**BEFORE THE ENVIRONMENTAL PROTECTION AUTHORITY AT WELLINGTON**

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| **IN THE MATTER** | of the Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012 ("the Act") |
| **AND** | |
| **IN THE MATTER** | of the applications by Trans-Tasman Resources Limited (TTR) for marine and discharge consents to mine iron sand under sections 20 and 87B of the Act and |
| **BETWEEN** | **Trans- Tasman Resources Limited**<br>Applicant |
| **AND** | **The Environmental Protection Authority**<br>EPA |
| **AND** | **Kiwis Against Seabed Mining Incorporated (KASM**<br>Submitter |

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**OPENING SUBMISSIONS FOR KASM AND GREENPEACE**

**Dated 16 February 2017**

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# Introduction and Structure of Submission

1. These opening submissions are made on behalf of Kiwis Against Seabed Mining, Inc. ("KASM") and Greenpeace New Zealand, Inc. ("Greenpeace") (sometimes jointly referred to as the Environmental Submitters). Greenpeace and KASM are making a joint submission in the interests of efficiency for all parties in cost and time. Greenpeace has adopted KASM's evidence. This submission discusses some statutory provisions, including those relating to adaptive management, international legal provisions, and then outlines KASM evidence.

2. The immense public interest in this second application by Trans-Tasman Resources (TTR) is shown by the unprecedented number of submissions: around 13,000, being over three times the number for the first application. We also want to acknowledge the hard work this has entailed for the EPA staff in dealing with these huge numbers and the DMC in the additional logistics. The public interest in the seabed mining application was recognised by the Environment Court in *KASM v EPA* [2016] NZEnvC 217 at paragraph 60, when the Court referred to the over 8,000 submitters that had then been received by the EPA with respect to this application.

> [60] We commence our discussion in that regard by observing that there is unquestionably considerable public interest in the Trans-Tasman proposal which involves the mining of material in the public domain. To date, some 8,000 submissions have been received on the proposal and one of those submitters, Ngati Ruanui, represents nearly 8,000 people in its own right.

3. KASM and Greenpeace oppose the proposed activity and submit that the application should be declined in full as it will negatively impact both the mining area and the area surrounding the mining site as well as the more distant coastal marine environment, changing the physical, chemical and biological nature of the seawater, causing ecosystem stress and reducing the ability for life in the water column and on the seabed to exist, thus degrading the quality of the oceans as a whole. This runs contrary to kaitiakitanga (or stewardship) by both tangata whenua and coastal communities over the environment. Potential adverse effects of the mining application are identified in our expert evidence and specifically include effects on the marine biodiversity, the benthos and marine mammals, including blue whales and Maui's dolphins.

4. The current application in no way overcomes the reasons the first application was denied. Better modeling around the plume is in our submission virtually the only advance: neither benthic investigations, marine mammal surveys, ambient sound measurements, nor appropriate economic analysis which takes account of environmental and social costs were carried out. The result is the that the voluntary environmental, iwi and local communities have had to go to enormous expense, time and stress to again critique and review what is essentially the same application as that which failed previously.

5. In terms of the Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012 (the "Act"), the applications do not satisfy the purpose of the Act (section 10(1)): "The purpose of this Act is to promote the sustainable management of the natural resources of the exclusive economic zone and the continental shelf."[1]

6. By way of summary, as noted in our submission:

- The application fails to satisfy the requirements of sections 10, 11, and 12, as well as s 59, of the Act. The assessment of environmental effects flawed, being based on incomplete scientific research and therefore does not supply an adequate baseline study. The application will not promote the sustainable management of the natural resources of the exclusive economic zone (EEZ) and the continental shelf (see section

[1] Sustainable management' is defined in section 10(2) as follows:
"In this Act, sustainable management means managing the use, development, and protection of natural resources in a way, or at a rate, that enables people to provide for their economic wellbeing while—
(a) sustaining the potential of natural resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and
(b) safeguarding the life-supporting capacity of the environment; and
(c) avoiding, remedying, or mitigating any adverse effects of activities on the environment."

10(2)). It will not sustain the potential of natural resources (excluding minerals) to meet the reasonably foreseeable needs of future generations (section 10(2)(a)) and will not safeguard the life-supporting capacity of the environment (section 10(2)(b)). The application will fail to avoid, remedy or mitigate adverse effects appropriately (section 10(2)(c)).

- While the Applicant has emphasised the need for this application to be assessed as a new application, much of the evidence is the same as what was used 3 years ago in 2013. Also relevant are the failings of the 2013 application, such as adequate baseline information. Section 59(2)(m) of the Act makes it clear that the findings of the first DMC can be taken into account as "any other matter the EPA considers relevant and reasonably necessary to determine the application." Indeed, the Applicant relies extensively on evidence from the first application. The Applicant cannot submit evidence it presented to an earlier DMC yet argue that the DMC's findings are not relevant.

- There are only two only significant changes from the first application: one is that the HR Wallingford has provided additional evidence about the plume and the second is the different economic model that has been used. There has been no difference in law with regard to the standard of certainty that must be met. There is a difference in law on adaptive management. That is discussed later. In our submission, the net result is the same: adaptive management did not fix the uncertainties in the first application, and cannot fix them in this one.

- One significant difference is the absence of cross examination. KASM has already stated its viewed on this. As there is no cross examination, this submission will go into our evidence in some detail in order to alert DMC to key issues to put to other witnesses, as there may not be an opportunity during the hearing.

