

**Trans-Tasman Resources Limited Application to the EPA
Suggested Marine Mammal Conditions (other than noise)**

Recommended condition/s	Agree		Disagree	Comments (followed by name in brackets where applicable) <u>Note:</u>
	AB	BW		
<p>1. The consent holder shall ensure that at all times its employees and contractors undertaking airborne, seagoing and watch-keeping duties are informed of their obligations under the Marine Mammals Protection Act 1978 and Marine Mammals Protection Regulations 1992.</p>	<p>AB BW LS MH SC MC</p>		<p>AB = Andrew Baxter BW = Bernd Wursig SC = Simon Childerhouse MC = Martin Cawthorn LS = Liz Slooten MH = Michael Huber</p>	<p>1. Miles Yeates was unavailable to comment on these proposed conditions. 2. Liz Slooten expressed concerns about all the conditions except condition No. 1, noting she "did not sign onto those particular conditions, because the condition would serve no useful purpose or is insufficient to reduce impacts or ensure sustainability".</p>
<p>2. The consent holder shall undertake baseline surveys and subsequent monitoring surveys for cetaceans (whales and dolphins). The surveys shall monitor and assess scientifically cetacean presence, distribution, density and, where possible, total abundance, with a purpose of informing decision making including the development, ongoing implementation and review of the marine mammal</p>	<p>AB BW MH SC MC</p>			<p>It was not possible within the timeframe available to reach a consensus on a definition for the South Taranaki Bight. An option would be to define the area explicitly; e.g. a set distance from the consent area boundary or as a defined area with known coordinates. (Andrew Baxter)</p>

<p>section of the EMMP. The baseline survey and ongoing monitoring survey protocols shall:</p> <ol style="list-style-type: none"> a. be endorsed by the TPRG and approved by the EPA b. be designed and undertaken by independent, qualified and experienced marine mammal scientists who are endorsed by the TPRG and approved by the EPA; c. adopt scientifically appropriate and best-practice marine mammal survey methodologies; d. include the consent area and sufficient parts of the wider South Taranaki Bight, and be of sufficient duration, frequency and seasonality, to be able to achieve the purpose of this condition. e. be designed to assess any impacts of the mining operation on cetacean species with sufficient statistical power. 			<p>Aren't density and abundance the same thing? Perhaps "population size" is what is meant instead of abundance. Also, what statistical power is "sufficient"? (Michael Huber)</p> <p>I agree with Mike about what is "sufficient" but figured that the EPA are really the ones that need to determine what level of certainty they require. We talked about trying to specify a level but decided it was going to be a "how long is a piece of string" argument. Science can answer the questions but management need to set the levels of confidence they require. Density & abundance are related but different. I could be wrong here but my thought was that given the small marine mammal sample sizes that I think you would get in most surveys, you may be able estimate density OK but probably not abundance. While I am happy to leave independent in the text as I agree with the sentiment, I challenge someone to define it! (Simon Childerhouse).</p> <p>Density and abundance are different e.g. total number of animals per square nautical mile versus total population over entire area surveyed – but getting perilously close to a semantic argument (Martin Cawthorn)</p> <p>This condition needs to be much firmer. The work should be funded by the consent holder, but not</p>
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			<p>undertaken by the consent holder. The surveys conducted by TTR so far are inadequate for the purpose of Environmental Impact Assessment, Baseline or ongoing monitoring. As implied under b. there is a need for an independent agency (e.g. DOC or a Regional Council) to oversee this work, including contracting a suitably qualified, independent scientist. Independent oversight will help ensure that the consent holder does not unduly influence this work, for example by putting pressure on the researchers to modify the text of their final report or by providing insufficient funding, compromising the scientific standards of the survey. For example, NIWA include a standard clause in their commercial contracts to ensure a client doesn't unduly influence the text of the research report. Any 'baseline' surveys to be conducted before mining should be undertaken as soon as possible, to allow the results of the research to inform decisions on whether consent is to be granted. The information provided by TTR so far is inadequate for this purpose. (Liz Slooten).</p>
<p>3. The consent holder shall undertake Passive Acoustic Monitoring (PAM) using a stationary acoustic monitoring system. The purpose of PAM shall be to monitor cetacean presence and distribution within the South Taranaki Bight, within and outside the Consent Area, in order to better inform decision making including the development, ongoing</p>	<p>AB BW MH SC MC</p>		<p>Visual surveys and PAM are not mutually exclusive. For example, PAM may be a better option for surveying and monitoring cetaceans which are widely dispersed and/or in low densities (e.g. Maui's dolphin). It was not possible within the timeframe available to reach a consensus on the number and</p>

