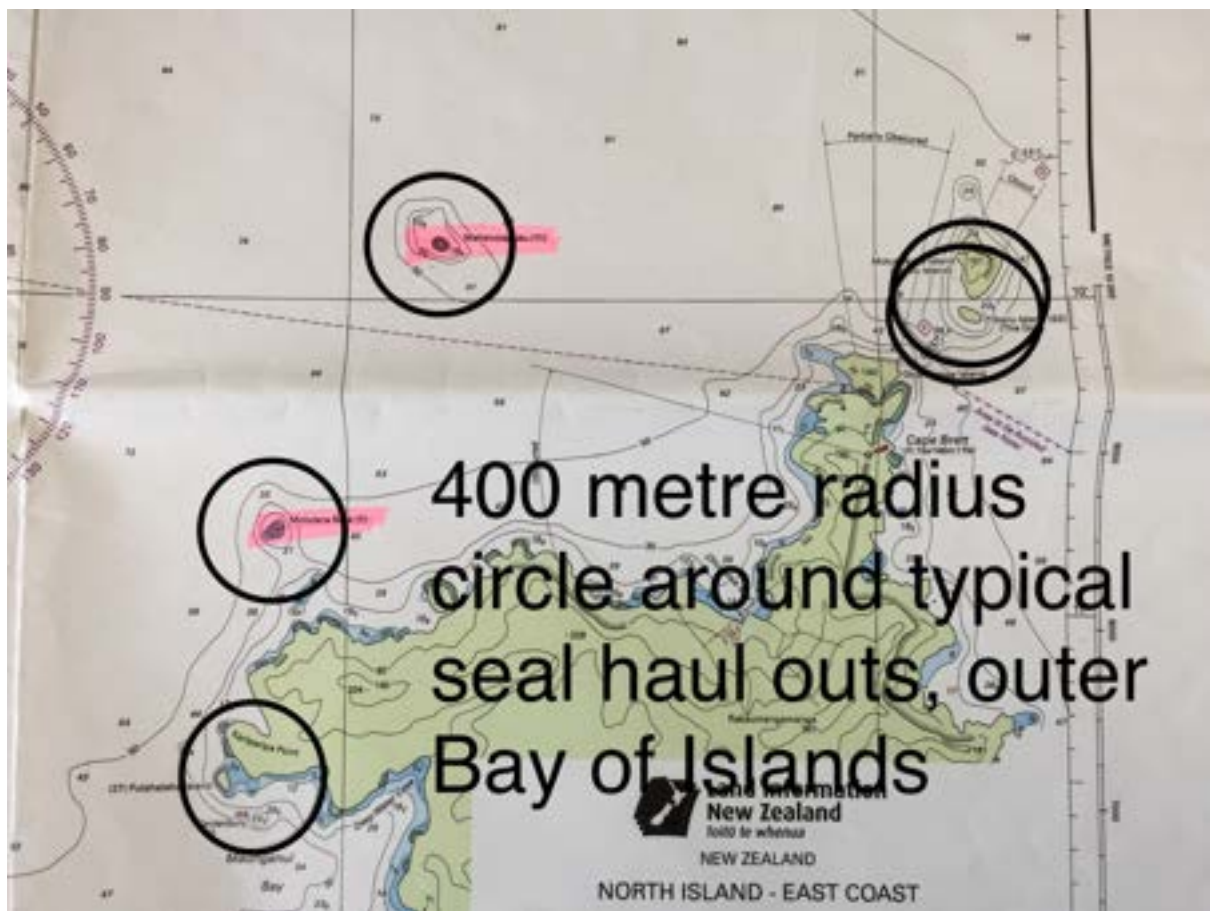
I should like to see new legislation drafted with the involvement of the Bay's marine community that addresses these concerns so that the department can do its job in a fair, open and legal manner. It is perfectly possible to write legislation to this effect, that does not impinge on the rights and freedoms that we have come to expect in a civilised society. Every other enforcement agency in the free world appears to be able to do so.

Richard Ham  
Senior Training Master and Examiner High Speed Ships

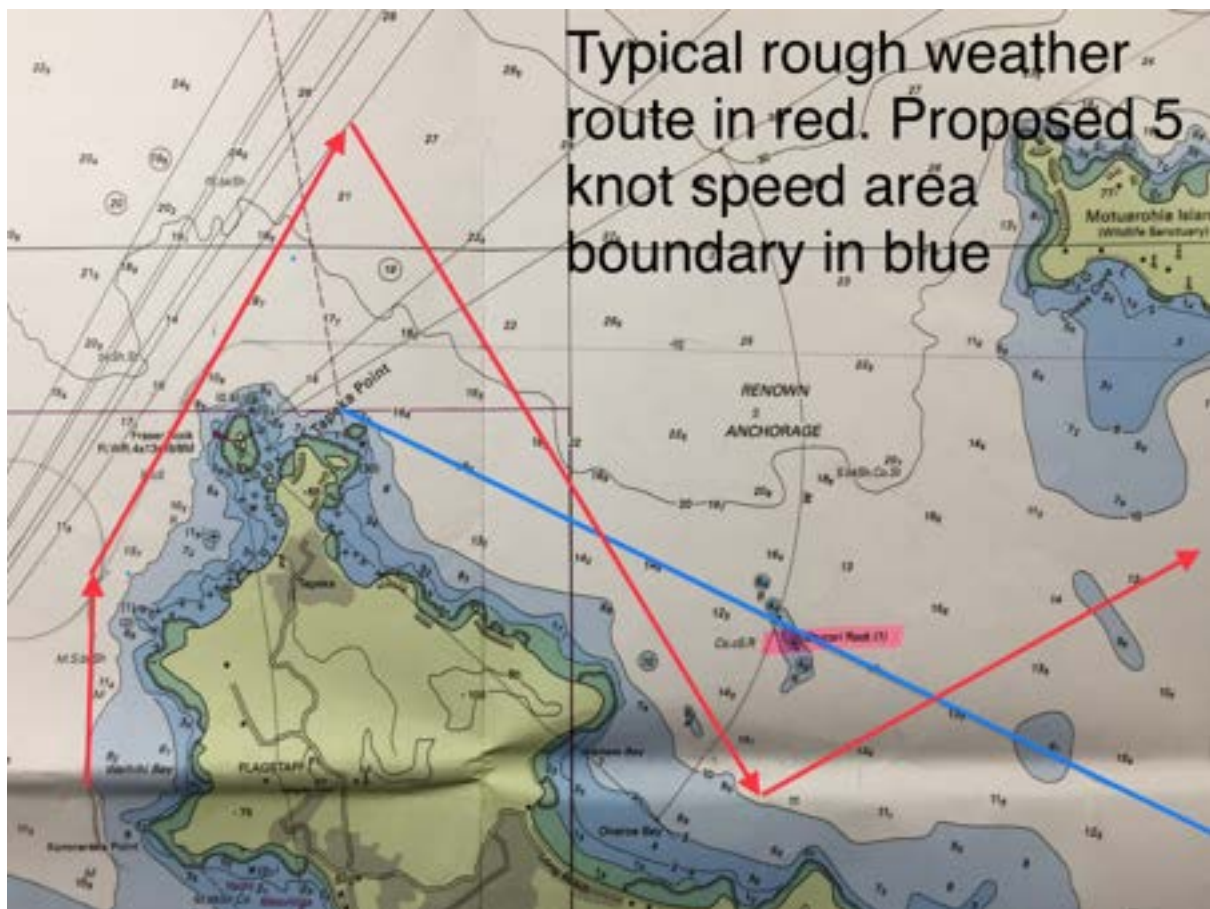
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# WS-BOIMMS-145467: 3