- Key issues such as insufficient benthic baseline evidence, insufficient marine mammal and noise evidence, inadequate oceanographic investigations of the affected area including rocky shoals and inadequate economic evidence remain. Moreover, the HR Wallingford evidence on the plume is, in our submission, flawed, in its reliance on a few non-representative samples, and subject to many uncertainties.

- The application is subject to New Zealand's obligations under various international conventions relating to the marine environment, including the United Nations Convention on the Law of the Sea 1982, the Convention on Biological Diversity 1992 or the Noumea Convention 1986. In our submission, it will not enable New Zealand to protect and preserve the marine environment, and is not in accordance with New Zealand’s duty to protect and preserve the marine environment.

- A precautionary approach to this proposal is required, in light of the many scientific uncertainties.

- The adaptive management approach cannot be used.

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## Witnesses

7. KASM provided witness statements on the following topics:

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| Professor Liz Slooten | Marine Mammals |
| Assistant Professor Leigh Torres | Marine Mammals including noise and other impacts |
| Dougal Greer | Plume modelling of the discharged sediment and the effect of these operations on natural sediment transport mechanisms. |
| Dr Shaw Mead | Benthic ecological matters |
| Dr Ngaire Phillips | Ecotoxicology |
| James Binney | Economic modelling and impacts |
| Dr John Cockrem | Penguins and other seabirds |

The evidence is outlined below.

## Statutory Matters

8. Section 10 makes it clear that the purpose of the Act is to promote the sustainable management of the natural resources of the exclusive economic zone (EEZ) and the continental shelf. ‘Economic well-being’ is not defined, but clearly the economic well-being of people is to be provided for. However, it must be done ‘while’ (a) sustaining the potential of natural resources

(excluding minerals) to meet the reasonably foreseeable needs of future generations; and (b) safeguarding the life-supporting capacity of the environment; and (c) avoiding, remedying, or mitigating any adverse effects of activities on the environment.[2] In our submission, all three requirements must be satisfied in order to achieve the purpose of the Act.

9. Under section 10(3), in order to achieve the purpose, the DMC must take into account decision-making criteria specified in relation to particular decisions; and apply the information principles to the development of regulations and the consideration of applications for marine consent.

10. Planning documents the DMC needs to take into account under section 59(2(h) include the New Zealand Coastal Policy Statement, the Regional

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[2] **10 Purpose**

(1) The purpose of this Act is to promote the sustainable management of the natural resources of the exclusive economic zone and the continental shelf.

(2) In this Act, sustainable management means managing the use, development, and protection of natural resources in a way, or at a rate, that enables people to provide for their economic well-being while—

- (a) sustaining the potential of natural resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and

- (b) safeguarding the life-supporting capacity of the environment; and

- (c) avoiding, remedying, or mitigating any adverse effects of activities on the environment.

(3) In order to achieve the purpose, decision-makers must—

(a) take into account decision-making criteria specified in relation to particular decisions; and

(b) apply the information principles to the development of regulations and the consideration of applications for marine consent.

Policy Statement or the Regional Coastal Plan, where activities affect the coastal marine area: these are documents which the first DMC were "not convinced that the proposal would satisfy". (First DMC, paragraph 760). Natasha Sitarz for Forest and Bird discuss these documents.

## Information Principles

11. Under s 10 (3), in order to achieve the statutory purpose, decision-makers must—

> (a) take into account decision-making criteria specified in relation to particular decisions; and
> (b) apply the information principles… to the consideration of applications for marine consent.

12. It may be thought that section 61[3] incorporates the precautionary approach. In our submission, the precautionary approach is different, and while it is still applicable, it is not stated in s 61(2).

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[3] S 61 of the Act provides as follows:

> **"61 Information principles**
>
> (1) When considering an application for a marine consent, the Environmental Protection Authority must—
>
> (a) make full use of its powers to request information from the applicant, obtain advice, and commission a review or a report; and
>
> **(b) base decisions on the best available information; and**
>
> **(c) take into account any uncertainty or inadequacy in the information available.**
>
> **(2) If, in relation to making a decision under this Act, the information available is uncertain or inadequate, the EPA must favour caution and environmental protection.**
>
> (3) If favouring caution and environmental protection means that an activity is likely to be refused, the EPA must first consider whether taking an adaptive management approach would allow the activity to be

> **(2) If, in relation to making a decision under this Act, the information available is uncertain or inadequate, the EPA must favour caution and environmental protection.**

13. The precautionary approach, however, is stated in Principle 15 of the 1992 Rio Declaration. That reads:

> **Principle 15**
>
> In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

The precautionary approach is just that: precautionary; not simply cautious. It moves the decision-making time forward. In other words, action is not to be delayed until full scientific certainty is obtained. Instead, measures to protect environmental degradation must be taken where there are threats of serious or irreversible damage.

14. This will be discussed further in the context of international law. For now, we wish to submit that the precautionary approach is a particular and important way of handling scientific uncertainty. This is entirely consistent with s 61(2): If the information available is uncertain or inadequate, the EPA must favour caution and environmental protection.

15. Put very simply, if the seabed mining proposal may, taking into account scientific uncertainty, fail to sustain the potential of natural resources to meet

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undertaken.
(4) Subsection (3) does not limit section 63 or 64.