<p>implementation and review of the marine mammal section of the EMMP. PAM survey protocols shall:</p> <ol style="list-style-type: none"> a. be endorsed by the TPRG and approved by the EPA; b. be designed and undertaken by independent, qualified and experienced marine mammal scientists who are endorsed by the TPRG and approved by the EPA; c. adopt scientifically appropriate and best-practice marine mammal acoustic survey methodologies; d. include the project area and sufficient parts of the wider South Taranaki Bight, and be of sufficient capacity (e.g. number and distribution of PAM devices) and duration, to be able to achieve the purpose of this condition. The number of devices and their deployment shall ensure cetaceans are able to be detected and their positions determined relative to the Consent Area. 		<p>distribution of PAM devices. (Andrew Baxter)</p> <p>PAM will require some serious discussion around technical considerations. For example a PAM system designed for a blue whale probably won't be able to reliably detect a Maui's dolphin and vice versa. Therefore it is important to identify what you want to monitor and over what area before designing a PAM system to do it. This may require more than one system to be deployed for different species or frequency bands. High frequency marine mammals like Maui's won't be detectable for more than a few hundred metres immediately around the PAM unit. Another consideration is that the crawler and FPSO moves so this will have to factored into any sampling design strategy. (Simon Childerhouse)</p> <p>I recommend that the DMC and EPA seek advice from an independent researcher who routinely uses PAM systems before considering this condition. Again, a baseline survey using PAM is required as soon as possible as the information gathered this way is essential in terms of determining to what extent Maui's dolphins, blue whales and other marine mammals use the area that would be affected by mining. i.e. The mining area itself, plus the sediment plume area, plus the area over which mining noise would be audible (an area similar in size to the</p>
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			<p>sediment plume). (Liz Slooten)</p> <p>How do you cope with UHF animals and U Low F animals in the same system? (Martin Cawthorn)</p>
<p>4. The consent holder shall engage an independent and suitably qualified and experienced marine mammal expert (endorsed by the TPRG and approved by the EPA) to prepare and provide to the EPA reports on all marine mammal baseline and ongoing monitoring surveys (including PAM) according to a schedule and in a format or formats agreed to by the EPA. As a minimum, reports shall be provided after the baseline surveys have been completed, annually for the next five years, and then as required by the EPA. The EPA shall refer such reports to the TPRG for consideration. The TPRG shall invite a marine mammal expert or experts to join the TPRG for such consideration. The TPRG may make recommendations for additional monitoring, amendments to the EMMP or changes to operational practices to mitigate adverse effects on marine mammals.</p>	<p>AB BW MH SC MC</p>		<p>Again, the intent of involving an "independent" expert is that these researchers would not be working directly for TTR. The fact that NIWA include a specific clause in their commercial contracts limiting the ability of industry to influence the research indicates that such direct contracting arrangements are not in the best interests of achieving scientifically robust and sustainable outcomes. (Liz Slooten)</p>
<p>5. The consent holder shall provide all relevant employees and contractors with a marine mammal species identification guide and shall prepare and implement a training package and programme (including assessment and certification) for staff and contractors to help ensure accurate species identification and assessment of behaviour.</p>	<p>AB BW MH SC MC</p>		<p>This is essentially a "feel good" measure, unlikely to provide any real benefits in terms of research or environmental protection. (Liz Slooten)</p>