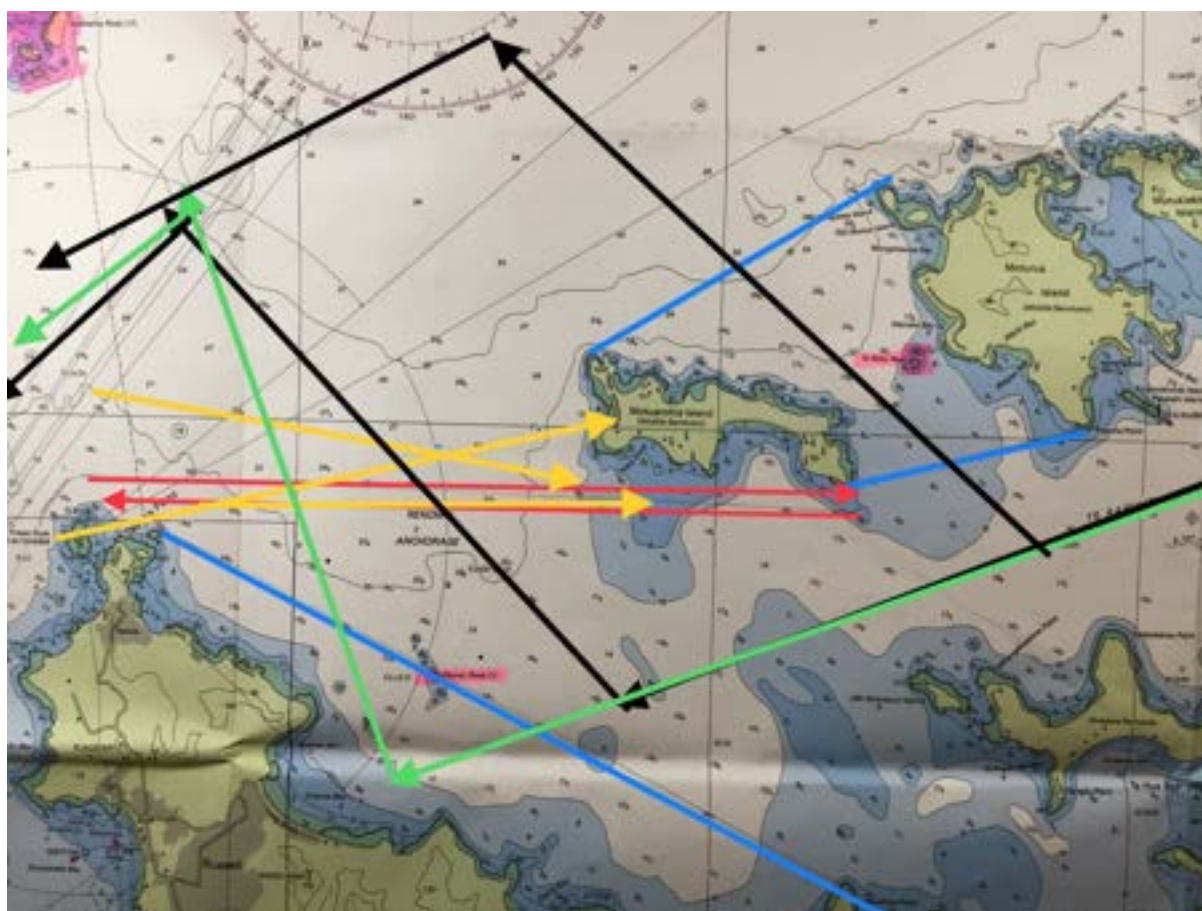


# WS-BOIMMS-145467: 4





# WS-BOIMMS-145467: 5



**WS-BOIMMS-145470: 1**



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 mail@yachtingnz.org.nz  
 www.yachtingnz.org.nz

Soil for Life

May 17, 2021

### Bay of Islands Marine Mammal Sanctuary

Yachting New Zealand oppose the proposed Marine Mammal Sanctuary Proposal, as it is written, and strongly urge the Department of Conservation to adopt a more collaborative approach to find a better solution. We are disappointed we were not consulted by DOC over this process, given our position within the yachting and boating sectors and the number of people and organisations we represent.

Yachting New Zealand is the national sports organisation for the sport of sailing at all levels in this country. We represent more than 200 member clubs, classes and affiliated organisations, including approximately 25,000 club members, making us the largest organisation in New Zealand to represent competitive and recreational keelboat sailors, large power boat users and dinghy sailors. There are four affiliated yacht clubs in the Bay of Islands, another eight in Northland and 38 in the Auckland region and all are active users of the Bay of Islands area. A number of significant national and international sailing events are held in the Bay of Islands annually, including the Bay of Islands Sailing Week, Coastal Classic and Millennium Cup, and the area also plays host to various national and regional championships.

Yachting New Zealand consulted widely with our members, as well as prominent organisations in the wider marine industry, before putting this submission together. On top of that, we have extensive experience in environmental and safety matters.

We partner with Maritime New Zealand to administer section 21 of the Transport Act around safety equipment and standards for boats departing New Zealand, of which most do so through Opuā. We are also connected through a wide-ranging network which includes, but is not exclusive of, the Safer Boating Forum which also includes harbour masters, industry leaders, brokers and other maritime operators, national organisations and bodies who communicate safety messaging to members and the wider public.