(5) In this section, **best available information** means the best information that, in the particular circumstances, is available without unreasonable cost, effort, or time."

the reasonably foreseeable needs of future generations, or will not safeguard the life-supporting capacity of the environment, consent should not be granted. In this case, if the mining were to have the potential through the sedimentation, plume and noise to cause significant damage to the benthic environment, phytoplankton and zooplankton, fish or marine mammals, and there is insufficient certainty in the evidence for the DMC to be satisfied that the three tests in s 10(2) are met, then the DMC should not grant consent.

16. TTR have had the opportunity to address at least some of the uncertainties. After the first DMC considered the first application, they found that more baseline work should have been undertaken prior to the application being lodged:

> We consider comprehensive and longer-term baseline studies of the presence of marine mammals in the STB would have assisted us to understand the importance of the STB to various species and what they use this area for (e.g foraging, breeding, calving, migrating etc.). The absence of this information leaves us uncertain as to the significance of the proposed mining area and the wider area of the STB affected by the mining operation to cetaceans. [351]

Yet that work was not done. This is discussed below.

17. Nor did TTR take the opportunity of carrying out broader baseline studies. The first DMC found that "In our view, once the baseline monitoring is completed, there will be significantly more information about the receiving environment. However, while we accept it is not necessary to have all information available on which to base conditions of consent and an adaptive management regime, we are not convinced in this case there is sufficient 'baseline' understanding on which to base the Environmental Performance

Objectives as the basis of the overall adaptive management approach and to be able to meet the purpose of the Act." (First DMC para 837)

18. Nor did TTR map the area for other rocky reefs. The first DMC noted that "The expert witness for the Director-General of Conservation, Ms Kristina Hillock, noted that there are likely to be other significant rocky reef sites in the STB that have not been mapped.) (First DMC para 260) This matters: as in the first application there are "uncertainties in relation to the plume effects on the benthic environment and the potential for the plume to impact on the rocky reef environments down current from the mining area and on biogenic habitats adjacent to the mining area, both of which are identified as higher value and likely to be more sensitive to sedimentation." (First DMC para 290)

19. One other area where necessary work should have been done is economic analysis. The first DMC found that "the lack of clarity about the extent of economic benefit to New Zealand outside of royalties and taxes and the economic value of the adverse effects, cannot be remedied by the imposition of other lawful conditions that we could require based on the evidence before us." (first DMC para 13)

20. KASM in August wrote to the EPA in August 2016, before the application was lodged, expressing concern that "It is clear that two matters failed to be assessed in the last application: (1) the extent of economic benefit to New Zealand outside of royalties and taxes and (2) the economic value of the adverse effects. It is therefore incumbent on TTR to complete those analyses properly, and on EPA to refuse the application as incomplete in case it does not do so. The kind of analyses supplied in the last application will not

suffice." Yet they were not done. This is discussed in the evidence of Mr Binney.

21. S 63(2) makes the importance of adequate information crystal clear: "To avoid doubt, the EPA may refuse an application for a consent if it considers that it does not have adequate information to determine the application." This provision thus gives the DMC the scope to apply the precautionary approach.

22. Under s 39(2)(b) The impact assessment is required to contain the information required by subsection (1) in sufficient detail to enable the EPA and persons whose existing interests are or may be affected to understand the nature of the activity and its effects on the environment and existing interests. The applicant needed to under s 39(1)(b) "describe the current state of the area where it is proposed that the activity will be undertaken and the environment surrounding the area; and (c) identify the effects of the activity on the environment and existing interests (including cumulative effects and effects that may occur in New Zealand or in the sea above or beyond the continental shelf beyond the outer limits of the exclusive economic zone."

23. S 59(2) contains a lengthy list of mandatory considerations when making decisions. Three matters to highlight are (a) cumulative effects, (d) the importance of protecting the biological diversity and integrity of marine species, ecosystems, and processes; and (e) the importance of protecting rare and vulnerable ecosystems and the habitats of threatened species. These matters indicate the statutory importance of biological diversity and integrity of marine species, ecosystems and process, as well as the habitats of

threatened species. This is relevant in respect of benthic diversity and the habitats of maui's dolphin and blue whales, for example.

24. Also relevant to the effects on maui's dolphin and blue whales is the s 6 definition of effect, which includes (d) any cumulative effect that arises over time or in combination with other effects; and (f) any potential effect of low probability that has a high potential impact." S 59(2)(a) also makes it clear that the DMC must consider cumulative impacts: "The EPA must take into account—(a) any effects on the environment or existing interests of allowing the activity, including—(i) cumulative effects."

This for instance is important for impacts on the maui's dolphins and blue whales: noise effects from existing shipping and minerals activities and overlap between fishing, mining and other activities.