<p>6. The consent holder shall ensure:</p> <p>a. sufficient personnel on board all its vessels (including the FPSO) are, in addition to their regular duties, trained as cetacean observers (COs) in terms of marine mammal identification, behaviour observation, operational procedures and reporting, to standards agreed to by the EPA.</p>	<p>AB BW MH SC MC</p>	<p>Item 6 in its entirety is essentially a "feel good" measure, unlikely to provide any real benefits in terms of research or environmental protection. (Liz Slooten)</p> <p>The term "cetacean observers" (COs) was purposefully chosen to ensure there is no confusion between these observers and highly trained Marine Mammal Observers (MMOs) under the Seismic Code of Conduct. Watch-keepers are likely to be the best placed personnel for training as COs (Andrew Baxter).</p> <p>Experts generally noted and agreed that the effectiveness of this condition (and all others relating to COs and reporting of sightings) is limited by the ability of COs being able to detect marine mammals and observe their behaviour, in particular:</p> <ul style="list-style-type: none"> • It is not possible to see marine mammals at night (unless using night vision or heat sensing equipment) • Detection ability is strongly influenced by weather conditions and sea state, and the experience of the observers/s. • Even in good sightings condition, only a percentage of animals may be sighted. • The latter is particularly true for non-professional observers who have other on-board duties and
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			<p>where scanning for marine mammals forms only a proportion of their duties; though this will be offset to some extent by having COs on board all vessels.</p> <p>Notwithstanding these limitations, most experts (with the exception of Liz Slooten) agreed that on-board monitoring for marine mammals was still worthwhile, as long as these limitations are well understood.</p> <p>Another option would be to require dedicated and highly trained COs (akin to MMOs under the Seismic Code) for the first 12 months of the operation to establish baseline levels of marine mammal observation sighting rates (Simon Childerhouse).</p>
<p>b. at least one CO is on active duty on every vessel engaged in works during daylight hours (including the FPSO and vessels travelling to and from the extraction area).</p>	<p>AB BW MH SC MC</p>		<p>Refer comments above about the limitations of COs being able to detect marine mammals.</p>
<p>c. COs maintain regular checks for marine mammals around the TTR operational area and report on all marine mammal sightings. (Note: COs may have other duties on board the vessels but sufficient time shall be allotted for regularly scanning for and reporting on marine mammal presence and behaviour).</p>	<p>AB BW MH SC MC</p>		<p>Refer comments above about the limitations of COs being able to detect marine mammals.</p>

<p>d. COs maintain a daily log in a format agreed by the EPA of all marine mammal sightings and interactions including:</p> <ul style="list-style-type: none"> ○ Date, time and location (where practicable in latitude/longitude) of all marine mammal sightings relative to the consented operation ○ number of marine mammal individuals associated with each sighting, including the number of cetacean calves if present ○ behaviour of marine mammals including travelling, feeding, milling, avoidance, attraction and changes in behaviour ○ any marine mammal injuries or mortalities (including those attributable to the consented operation) ○ any management responses in relation to disturbed, distressed or injured marine mammals ○ time spent by COs actively on watch for marine mammals on a daily basis <p>Note: CO training, procedures and reporting (including the daily log) may be audited by the EPA at any time.</p>	<p>AB BW MH SC MC</p>		<p>Refer comments above about the limitations of COs being able to detect marine mammals.</p>
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<p>7. The consent holder shall prepare a report annually on all marine mammal sightings in a format agreed to by the EPA. This report shall include as a minimum:</p> <p>a. date and location of all marine mammal sightings relative to the consented operation.</p>	<p>AB BW MH SC MC</p>		<p>Refer comments above about the limitations of COS being able to detect marine mammals.</p> <p>Item 7 in its entirety is essentially a “feel good” measure, unlikely to provide any real benefits in terms of research or environmental protection. (Liz Slooten)</p>
<p>b. number of individuals (including cetacean calves) associated with each sighting</p>	<p>AB BW MH SC MC</p>		
<p>c. behaviour of marine mammals including travelling, feeding, milling, avoidance, attraction and changes in behaviour</p>	<p>AB BW MH SC MC</p>		
<p>d. any marine mammal injuries or mortalities (including those attributable to the consented operation)</p>	<p>AB BW MH SC MC</p>		
<p>e. an assessment of the sightings data by a suitably qualified marine mammal biologist.</p>	<p>AB BW MH SC MC</p>		