We oppose the proposed Marine Mammal Sanctuary Proposal, as it currently stands, for the following reasons:

- The proposal will significantly impact local, national and international sailing events in the Bay of Islands. Requiring vessels, including boats racing, to stop if they are within 400m of marine mammals is unreasonable and unworkable and will lead to many







Sail for Life

abandoned races and events. This will make events that are important to the region difficult to deliver.

- We also oppose a vessel coming to a complete halt on the grounds of navigational safety. It has the potential to be unsafe for a range of sailing and powered vessels constrained by draft and restricted in their ability to manoeuvre.

Thank you for the opportunity to present Yachting New Zealand's submission on the proposed Bay of Islands Marine Mammal Sanctuary and we welcome the opportunity to be involved in further consultation on this very important issue.

Kind regards

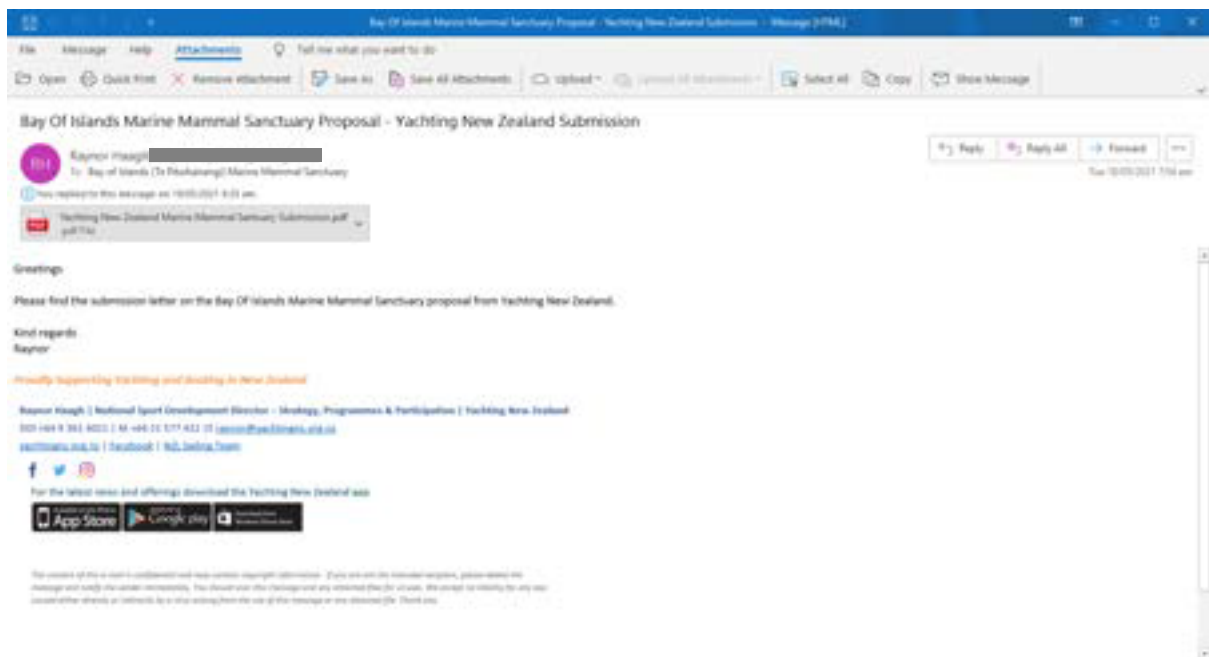


David Abercrombie  
Yachting New Zealand chief executive



Sail for Life

# WS-BOIMMS-145470: 2






# WS-BOIMMS-145473



To Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary

 You replied to this message on 19/05/2021 4:05 pm.  
We removed extra line breaks from this message.

Bay of Islands Marine Mammal Sanctuary

I strongly recommend a MMS in the Bay of Islands for the following reasons:

The Bottlenose Dolphin population in Bay of Islands where uniquely high levels of interactions with people and vessels are affecting all Marine Mammals.

Marine Mammals Protection Regulations do not adequately address interactions between people, vessels and Marine Mammals.

The Bottlenose Dolphin population has declined significantly, from 278 in 1997 to 26 in 2020.

Of these 26 individuals, only 16 now frequently visit the Bay of Islands.

75% of all calves die before reaching adulthood.

No new calves were born during calving season (December-March) in 2019/20.

In the Bay of Islands the Bottlenose Dolphins spend on average 86% of daylight hours in the presence of at least one vessel.

After interacting with people and vessels, the dolphins take up to six hours to return to normal behavior. (Feeding the babies, resting and mating).

Under the New Zealand Threat Classification Scheme these are classed as:

\* Threatened (Nationally Critical and Nationally Endangered)

\*\* At Risk

\*\*\* Data Deficient

The Bay of Islands is a Marine Mammal Mecca with the following species frequently visiting our bay including their Threat Classification: Bottlenose Dolphin \* Endangered, Blue Whale \*\*\*, Bryde's Whale \* Endangered, Common Dolphin, False Killer Whale \*\* At Risk, Orca Whale **704** At Risk, Humpback Whale, NZ Fur Seal, and Pilot Whale.

The Bay of Islands is an important location as it provides a nursery habitat for Marine Mammals. The Mammals frequently spend time within the boundary of Tapeka Point and Whangaiwahine Point, and between Motuarohia

**WS-BOIMMS-145476**

Tammy Jameson

This is a submission to the Marine Mammal Sanctuary proposal in the Bay Of Islands 2021

I Oppose the Marine Mammal sanctuary

My name is Tammy Jameson and I have been a Skipper in the Bay of Islands for over 20 years for one of the companies that has a permit to view and swim with the dolphins. My involvement with the dolphins has been pretty much full time in my work.

I know the individual dolphins well and have watch many grow up from calves and seen the improvement of the general public over these many years. My observations on the dolphins behaviour in this time is reflected in my reasons below of saying NO.

The reason I oppose this sanctuary is:

- The want for vessels to stop completely until the dolphins move out of the 400mtrs area would have some vessels stuck for a while as sometimes the dolphins mill in an area for 30+ minutes. A sailing vessel would not be able to do this (stop).

Change to Stay on original line of travel, go into neutral (if safe and possible), slow for boats under sail. If a motor vessel stops by going into neutral, the dolphins generally do two things, come and say hi or continue on their way. If the latter there is no requirement to wait until they are that far away so drop distance to 300mtrs. Joining a sailing boat for a short period of time is an amazing experience for all, even for the dolphins, but generally the dolphins will pull off within 5 min and return to the pod.