## International Law and Obligations

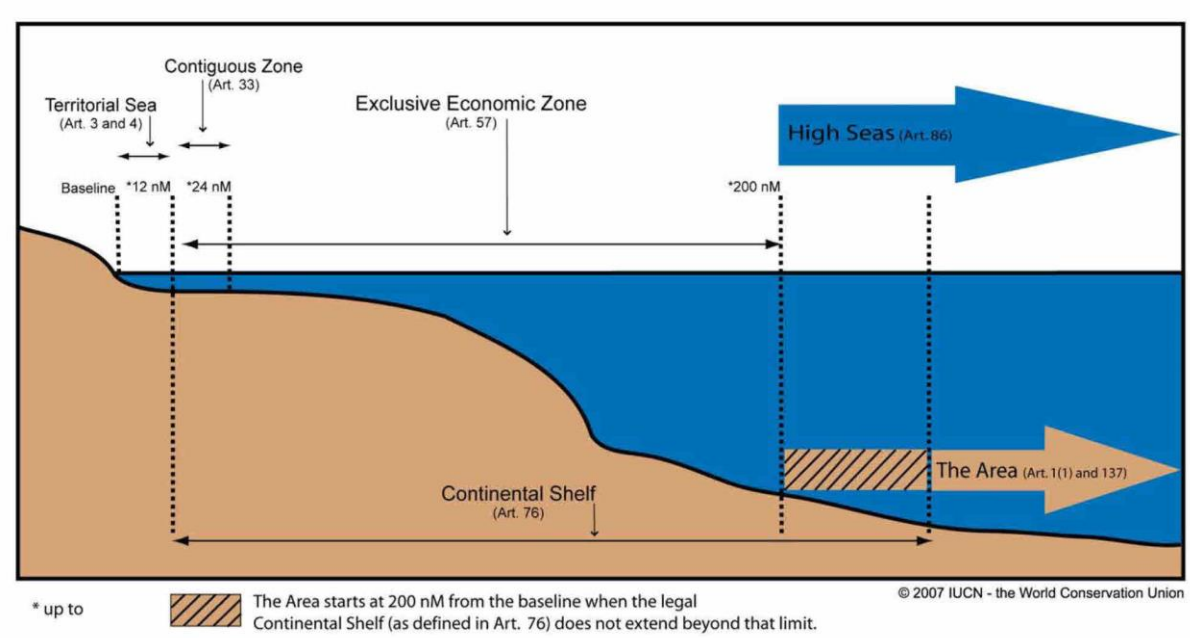
25. s 11 reads as follows:

> **11 International obligations**
>
> - This Act ***continues or enables*** the implementation of New Zealand's obligations under various international conventions relating to the marine environment, including—
> - (a) the United Nations Convention on the Law of the Sea 1982:
> - (b) the Convention on Biological Diversity 1992. (emphasis added)

Whether in a specific respect the Act 'continues' the implementation of New Zealand's obligations or 'enables' them, in our submission the result is the same: the DMC should take notice of those international obligations. The Act essentially filled a hole in New Zealand's environmental regime. Before the Act, there was no regulatory regime that assessed the potential environmental

impacts of a proposed activity in the EEZ beyond the 12 mile territorial seas limit (being the reach of the Resource Management Act 1991 ("RMA")) or on the continental shelf and decided whether the activity should be allowed to occur (having regard to its environmental impact).

26. Put very simply, we are here because of international law. The continental shelf and the EEZ are entirely products of international law. It is thus important to understand the requirements of international law.




**New Zealand's international obligations**

27. In section 11, the Act refers to New Zealand's international obligations including, but not limited to, those arising under the United Nations Convention on the Law of the Sea 1982 (**UNCLOS**) and the Convention on Biological Diversity 1992 (**CBD**) are relevant to the interpretation and application of the Act. These include:

- the obligation to protect and preserve the marine environment;

- the obligation to conduct an environmental impact assessment;
- the obligation not to cause transboundary harm; and
- the obligation to take a precautionary approach.

These will be discussed in turn.

**Obligation to Protect and Preserve the Marine Environment**

15. Numerous articles in the United Nations Convention on the Law of the Sea (UNCLOS) impose on New Zealand relevant international obligations to protect the marine environment with respect to seabed mining. Three relevant articles are Articles 192 – 194, which provide:

> Article 192
>
> *General obligation*
>
> States have the obligation to protect and preserve the marine environment.
>
> Article 193
>
> *Sovereign right of States to exploit their natural resources*
>
> States have the sovereign right to exploit their natural resources pursuant to their environmental policies and in accordance with their duty to protect and preserve the marine environment.
>
> Article 194
>
> *Measures to prevent, reduce and control pollution of the marine environment*
>
> 5. The measures taken in accordance with this Part shall include those necessary to protect and preserve rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other forms of marine life.

We observe that this is consistent with section 59(2) (e), which requires the EPA to take into account the importance of protecting rare and vulnerable ecosystems and the habitats of threatened species.

28. New Zealand is also bound by the Convention for the Protection of Natural Resources and Environment of the South Pacific Region 1986 (Noumea Convention), which is a regional international convention imposing obligations on New Zealand. Articles 5 and 8 impose similar obligations to Articles 192 – 194 of UNCLOS. Some relevant extracts are:

> Article 5 GENERAL OBLIGATIONS
>
> The Parties shall endeavour, either individually or jointly, to take all appropriate measures in conformity with international law and in accordance with this Convention and those Protocols in force to which they are party to prevent, reduce and control pollution of the Convention Area, from any source, and to ensure sound environmental management and development of natural resources, using for this purpose the best practicable means at their disposal, and in accordance with their capabilities. In doing so the Parties shall endeavour to harmonize their policies at the regional level.
>
> …
>
> 5. The Parties shall endeavour to establish laws and regulations for the effective discharge of the obligations prescribed in this Convention. Such laws and regulations shall be no less effective than international rules, standards and recommended practices and procedures.
>
> …
>
> Article 8 Pollution from Seabed Activities
>
> The Parties shall take all appropriate measures to prevent, reduce and control pollution in the Convention Area resulting directly or indirectly from exploration and exploitation of the seabed and its subsoil.