<p>8. The consent holder shall report any sightings of a Maui's or Hector's dolphin, to the Department of Conservation (DOC) immediately.</p>	<p>AB BW SC MC</p>	<p>MH</p>	<p>Suggest a more practicable term than "immediately" – within 24 hours, or other realistic time frame. Even one hour later is not "immediately" and it may not be possible to drop everything to contact DOC. Is there a mechanisms to notify DOC at any time (e.g., weekends, holidays)? (Michael Huber)</p> <p>I think immediate is OK. It is important for DOC to know immediately so they can send out a boat or plane to confirm it one is seen (Simon Childerhouse)</p> <p>I have left it as "immediately" for the reasons given by Simon, though would be happy with something like "as soon as possible and with urgency." (Andrew Baxter)</p> <p>This is essentially a "feel good" measure, unlikely to provide any real benefits in terms of research or environmental protection. (Liz Stooten)</p>
<p>9. The consent holder shall report any marine mammal strikes, entanglements, injuries or deaths to DOC immediately. If a strike, entanglement, injury or death involves a Maui's or Hector's dolphin, the consent holder shall, subject to the consent holder's obligations under the Marine Mammals Protection Act 1978, recover the carcass, notify DOC immediately and return it to shore as soon as possible for collection by DOC. The animal carcass shall be put on ice to</p>	<p>AB BW MH SC MC</p>	<p>MH</p>	<p>This is essentially a "feel good" measure, unlikely to provide any real benefits in terms of research or environmental protection. (Liz Stooten).</p> <p>This is fine. DOC is just a phone call away, then it is up to them to decide what they will do (Martin Cawthorn).</p>

<p>preserve the specimen as much as possible.</p>			
<p>10. Should a Maui's dolphin, Hector's dolphin or any whale or whales be detected in the general vicinity of the FPSO at the time of the initial start-up (or any future re-start) of the crawler and production equipment on the FPSO, the consent holder shall ensure the start-up is delayed until the whales have moved to a minimum distance of 500 metres from the FPSO.</p>	<p>AB BW MH SC MC</p>		<p>This condition is precautionary and unlikely to be particularly onerous. It is anticipated there will be few shutdowns and the chances of a Maui's/Hector's dolphin or whale being near the TTR site at the time of a re-start would be slim (Andrew Baxter)</p> <p>The probability of whales being detected, given the provisions in these conditions, is so low that the conditions are unlikely to provide any measurable benefits in terms of research or environmental protection. (Liz Slooten).</p> <p>Could say "cetaceans" (Martin Cawthorn)</p>
<p>11. Should any whale or whales be observed to approach closer than 500 metres to the FPSO while the crawler and FPSO plant equipment are operational, the consent holder shall as far as practicable minimise the amount of noise and sediment entering the water in accordance with the EMMP, including the following options:</p> <ul style="list-style-type: none"> a. shutting down the crawler and production equipment on the FPSO if this is operationally feasible; b. reducing the combined power of the crawler and the production equipment on the FPSO as far as 	<p>SC AB BW</p>	<p>MH MC</p>	<p>While I support the intent of this condition for the reasons outlined in my summary evidence, and accept the need for practicality issues to be factored in, the current wording is very uncertain and would probably be unenforceable. I would prefer it to be more explicit/enforceable. Perhaps the conditions experts could rewrite this condition to make it more certain (Andrew Baxter; Bernd Würsig also agreed with this statement)</p> <p>Maui's and Hector's dolphins are excluded. Humpback whales can be curious and approach vessels etc. I am not convinced that a requirement to</p>