- The involvement of all Marine mammals is something I can't quite figure out why they have been included, as the small amount of time we get visiting numbers of different species of whales, orca, pilot whales and even false killer whales in the Bay of Islands can only be described as a treat. Seals also being included is mystery as this will stop a massive amount of activities for no reason in a lot of places where they hang, Piercey Island, Bird rock, the Cape Brett landing, Tapeka point, and even the Opuia marina.

Change to Bottlenose dolphins only, the seals are in healthy numbers and have never been a concern.

- The two Dolphin Safe Zones (which are huge ) That requires one to travel through these areas at 5 knots with no dolphins in sight is something I have struggled with when one has to abide by the MMPA, one should slow down when coming across dolphins anyway, we as part of maritime rule also have to travel at a 5 knots speed within 200 meters of the shoreline. For safety reasons these areas are often used by vessels when the middle ground in rough or there is strong winds from the Southerly quarter.

Change to Remove completely .

- Taking out swimming with MM is sad as when dolphins want to interact then it is once again it is their choice they are wild, and let them have some fun, I have never seen anyone being able to keep up with them, so they call the shots.

Change to Stick to the Marine Mammals Protection Act, there is to be no swimming with calves or juveniles which I support, just again needs to be educated. There is many times over summer where sub adult pods will mingle in amongst the boats anchored, and by the camp grounds so memory making moments when one is at anchor or swimming from the beach.

If the Marine Mammals Protection Act was properly educated then enforced I would expect to see a vast improvement again with the general public. **Not enough has been done.** There are only small signs by boat ramps, No signs at the marinas or at yacht clubs or boat clubs. This would need to be a National campaign which could only benefit all of New Zealand marine mammals and for all that use the waters around the coast.

I am disappointed in the efforts of Ms Peters in her communication and with-holding information, not working in collaboration with the operators has left a bitter taste in ones mouth when it could have been helpful to her and also for the dolphins. She has also been fully aware of the aggressive pod out here and has only just started mentioning this,

I feel (as well as others) that there is a major breach of a "conflict of interest" where the Marine Mammals ranger has her husband involved with the research.

This proposal has been put together without a lot of consideration and thought of what goes on here in the Bay of Islands. If there is such a major concern then all the permits should be removed and more enforcements followed through on.





**WS-BOIMMS-145479**



Tammy and Scott Jameson  
[info@boisnorkelling.co.nz](mailto:info@boisnorkelling.co.nz)

Bay of Islands Snorkelling submission to the Proposal of the Marine Mammal Sanctuary 15th of May 2021

Bay of Islands Snorkelling opposes the proposal for the following reason, with possible amendments.

- \* The proposal requires a vessel to stop within 400mtrs of marine mammals and to wait until they leave, This is not an option when seas are rough, for the passengers and vessel safety, also for time schedules.
- \* Amend to Neutral if possible or slow speed by sail and bring distance to 300 mtrs all vessels are to maintain their course (so not to turn back to reconnect).
- \* The blanket cover of all marine mammals in the sanctuary is not necessary as it is only the Bottlenose dolphins that the concern is about. In particular the seals who are thriving at the moment, and if in the water or on the rocks would put a halt to a lot of activities for all boating, tour operations, diving, snorkelling and even ferry services.
- \* Amend to Bottlenose dolphins only
- \* No swimming with any marine mammals. I have seen many encounter where the dolphins choose to go into beaches to have that interaction with people and this is an amazing moment for all and if they don't want to stick around, no one can swim that fast.
- \* Amend to Only Pods with calves and swimming only if you are at anchor, this way they can move on easily or avoid. Dolphins choice.
- \* To have the two areas as 'safe zones' for the dolphins to be only 5 knots at all times is bizarre and not required when one has to stop/slow down anyway. Coastal Bottlenose Dolphins are well known to use the coastline to have their rest period. These areas are also safe travel places (for boats) when the middle ground has rough seas or there is strong winds from the South. Maritime law is that a vessel can only do 5knots within 200 mtrs of the shore anyway.
- \* Amend to Remove completely as these areas are massive and one has to slow down anyway.

We note that the Marine Mammals Protection Act that is already there has not been well educated enough in the Bay of Islands to the general public and needs to be put across as a serious act to get people to stick to the rules, in this I do not mean misleading information or scare mongering also the child puzzles and comical way it has been given out lately does not work. The signs at boat ramps are small and no signs or information at boat clubs or marinas is disappointing.

If the marine mammals protection act is followed then there should be no need to add a sanctuary.

The Research has been limited to one possible cause and no other factors. To get any backing from us we will need more research on these other concerns. Their food, social behaviour and the general eco system.

In closing, the dolphins are wild and have the freedom to choose when they would like to interact with any vessel, for one to want to 'rehab' them because they are having fun is absurd. The peak time of summer (6 weeks max) can be seen to put a strain on the dolphins, but they are very clever at disappearing (not to be seen) when they want to. The dolphins out there are (also by DOC's accounts) healthy and the numbers outside the Bay of Islands plenty.





# WS-BOIMMS-145482

**Jared Bothwell**

---

**From:** Judith and Bruce Burling [REDACTED]  
**Sent:** Tuesday, 18 May 2021 11:42 am  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary  
**Subject:** Support for proposed marine mammal sanctuary in Te Pēwhairangi

From Judith and Bruce Burling  
[REDACTED]

We totally support the establishment of the marine sanctuary in Te Pēwhairangi

We have lived beside the Kerikeri Inlet just east of Taranaki Island for over 25 years - originally we regularly saw dolphins, sometimes circling herding fish, sometimes dancing on their tails or just in groups traveling up and down the Inlet

In the last few years we have seen NO dolphins at all

If changes are to be made to the proposal we would like to see huge expansions to the protected area

AND

With only 0.4% of the NZ coastal waters protected it seems absolutely essential that all sanctuary areas are enlarged and more created so that this and future generations will be able to see fish, scallops, crayfish and other marine life before they become extinct - examples like Poor Knight Islands and Leigh Goat Island reserves even though they are small in area show the abundance of life that can be seen if there is no fishing and dredging

We would like to see a large and totally protected marine sanctuary in Te Pēwhairangi

Bruce and Judith Burling

**WS-BOIMMS-145485: 1**

# Bay of Islands Yacht Club

(Incorporated)



Clubhouse, Waitangi  
PO Box 205, Paihia  
Bay of Islands, NZ  
Phone (09) 402-7891

May 15<sup>th</sup>, 2021

Wendy Tobin – Vice Commodore of Bay of Islands Yacht Club

Phone: [REDACTED]

Email: [REDACTED]

Send to Email: [boimms@doc.govt.nz](mailto:boimms@doc.govt.nz)

Bay of Islands Yacht Club members spend many hours on the water and this mammal sanctuary proposal will directly affect our operations. We support the marine mammal sanctuary proposal in principal, however, not in its current form. We have suggested below some changes and amendments that would make this proposal more practical.