The "Area" as defined by the Noumea Convention includes New Zealand's 200 nautical mile EEZ.

29. The International Tribunal for the Law of the Sea (ITLOS) in its 2010 Advisory Opinion[4], stating[5] there is a general obligation of due diligence, in that case of States sponsoring deep seabed mining applications, but also more generally applicable, as is seen from a case which New Zealand itself brought to ITLOS, *the Southern Bluefin Tuna cases.*[6] The 'due diligence' obligation is an obligation to deploy adequate means, to exercise best possible efforts, to do the utmost, to obtain the result.[7]

**Obligation to perform an environmental impact assessment**

30. One of New Zealand's international obligations is to carry out an environmental impact assessment. Article 206 of UNCLOS provides that,[8] and the Seabed Disputes Chamber ITLOS has stated that "It should be stressed that the obligation to conduct an environmental impact assessment is a direct obligation under the Convention and a general obligation under customary

[4] ITLOS Case No. 17, Responsibilities and Obligations of States Sponsoring Persons and Entities with Respect to Activities in the Area. 1 February 2011. ("Advisory Opinion"). At https://www.itlos.org/index.php?id=109.
[5] Advisory Opinion, Para 130.
[6] ITLOS stated that:
"The link between an obligation of due diligence and the precautionary approach is implicit in the Tribunal's Order of 27 August 1999 in the Southern Bluefin Tuna Cases (New Zealand v. Japan; Australia v. Japan). This emerges from the declaration of the Tribunal that the parties "should in the circumstances act with prudence and caution to ensure that conservation measures are taken ... ..(ITLOS Reports 1999, p.274, at paragraph 77), and is confirmed by the further statements that "there is scientific uncertainty regarding measures to be taken to conserve the stock of southern bluefin tuna" (paragraph 79) and that "although the Tribunal cannot conclusively assess the scientific evidence presented by the parties, it finds that measures should be taken as a matter of urgency" (paragraph 80). Tribunal's Order of 27 August 1999 in the Southern Bluefin Tuna Cases (New Zealand v. Japan; Australia v. Japan).
[7] Advisory Opinion, para 110. It is in that sense an obligation of conduct; not result. This emerges clearly from the Judgment of the ICJ in the Pulp Mills on the River Uruguay: "An obligation to adopt regulatory or administrative measures and to enforce them is an obligation of conduct. Both parties are therefore called upon, under article 36 [of the Statute of the River Uruguay], to exercise due diligence in acting through the [Uruguay River] Commission for the necessary measures to preserve the ecological balance of the river" (paragraph 187 of the Judgment)." I.C.J., *Case Concerning Pulp Mills on the River Uruguay* (Argentina v. Uruguay), I.C.J. Reports 2010, p. 14 (28 April 2010). Para 164. At http://www.icj-cij.org/docket/index.php?p1=3&p2=1&k=88&case=135&code=au&p3=4. ("*Pulp Mills Case"),* Para. 111.
[8] Article 206 Assessment of potential effects of activities
When States have reasonable grounds for believing that planned activities under their jurisdiction or control may cause substantial pollution of or significant and harmful changes to the marine environment, they shall, as far as practicable, assess the potential effects of such activities on the marine environment and shall communicate reports of the results of such assessments in the manner provided in article 205.

international law."[9] Article 16 of the Noumea Convention similarly provides for EIAs and also specifically for public participation to prevent any substantial pollution of, or significant and harmful changes within, the Convention Area.[10]

**Obligation to take a Precautionary Approach**

31. The precautionary principle is most concisely stated in Principle 15 of the Rio declaration, cited above. The Seabed Disputes Chamber of ITLOS stated in the *Seabed Mining Advisory Opinion* at paragraph 131 that "the precautionary approach is … an integral part of the general obligation of due diligence of sponsoring States, which is applicable even outside the scope of the [International Seabed Authority] Regulations." ITLOS also observed in its Advisory Opinion (Advisory Opinion, para. 135) that the precautionary approach has been incorporated into a growing number of international treaties and other instruments, many of which reflect the formulation of Principle 15 of the Rio Declaration. "In the view of the Chamber, this has initiated a trend towards making this approach part of customary international law." The ICJ in *Gabčíkovo-Nagymaros* (I.C.J., Gabčíkovo-Nagymaros Project (Hungary/Slovakia) observed that "The Court is mindful that, in the field of

[9] *Responsibilities and obligations of States sponsoring persons and entities with respect to activities in the Area (Advisory Opinion)* ITLOS Seabed Dispute Chamber Case No.17, 1 February 2011 at [145].

[10] Noumea Convention
Article 16 Environmental Impact Assessment
2. Each Party shall, within its capabilities, assess the potential effects of such projects on the marine environment, so that appropriate measures can be taken to prevent any substantial pollution of, or significant and harmful changes within, the Convention Area.
3. With respect to the assessment referred to in paragraph 2, each Party shall, where appropriate, invite:
(a) public comment according to its national procedures;
(b) other Parties that may be affected to consult with it and submit comments.
The results of these assessments shall be communicated to the Organisation, which shall make them available to interested Parties."

environmental protection, vigilance and prevention are required on account of the often irreversible character of damage to the environment and of the limitations inherent in the very mechanism of reparation of this type of damage." (140)

32. These submissions do not attempt to summarise or rebut the evidence of the applicant; there is no time to do that. But one matter must be raised. Dr Mike Patrick gave evidence on other regimes. In the course of his evidence he called submissions, which can only be those of KASM, "at best misinformed, at worst disingenuous." KASM, and counsel, take great exception to this. His evidence on matters of international law, which is evidence of a marine biologist, is in our submission incorrect and no weight should be place on it.