<p>practicable; c. minimising ancillary vessel activity to the extent practicable.</p>		<p>shut down because a humpback whale approaches is justified, noting Andrew's comment about enforceability. This condition could create an incentive for the operator to attempt actions to repel whales. (Michael Huber)</p> <p>I too don't think this is quite right but it is a good start. I personally don't believe that a shutdown is necessary but I am OK with it being listed as an option for them. Reducing noise and sediment as far as practical is a challenge to monitor for sure but is a good general practice. (Simon Childerhouse)</p> <p>The probability of whales being detected, given the provisions in these conditions, is so low that the conditions are unlikely to provide any measurable benefits in terms of research or environmental protection. (Liz Slooten)</p> <p>I appreciate the probable rarity of the occasion and unenforceability. I don't think it's necessary. (Martin Cawthorn).</p>
<p>12. The consent holder shall develop procedures to minimise the risk of vessel interaction with marine mammals which shall be set out in the marine mammal section of the EMMP, and in particular those procedures shall include methods to ensure:</p>	<p>AB BW MH SC MC</p>	<p>This is essentially a "feel good" measure, unlikely to provide any real benefits in terms of research or environmental protection. There is no evidence that any of the steps described in 12 a-c would reduce the risk of ship strike or other negative impacts</p>






			caused by shipping. (Liz Slooten)
a. masters of all vessels (excluding the FPSO) reduce speed to a safe minimum within 500 metres of, and take all practical steps to avoid any large whales which may be seen.	AB BW MH SC MC		
b. The masters of the large bulk carrier ship/s take all practical steps to avoid any blue whale feeding aggregations in the wider South Taranaki Bight region (where these are known to be present at the time).	AB BW MH SC MC		
c. Helicopters servicing the operation maintain a minimum altitude of 600 m (2000 feet) except when landing and taking off.	AB BW MH SC MC		
13. The consent holder shall minimise as far as possible the risk of whale entanglement including ensuring: <ul style="list-style-type: none"> a. all ropes and floats associated with the operation are of sufficient size and maintained under sufficient tension so as to minimise the risk. b. there are no floating ropes or lines on the surface. 	AB BW MH SC MC		There is no evidence that the steps described in 13a and b would reduce the risk of entanglement. (Liz Slooten)

Other or general comments

Name	Comment
Bernd Würsig	Bernd Würsig raised concerns about planned offloading of iron sand in Admiralty Bay, a significant bay for dusky dolphins in the outer Marlborough Sounds. While not part of the current application, Professor Würsig wished this matter to be noted.
Liz Slooten	<p>"Like the noise conditions, no evidence has been provided that the non-noise conditions would reduce impacts on marine mammals or have a realistic chance of detecting such impacts. Overall, there is no evidence that following the noise and non-noise conditions would ensure that the overall cumulative impact of the operation (in addition to existing environmental impacts) is sustainable for the marine mammal populations in the STB area.</p> <p>"By comparison, I am currently preparing a report requested by Port of Lyttelton who are planning to use a bubble-net to reduce noise from repairs to the port (earthquake damage). This is specifically to reduce the amount of noise affecting Hector's dolphins (and other species) in Lyttelton Harbour. Most of the above conditions proposed for the TTR development give the impression that something is being done to materially reduce – or at least monitor – impacts. By "feel good" measure, in my comments above, I mean that these conditions give the impression that something is being done to avoid, remedy or mitigate the impact in question. When in reality there is unlikely to be any measurable or biologically significant reduction in risk.</p> <p>"I have not signed onto conditions that do not show a realistic promise of either reducing impacts or detecting them. Designing research that would detect impacts, would require clearly specifying the goals of monitoring. Presumably, the goal is to ensure that any impacts of the mining on marine mammals would be detected. The joint statement mentions some of the potential impacts. Before appropriate conditions can be set, it is necessary to specify the specific biological data that would need to be gathered in order to test for those impacts. E.g. Behavioural responses, movements, distribution, changes in</p>

survival or reproductive rates, and when these should be measured – e.g. before, during, after mining – while dredge on/off. It would be useful for the expert group, preferably with some additional independent science input, to discuss these issues.”

Signed

Andrew Baxter	
Bernd Würsig	
Simon Childerhouse	
Martin Cawthorn	
Liz Sloboten	
Michael Huber	