- The proposal suggests that vessels within 400m of Marine Mammals will have to come to a complete stop until the marine mammals move 400m away from the vessels. This could create an 800m wide stop zone for all vessels. Sailing vessels are known to create less of a disturbance to dolphins. It is impractical to prevent sailors from entering an 800m zone. This proposal would result in the abandonment of yacht races and events.
- Another amendment we would suggest is to remove the clause of stopping and dropping sails while on the water. Taking sails down is not only extremely difficult, but also could become a safety issue as without sails vessels lose steering.
- The inclusion of seals in the species protected by the marine mammal sanctuary should be removed. Seals are known to be quite sedentary and can stay in a location for an extended period of time. Under the proposed rules they have the potential to restrict all vessel movements in large portions of the Bay of Islands.
- Reduce the minimum space required around marine mammals to 300m. This is consistent with current rules and reduces the disruption to boaters and sailors.
- Remove the requirement for vessels to come to a complete stop around marine mammals if they are in direct route. They should and instead require vessels to reduce speed to 5kts. However, all vessels actively seeking out dolphins should come to a complete stop outside of the 300m restrictions.

BOIYC recognises that the sanctuary will improve the ability to control the actions of vessels around marine mammals. More regulation and enforcement of existing rules is desperately needed in order to protect these vulnerable species which are declining in numbers.

## Bay of Islands Yacht Club

(Incorporated)



Clubhouse, Waitangi  
PO Box 205, Paihia  
Bay of Islands, NZ  
Phone (09) 402-7891

We also would like to encourage more research into marine mammals feeding habits. Fish stocks have reduced dramatically in the Bay of Islands over the last 20 years. It is important that we protect the marine mammal's food sources with more stringent regulations around protecting our fish stocks.

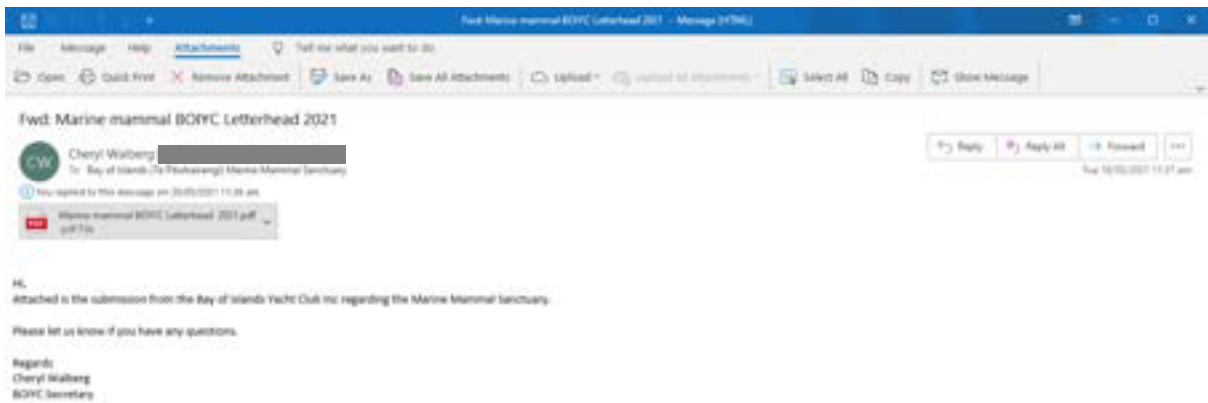
Another point to consider is that vessel numbers in the Bay of Islands have increased dramatically. This has put additional pressure on our marine mammals in multiple ways. As a result, our dolphin numbers have reduced to the point where something has to be done before it is too late.

Ngā mihi,

Wendy Tobin – Vice Commodore of the BOIYC



# WS-BOIMMS-145485: 2



The screenshot shows an email client window titled "Fwd: Marine mammal BOIFC Letterhead 2021 - Message (HTML)". The interface includes a menu bar with "File", "Message", and "Help" options, and a toolbar with actions like "Open", "Quit First", "Remove Attachment", "Save As", "Save All Attachments", "Upload", "Select All", "Copy", and "Show Message".

The email subject is "Fwd: Marine mammal BOIFC Letterhead 2021". The sender is Cheryl Wallberg, with a profile picture showing the initials "CW". The recipient is "Bay of Islands (267646666) Marine Mammal Sanctuary". A timestamp indicates the message was received on 2019/02/11 at 11:25 am. The email contains one attachment: "Marine mammal BOIFC Letterhead 2021.pdf".

The body of the email contains the following text:

Hi,  
Attached is the submission from the Bay of Islands Yacht Club inc regarding the Marine Mammal Sanctuary.  
Please let us know if you have any questions.

Regards,  
Cheryl Wallberg  
BOIFC Secretary

**WS-BOIMMS-147491: 1**

## Proposed Bay of Islands Marine Mammal Sanctuary

May 11 2021

Email: [boimms@doc.govt.nz](mailto:boimms@doc.govt.nz)

Submission of:

Edward Hanson

[REDACTED]

[REDACTED]

[REDACTED]

### Marine Mammal Sanctuary

Instead of imposing laws on a small area of New Zealand spend your time educating New Zealanders not to chase dolphins in their boats.

The majority of problems are created by casual visitors to the BOI who are unaware of the issue, or the limitations imposed by the current regulations.

A targeted public education programme based on the current regulations such as that for the fan worm problem may give better results than imposing another layer of regulation.

The education requirements of the BOIMMS should be consistent with other government agency messaging. The attached image promoting swimming with dolphins was regularly promoted in the NZ Herald and other websites during the period of consultation. It is inconsistent that areas be targeted for additional restrictions while at the same time the cause of the problem is being promoted with government funding. While this is a Kaikoura based activity, the message is to try new activities and swimming with dolphins is good for you. This advertising campaign has the potential damage dolphin populations much more than the proposed benefits of the BOIMMS. It also negates the benefit of any education campaign that is undertaken.