33. Dr Phillips said that Articles 192-194 of UNCLOS "do not in any way require States to preserve and protect the marine environment *at any cost*." (Emphasis added). Firstly, neither KASM nor counsel have charactised them as that, as that "at any cost" does not appear in the article. Article 192 is not subject to a cost restriction or test. Rather, article 192 provides that "States have the obligation to protect and preserve the marine environment." That article is unqualified, and has been described by international courts as a "general obligation". Moreover, Article 193 is subject to it: NZ has the right to exploit its natural resources, in accordance with its duty to protect and preserve the marine environment.

34. Most recently, the Annex VII arbitration tribunal on the South China Sea dispute (between Philippines and China)[11] had this to say in paragraph 942-944:

> 942. Although phrased in general terms, the Tribunal considers it well established that Article 192 does impose a duty on States Parties, the content of which is informed by the other provisions of Part XII and other applicable rules of international law.
> This "general obligation" extends both to "protection" of the marine environment from future damage and "preservation" in the sense of maintaining or improving its present condition. Article 192 thus entails the positive obligation to take active measures to protect and preserve the marine environment, and by logical implication, entails the negative obligation not to degrade the marine environment. The corpus of international law relating to the environment, which informs the content of the general obligation in Article 192, requires that States "ensure that activities within their jurisdiction and control respect the environment of other States or of areas beyond national control." Thus States have a positive "'duty to prevent, or at least mitigate' significant harm to the environment when pursuing large-scale construction activities." The Tribunal considers this duty informs the scope of the general obligation in Article 192.
> 942. The content of the general obligation in Article 192 is further detailed in the subsequent provisions of Part XII, including Article 194, as well as by reference to specific obligations set out in other international agreements, as envisaged in Article 237 of the Convention.
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> 943. Article 194 concerns "pollution of the marine environment," a term which is defined in Article 1 of the Convention to mean "the introduction by man, directly or indirectly, of substances . . . into the marine environment . . . which results or is likely to result in such deleterious effects as harm to living resources and marine life . . . [and] hindrance to . . . legitimate uses of the sea . . . ." The "measures to prevent, reduce and control pollution of the marine environment" are set out in Article 194: [citation of Article 194 follows]
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> 944. Articles 192 and 194 set forth obligations not only in relation to activities directly taken by States and their organs, but also in relation to ensuring activities within their jurisdiction and control do not harm the marine environment.

35. Dr Philips also states (paragraph 64) that "With regard to the CBD and Noumea Conventions, and indeed other later maritime Conventions, these are

[11] The South China Sea Arbitration (The Republic of Philippines v. The People's Republic of China) 2016. PCA case number 2013–19.

subservient to UNCLOS". If by that he means that their provisions are without importance or are somehow rendered meaningless by UNCLOS, we submit this is not the case. The CBD was concluded in 1992, fully ten years after UNCLOS, and the Noumea Convention in 1986, 4 years after UNCLOS. There are numerous other maritime conventions that have been concluded since UNCLOS, and the fundamental principle of international law is stated in Article 26 of the Vienna Convention on the Law of Treaties: "ARTICLE 26 PACTA SUNT SERVANDA Every treaty in force is binding upon the parties to it and must be performed by them in good faith."

The CBD specifically addresses its relationship with UNCLOS in article 22:

ARTICLE 22. RELATIONSHIP WITH OTHER INTERNATIONAL CONVENTIONS

> 1. The provisions of this Convention shall not affect the rights and obligations of any Contracting Party deriving from any existing international agreement, except where the exercise of those rights and obligations would cause a serious damage or threat to biological diversity.
> 2. Contracting Parties shall implement this Convention with respect to the marine environment consistently with the rights and obligations of States under the law of the sea.

36. The Vienna Convention addresses the application of successive treaties relating to the same subject matter in article 30. The relevant paragraphs are paragraph 2 and 3:

> 2. When a treaty specifies that it is subject to, or that it is not to be considered as incompatible with, an earlier or later treaty, the provisions of that other treaty prevail.
> 3. When all the parties to the earlier treaty are parties also to the later treaty but the earlier treaty is not terminated or suspended in operation under article 59, the earlier treaty applies only to the extent that its provisions are compatible with those of the latter treaty

37. In our submission, no more needs to be said. The relevant provisions of the CBD and the Noumea Convention are not incompatible with UNCLOS. UNCLOS[12] requires that for seabed activities within national jurisdiction, such as those the subject of this hearing, laws, regulations and measures shall be no less effective than international rules, standards and recommended practices and procedures.[13]

38. The content of the necessary laws is also provided in UNCLOS. We have stated these earlier, but in summary, New Zealand must:

- protect and preserve the marine environment;[14]
- conduct prior environmental impact assessments of activities likely to cause significant harm,[15] with public involvement;[16]
- conduct ongoing monitoring of environmental impacts;[17]
- protect and preserve rare or fragile ecosystems and habitats;[18]
- prevent, reduce and control pollution from seabed activities;[19]
- prevent, reduce and control pollution caused by ships[20] and from dumping at sea;[21]
- prevent trans-boundary harm;[22]