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SEASON  
STARTS  
NOW**

[DISCOVER MORE](#)

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NEW ZEALAND**

**Dolphin Encounter  
KAIKOURA**

**IT'S  
RECHARGE  
SEASON**

**DO SOMETHING  
NEW  
NEW ZEALAND**

*Advertise with NZME.*

*1 New Zealand Herald Website: Tourism New Zealand: 29 April 2021*



2 New Zealand Herald Website: Tourism New Zealand: 29 April 2021

### Marine Mammal Safe Zone

- a. The first zone being between Motuarohia Island (Robertson Island) and Moturua Island, enclosed to the North by a straight line running from 174°9.608'E , 35°13.661'S to 174°10.736'E, 35°13.382'S and enclosed to the South by a straight line running from 174°10.672'E, 35°14.177'S to 174°11.617'E, 35°13.960'S;
- b. The second zone being sea area between Tapeka Point and Whangaiwahine Point enclosed to the South by a straight line running from 174°7.390'E, 35°14.498'S and 174°11.237'E, 35°14.904'S

My family owns property at Paroa Bay within the Proposed Marine Mammal Safe Zone (MMSZ). As a landowner and user of the area since 1993, we have an intimate understanding of the dolphin patterns in the Bay and the boat traffic in the area. For most landowners in the MMSZ, the presence of dolphins and other marine mammals is not a novelty and there is no desire to investigate their activities or interact with them.

The majority of private dolphin watching occurs in the area just South of Robertson Island, and is usually associated with vessels not normally resident in the immediate area. For these boats it is a novelty.

We have good views over Paroa Bay and are aware of when dolphins and other Marine Mammals are active in the bay. There are long periods when there are no Marine Mammals visible in the Bay. Speed restrictions should not apply during these periods.

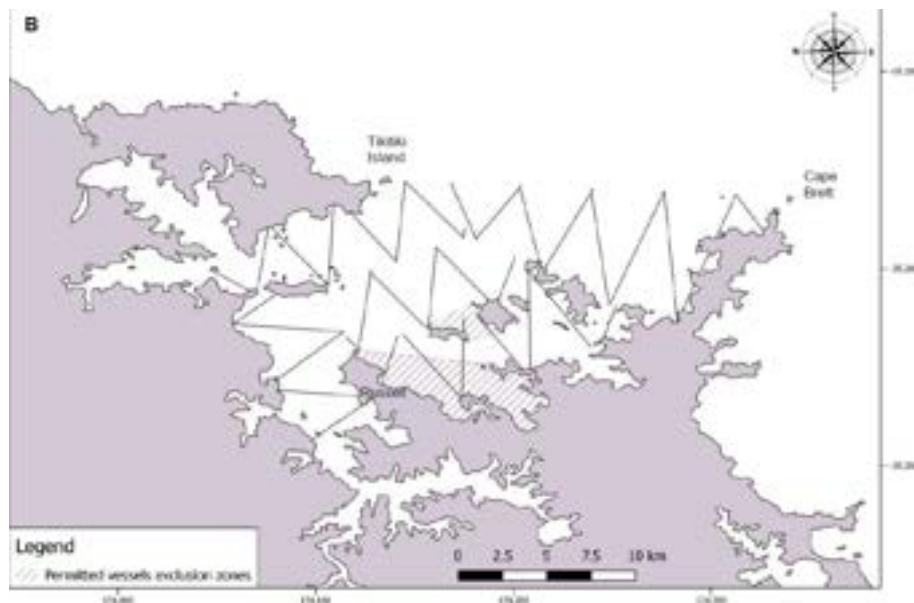
Our normal boating activities in the area include, fishing, water skiing, sailing and venturing out to other areas. All of these involve traveling at speeds greater than 5kn. It is important to note that in most cases this occurs when there are no dolphins visible in the surrounding area.

The proposed restrictions of the wider BOIMMS would allow for normal coastal activities to occur without the permanent 5kn restrictions on daily boating activities.

The property owners of the MMSZ are the people most inconvenienced by the proposal, but also least likely to engage in behaviours that put the dolphins at risk.

It is also important to note that prior to this proposal there has been no attempt at communication / engagement with the property owners within the MMSZ. Due to the proximity to the area, the land owners are the people most likely to be able to assist with objectives and the education of other boat owners. Given the high costs associated with enforcing the proposed restrictions it would be better to have local residents supporting the objectives rather than alienated by the regulations.

The 2020 research undertaken by Trioceans does not appear to have entered either Paroa Bay or Manawora Bay as part of its studies. Due to the fact that the proposal draws on this report in suggesting the MMSZ, there is a reliance on data that is not relevant to the subject area.



**Figure 1:** Entire study area (A) and Bay of Islands only (B) and transect lines, New Zealand. The arrows indicate operational limits for permitted vessels. The dashed zones represent the current exclusion zones for permitted vessels.

It is also important to note that if the Dolphin population is to be supported, this should be on a wider basis that incorporates marine reserves. This will protect the food species required.

Over the last 25 years many properties adjacent to the MMSZ have initiated large scale revegetation programs. This has reduced the silt generated in the area. Siltation is an issue which has a dramatic impact on marine ecosystems and should be addressed as a larger view of the regeneration requirements of the region. This is again a situation whereby those individuals who have contributed most are being penalised most.

If a MMSZ is to be adopted it should be limited to the area from Tapeka Point to Oturori Rock to the Northern End of Waitata Bay. This area should also be adopted as a Marine Reserve. This area has limited high speed traffic and is more easily avoided if needed. Similarly there are other locations in the Bay of Islands that would be more appropriate as a MMSZ which would have less impact on local residents.

The challenge you have is uneducated people attempting to interact with Dolphins. The harsh restrictions of the MMSZ does not achieve a solution to this demand. It however inconveniences and alienates those people mostly likely to be able to educate those people that are seeking these interactions.

**My submission is that the Proposed Marine Mammal Sanctuary should not be adopted unless the Marine Mammal Safe Zones are removed.**

**If a Marine Mammal Sanctuary is adopted then it should be supported by an education programme that is consistent with other Government messaging.**

**If a Marine Mammal Sanctuary is adopted then it should not have exclusions for commercial vessels.**

**Similar restrictions should be placed in all areas where dolphins are found in New Zealand.**

Kind regards



**Edward Hanson**

# WS-BOIMMS-147491: 2

**From:** Edward Hanson [REDACTED]  
**Sent:** Tuesday, 11 May 2021 8:46 pm  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary  
**Subject:** Proposed Bay of Islands Marine Mammal Sanctuary  
**Attachments:** Bay of Island Dolphin Submission EPH.pdf

**Edward Hanson**

Mobile NZ [REDACTED]  
Email: [REDACTED]



**WS-BOIMMS-147494: 1**

Marine Mammal Sanctuary Bay of Islands

- 1 Do you support or oppose the proposed marine mammal sanctuary? If so why, or why not?
  - 2 Do you believe the proposal should be changed or amended? If so, what changes would you propose and why?
  - 3 Do you agree with how we have characterised the problem, objectives and impacts? If not, how would you change it?
1. SUPPORT I have enjoyed the Bay of Islands for the last 50years and have seen the degradation of this beautiful treasure (Taonga) I have known the Bay of Islands when dolphins were so numerous that they would always be part of your day. I support this proposal as it may go some way to addressing the problem.
  2. The proposal is great as is but I would like to see the same area as a total marine sanctuary-no take zone. That would bring the dolphins back as they would have food. I would take the sanctuary out 5 kilometres from Cape Brett. (like Leigh)
  3. I agree with characterisation of the problem, great research. I think further research should be done on all fish species. ( Crayfish have not come back in the ( Hauraki Gulf)

**Te Pēwhairangi (Bay of Islands) marine mammal sanctuary  
proposal submission form**

**Your details**

Your name: Robert Newport

Organisation (if applicable): \_\_\_\_\_

Street address: \_\_\_\_\_

Suburb: \_\_\_\_\_

City: \_\_\_\_\_

Region: \_\_\_\_\_

Email address: \_\_\_\_\_

Phone number: \_\_\_\_\_

Are you whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area?

Yes  No

If you answered yes, please provide details (eg. which hapū and/or iwi do you affiliate to):

**Which group(s) best describes your interest:**

Northland / Te Pēwhairangi Bay of Islands community member

Whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area

Recreational maritime vessel operator

Commercial maritime vessel operator

Local business owner

Local community group

Member of the New Zealand general public

Science and research

Environmental groups

Other (please specify): \_\_\_\_\_

**Official Information Act 1982**

Please note that any submission you make will become public information and that anyone can ask for copies of all submissions under the Official Information Act 1982.

The Official Information Act states that we must make information available unless there is a good reason for withholding it and provides a list of such reasons in sections 6, 9 and 18. If you think there is a good reason to withhold specific information, please state this in your submission. A good reason may include commercial confidentiality or that it is personal information. Note that any decision that is made by DOC to withhold information can be reviewed by the Ombudsman, who may require the information to be released.

I would like specific information in my submission withheld.

Please state the reasons for wanting specific information in this submission withheld.

## WS-BOIMMS-147494: 2

**From:** Blue Newport [REDACTED]  
**Sent:** Wednesday, 12 May 2021 9:18 am  
**To:** Bay of Islands (Te Pēwhairangi) Marine Mammal Sanctuary  
**Subject:** submission  
**Attachments:** Submission.pdf

Hi Team please find attached my submission

Blue Newport

**WS-BOIMMS-151512: 1**

**Te Pēwhairangi (Bay of Islands) marine mammal sanctuary  
proposal submission form**

**Your details**

Your name: Brigid Lynch, Glen McGrath, Sally Roberts, Andrea Watts, Peter Watts

Organisation (if applicable): \_\_\_\_\_

Street address: \_\_\_\_\_

Suburb: \_\_\_\_\_

City: \_\_\_\_\_

Region: \_\_\_\_\_

Email address: \_\_\_\_\_

Phone number: \_\_\_\_\_

Are you whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area?

Yes  No

If you answered yes, please provide details (eg. which hapū and/or iwi do you affiliate to):

**Which group(s) best describes your interest:**

- Northland / Te Pēwhairangi Bay of Islands community member
- Whānau, hapū or iwi that exercises kaitiakitanga in the proposed sanctuary area
- Recreational maritime vessel operator
- Commercial maritime vessel operator
- Local business owner
- Local community group
- Member of the New Zealand general public
- Science and research
- Environmental groups
- Other (please specify): \_\_\_\_\_

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I would like specific information in my submission withheld.

Please state the reasons for wanting specific information in this submission withheld.



**WS-BOIMMS-151512: 2**



## Proposed Te Pēwhairangi (Bay of Islands) Marine Mammal Sanctuary

18 May 2021

Submission of:	Postal address:	Email address:
Brigid Lynch Glen McGrath Sally Roberts Andrea Watts Peter Watts	[REDACTED]	[REDACTED]

1.

We **oppose** the proposed marine mammal sanctuary in its current form.

Action must be taken to educate the public on how to behave around marine mammals, but we don't think this should include a speed limit in parts of Te Pēwhairangi.

2.

### MARINE MAMMAL SAFE ZONES

We believe the proposal should be **amended** to remove the 5 knot speed restrictions and "marine mammal safe zones".

Restricting speed in those zones would have long-lasting impacts on local families, and would stop children, whānau and friends from enjoying general water-based activities in the Bay of Islands.

Our children have been learning to water-ski and sail in the same waters as their parents and tupuna at Paroa Bay. Under the proposal, this would stop.

We fish to provide for our families and others who aren't so fortunate. Under the proposal, this would be limited.

We venture further out into the Bay of Islands to explore with visiting family and friends. Under the proposal, this would be impractical.

For those who live and holiday regularly around the proposed marine mammal safe zones, seeing dolphins and other marine mammals from the shore and on the sea sparks joy, but we respect their space and do not interact with them.

We are the people most inconvenienced by the 5 knot speed restrictions of the proposal, but also least likely to engage in behaviours that put the dolphins at risk. We are also the eyes and ears and voices of Te Pēwhairangi, and our children are the kaitiaki.

We believe a targeted public education programme would give better results than imposing another layer of regulation. Those most likely to put dolphins at risk are uneducated visitors attempting to interact with them. The restrictions of the marine mammal safe zones do not solve this, but instead

would inconvenience and alienate the local people who are mostly likely to be able to educate others.

**MARINE MAMMAL SANCTUARY**

We **support** the creation of a marine mammal sanctuary in general, and the prohibition on being in the water with any marine mammal within the boundaries of that marine mammal sanctuary.

We **support** a 400m distance from any marine mammal present within the boundaries of the marine mammal sanctuary.

We **oppose** exempting commercial vessels from this restriction. The majority of close contact with marine mammals is initiated by vessels with viewing permits, so exempting them seems counterintuitive. During the summer, commercial dolphin-watching boats in an area often act as markers, drawing in private boats looking to interact with the dolphins.