[12] United Nations Convention on the Law of the Sea. Signed at Montego Bay, Jamaica, 10 December 1982, entered into force 16 November 1994. United Nations Treaty Series 397, 21 International Legal Materials 126, at http://www.un.org/Depts/los/convention_agreements/texts/unclos/closindx.htm (UNCLOS).
[13] UNCLOS art. 208(3).
[14] UNCLOS Art. 192.
[15] UNCLOS Art. 206.
[16] CBD Art 14, and Noumea Convention Article 16. See also the Aarhus Convention and Espoo Convention on Environmental Impacts Assessments in a Transboundary Context, signed at Espoo on 25 February 1991, entered into force 10 September 1997, 1989 UNTS 309, at http://www.unece.org/env/eia/about/eia_text.html.
[17] UNCLOS Art. 204.
[18] UNCLOS Art. 194(5). Also see Noumea Convention art. 14.
[19] UNCLOS Arts. 194(3)(c) (marine environment generally), 208(1) (national jurisdiction), 209(2) (the Area). See also Noumea Convention art.8.
[20] UNCLOS Arts. 194(3)(b) (marine environment generally), 211. See also MARPOL 73/78 and other IMO Conventions.
[21] UNCLOS Arts. 194(3)(a) and 210; See also the 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes or other Matter (adopted 13 November 1972, entered into force 30 August 1975) 11 ILM 1972 1358 (London Convention) and the 1996 Protocol to the 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes or other Matter (adopted 7 November 1996, entered into force 24 March 2006) (London Protocol). The London and Protocol exclude the disposal, and in the Protocol, storage, of "wastes or other matter directly arising from, or related to the exploration, exploitation and associated off-shore processing of sea-bed mineral resources" from coverage by the provisions of the Convention and Protocol.
[22] UNCLOS Arts. 194(2), CBD Art 3, London Protocol Art. 3(3).

- conserve biodiversity;[23]
- take measures for ensuring safety at sea;[24] and
- not interfere with rights and freedoms of other States, [25] such as the installation of submarine pipelines and cables,[26] and marine scientific research.[27]

39. Far from KASM's submissions being "at best misinformed, at worst disingenuous", they are correct, authoritative and should be given considerable weight. Lead counsel for KASM, himself has practiced international law for over 30 years and is available to answer questions, here, later or in writing, on matters of international law. Another eminent New Zealand international lawyer, Rob Makgill for the Fisheries Submitters, no doubt will also provide submissions on the matter and his submissions should in our submission also be given considerable weight.

## Adaptive Management

40. In Minute 17,[28] the DMC requested submissions on adaptive management. S 87F(4) of the Act specifically limits the application of adaptive management to marine consents excluding marine discharge consents: "(4) If the EPA grants the application, it may issue the consent subject to conditions under section 63, but not under section 63(2)(b)." Secton 63(2)(b) reads that "The conditions that the EPA may impose include, but are not limited to, conditions— that together amount or contribute to an adaptive management approach."

The first issue is therefore whether or not s 87F(4) applies to this application.

[23] CBD Arts. 5, 6, 8.
[24] UNCLOS Art. 94(3), and see the 1974 Convention for the Safety of Life at Sea (adopted 1 November 1974, entered into force 25 May 1980, as amended numerous times), at http://cil.nus.edu.sg/1974/1974-international-convention-for-the-safety-of-life-at-sea/ and other IMO conventions.
[25] UNCLOS Arts 58(3) and 78(2).
[26] UNCLOS Art. 79(2).
[27] UNCLOS Art. 246(8).
[28] Minute 17 dated 3 February 2017.

41. The additions to s 87[29] did not come into force until 31 October 2015,[30] which was after the decision on the first TTR application and the Chatham Rock Phosphate application. The application being considered by this DMC is therefore the first seabed mining application to be captured by s 87F(4). The 2013 Amendment Act established a new regime under which the EPA became responsible for regulating mining discharges in the EEZ.[31] Prior to this, the EEZ Act did not expressely regulate the marine discharges in the EEZ, despite the discharge being an integral part of any seabed mining application. The DMC was however obliged to take into account the effects of such discharges wherever those effects occured (both within the EEZ and inside the 12 nautical mile limit).[32] The new regime meant that discharges in the EEZ were now managed by both the EPA and Maritime New Zealand: the EPA manages mining discharges, and Maritime New Zealand manages other discharges of harmful substances.

42. Counsel have not found to date the specific provisions of 87F on marine discharges consents having been discussed in any Parliamentary Documentation or the Hansard. Its meaning is clear and unambiguous: adaptive management cannot be imposed by the EPA with regard to a marine discharge consent.

43. The marine discharge consent cannot be separated from the rest of the activity that has been applied for. An integrated management approach requires that the activity be considered as a whole and conditions of consent be considered as a whole. This is an inherent feature of environmental management in New Zealand. Discharges to the marine environment are part and parcel of the mining activity.

44. However, many of the conditions that have been prepared by TTR, considered together form the basis of adaptive management. These conditions would therefore be *ultra vires*. In demonstrating their inappropriateness, we must therefore consider adaptive management in order to distinguish conditions that are apart of an adaptive management regime and those that are not.

[29] Exclusive Economic Zone and Continental Shelf (Environmental Effects) Amendment Act 2013
[30] Exclusive Economic Zone and Continental Shelf (Environmental Effects) Amendment Act 2013 Commencement Order 2015 section 2.
[31] The relevant provisions are principally, but not exclusively, those introduced by the Amendment Act, ss 11 and 33.
[32] EEZ Act, s 59(2)(a)(ii).