**Our submission is that the proposed marine mammal sanctuary should not be adopted unless the marine mammal safe zones are removed.**

**If a marine mammal sanctuary is adopted then it should be supported by an education programme that is consistent with other government-initiated messaging.**

**If a marine mammal sanctuary is adopted then it should not have exclusions for commercial vessels.**

Sent by email to: [boimms@doc.govt.nz](mailto:boimms@doc.govt.nz)

**WS-BOIMMS-151515: 1**

Cameron Hockly  
Barrister and Solicitor

HOCKLY  
LEGAL

18 May 2021

Minister for the Environment  
Wellington

By email to boimms@doc.govt.nz

Kia ora

**RE: Proposed Marine Mammal Sanctuary for Te Pēwhairangi**

1. This is a cover letter sent on behalf of clients of mine, Bella Thompson and Marie Tautari.
2. We met and discussed the notice of the proposed Marine Mammal Sanctuary.
3. They discussed this with their wider whānau and hapū members and met with Carmen Hetaraka and Matiu Clendon Please on the 14<sup>th</sup> of May to finalise a response to the proposed sanctuary.
4. I attach the letters of response on behalf of three of those people;
  - a. Carmen Ria Hetaraka
  - b. Bella Thompson
  - c. Matutaera Tenanan Clendon.
5. We look forward to your response, when you do so please send that to me at [REDACTED] and also to [REDACTED]

Ngā mihi nunui



**Cameron Hockly**

Cameron Hockly LLB/BA

[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

**WS-BOIMMS-151515: 2**

From:



Minister for the Environment

14 May 2021

Delivery by email to boimms@doc.govt.nz

Re: Proposed Marine Mammal Sanctuary for Te Pēwhairangi

Tēnā koe Minister

This letter is sent by us as members of Ngāti Kuta, the hapū of Rakaumangamanga (Cape Brett), Rawhiti and the southern bays of Te Pēwhairangi, and is sent on behalf of all our whānau and hapū.

We have seen the notice about the proposed sanctuary, and this is our initial submission on it. We ask for a hui to follow up on this and to directly engage with you about how this sanctuary will operate, and who will be involved in making sure it works.

The starting point for our hapū is that we are ahi ka, we have lived on this coastline for centuries, our people are buried in this whenua, and we continue to live there and strongly maintain our active kaitiakitanga both for the whenua and for the moana, which sustain us.

We are already present in this whole rohe as kaitiaki, doing what we can to maintain the health of the moana, and all those species there. We have placed rahui along our coastline, as we have at Maunganui, (Deep Water Cove).

For us, this area is already a Rahui Tapu, it is an area we protect, both as our duty, and as who we are, because it sustains us, and we sustain it.

We appreciate the intention of the Marine Mammal Sanctuary, and in principle we support it, because it fits within (not over) the kaitiakitanga that we already currently practice, it fits within our conception of this rohe as a Rahui Tapu that we protect and serve.

We seek an indication from you that we will be able to be a part of the operation of this reserve as the kaitiaki of this rohe, and that we will be a part of this as a form of co-governance between the Crown and ourselves as tangata whenua and ahi ka.

From:

*Bella Ria Thompson*



*Rauha Rauha Kihuna / Ngati Kuta Hapū*

*Carmen Hetaraka*

*Te Uri o Hiki Hiki / Ngati Tautahi*

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\_\_\_\_\_

\_\_\_\_\_

Names

Signatures

Hapū

From:



Minister for the Environment

14 May 2021

Delivery by email to boimms@doc.govt.nz

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From:

WAIWAI TEANA CHENSON NGARIKUTA



_____	_____	_____
_____	_____	_____
_____	_____	_____

Names

Signatures

Hapū

**WS-BOIMMS-151524: 1**



Cameron Hockly  
Barrister and Solicitor

HOCKLY  
LEGAL

18 May 2021

Minister for the Environment  
Wellington

By email to boimms@doc.govt.nz

Kia ora

**RE: Proposed Marine Mammal Sanctuary for Te Pēwhairangi**

1. This is a cover letter sent on behalf of clients of mine, Bella Thompson and Marie Tautari.
2. We met and discussed the notice of the proposed Marine Mammal Sanctuary.
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4. I attach the letters of response on behalf of three of those people;
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  - b. Bella Thompson
  - c. Matutaera Tenanan Clendon.
5. We look forward to your response, when you do so please send that to me at [REDACTED] and also to [REDACTED]

Ngā mihi nunui

[REDACTED]

**Cameron Hockly**

Cameron Hockly LLB/BA

[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

**WS-BOIMMS-151524: 2**

From:



Minister for the Environment

14 May 2021

Delivery by email to boimms@doc.govt.nz

Re: Proposed Marine Mammal Sanctuary for Te Pēwhairangi

Tēnā koe Minister

This letter is sent by us as members of Ngāti Kuta, the hapū of Rakaumangamanga (Cape Brett), Rawhiti and the southern bays of Te Pēwhairangi, and is sent on behalf of all our whānau and hapū.

We have seen the notice about the proposed sanctuary, and this is our initial submission on it. We ask for a hui to follow up on this and to directly engage with you about how this sanctuary will operate, and who will be involved in making sure it works.

The starting point for our hapū is that we are ahi ka, we have lived on this coastline for centuries, our people are buried in this whenua, and we continue to live there and strongly maintain our active kaitiakitanga both for the whenua and for the moana, which sustain us.

We are already present in this whole rohe as kaitiaki, doing what we can to maintain the health of the moana, and all those species there. We have placed rahui along our coastline, as we have at Maunganui, (Deep Water Cove).

For us, this area is already a Rahui Tapu, it is an area we protect, both as our duty, and as who we are, because it sustains us, and we sustain it.

We appreciate the intention of the Marine Mammal Sanctuary, and in principle we support it, because it fits within (not over) the kaitiakitanga that we already currently practice, it fits within our conception of this rohe as a Rahui Tapu that we protect and serve.

We seek an indication from you that we will be able to be a part of the operation of this reserve as the kaitiaki of this rohe, and that we will be a part of this as a form of co-governance between the Crown and ourselves as tangata whenua and ahi ka.

From:

*Bella Ria Thompson*



*Ranata Reweti Kihuna / Ngati Kuta Hapū*

*Carmen Hetaraka*

*Te Uri o Hiki hiki / Ngati Tautahi*

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\_\_\_\_\_

Names

Signatures

Hapū

From:



Minister for the Environment

14 May 2021

Delivery by email to boimms@doc.govt.nz

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From:

WAIWAIARA TENANA      CHENSON      NGĀRIKUTA



_____	_____	_____
_____	_____	_____
_____	_____	_____

Names

Signatures

Hapū