45. Adaptive management is a consent management tool to cope with uncertainty of complex environmental systems. It builds upon the precautionary approach which is inherent in international and national environmental law. Adaptive management may in appropriate cases enable an activity to proceed even where the full scale of effects is not known. Adaptive managment is a structured process of learning by doing, and adapting management practices based on what has been learned. Adaptive management as included in the Act is not an exhaustive list and does not represent the full extent of what adaptive management could mean.[33]

46. The starting point of course is the Act. Section 4(1)(b) is unambiguous: "adaptive management approach has the meaning given in section 64(2)." That is an inclusive definition:

> (2) An adaptive management approach **includes**—
>
> (a) allowing an activity to commence on a small scale or for a short period so that its effects on the environment and existing interests can be monitored:
>
> (b) any other approach that allows an activity to be undertaken so that its effects can be assessed and the activity discontinued, or continued with or without amendment, on the basis of those effects.

47. The take-home is this: adaptive management includes, but is not limited to, either allowing an activity to commence on a small scale or for a short period so that its effects on the environment and existing interests can be monitored, any other approach that allows an activity to be undertaken so that its effects can be assessed and the activity discontinued, or continued with or without amendment, on the basis of those effects. And Section 87F(4) says that if the EPA grants the application, it cannot issue the consent subject to conditions under section 63(2)(b): in other words, conditions that together amount or contribute to an adaptive management approach. The Act could not be clearer.

[33] EEZ Act, s 64.

48. By way of fuller explanation, the Supreme Court in *Sustain Our Sounds v NZ King Salmon SC* 84/2013 [2014] NZSC 40 ('SOS') specifically addressed the issue of adaptive management and laid down a 4 part test. The Court held that:

> "[129] The secondary question of whether the precautionary approach requires an activity to be prohibited until further information is available, rather than an adaptive management or other approach, will depend on an assessment of a combination of factors:
>
> (a) the extent of the environmental risk (including the gravity of the consequences if the risk is realised);
>
> (b) the importance of the activity (which could in some circumstances be an activity it is hoped will protect the environment);
>
> (c) the degree of uncertainty; and
>
> (d) the extent to which an adaptive management approach will sufficiently diminish the risk and the uncertainty.
>
> The overall question is whether any adaptive management regime can be considered consistent with a precautionary approach."

49. Section 87F(4) clearly means that (1) the DMC can no longer attach conditions to a consent to achieve a staged development to counter any uncertainty in effects. (section 64(2)(a)) nor can the DMC in its conditions implement any other approach that allows an activity to be undertaken so that its effects can be assessed and the activity discontinued, or continued with or without amendment, on the basis of those effects. (section 64)(2)(b)).

50. This also means that section 61(3) no longer applies, so if favouring caution and environmental protection means that an activity is likely to be refused, the EPA must not first consider whether taking an adaptive management approach would allow the activity to be undertaken. This is a necessary corollary of section 87F(4). Following from section 61(2), "If, in relation to making a decision under this Act, the information available is uncertain or inadequate, the EPA must favour caution and environmental protection." Consistent with section 61(3), the consent should therefore be refused.

***Augier***

51. The DMC also asked for submissions in relation to the application of the Augier principle. The *Augier* Principle derives from a case in 1979, *Augier v Secretary of State for the Environment* (1978) 38 P & CR 219 (QBD), by which parties to environmental proceedings may be held to their undertakings given in the course of those proceedings. The key term is 'undertakings'. The High Court in *Frasers Papamoa Limited v Tauranga CC* CIV 2008-470-465 considered the priciple. The High Court at [22] quoted Sir Douglas Frank as follows: (ages 226-227)

> In my judgment, where an applicant for planning permission gives an undertaking, and, relying on that undertaking, the local planning authority, or the Secretary of State on appeal, grants planning permission subject to a condition in terms broad enough to embrace the undertaking, the applicant cannot later be heard to say that there is no power to require compliance with the undertaking.

52. Another explanation was given by Randerson J in *Springs Promotions Ltd v Springs Stadium Residents Association Inc* [2006] 1 NZLR 846: (para 87)

> It is difficult to conceive how the Environment Court could proceed effectively if parties giving specific undertakings or making specific representations as a foundation for its orders are not to be held to their word.

Allan J in Frasers endorsed, Randerson's approach: (para 32)

> I endorse, with respect, Randerson J's characterisation of the Augier principle as being concerned with "specific undertakings" or "specific representations" made as a foundation for orders of the Environment Court. It is in that formal setting that the cases earlier discussed have enforced Augier undertakings. Great care is required, in my view, in the application of the principle lest it be extended beyond its proper role.

He said that "It applies only to clear and unequivocal undertakings intended to be relied upon and so to provide a measure of security for those who subsequently act to their detriment." (paragraph 44)

53. This is not a case where an applicant's undertaking forms the basis for holding it to account to enforce a condition which may otherwise have been

unenforceable– a type of 'estoppel'. Rather, it is a case where there is a specific statutory prohibition against the condition in the clearest possible terms. The DMC is prohibited by the clear words of section 87F(4) from issuing consents subject to conditions under section 63(2)(b).

54. Therefore, the suggested conditions by Dr Philip Mitchell on paragraph 170 (a)-(d) form an adaptive management regime. In paragraph 176 Dr Mitchell makes it clear that the purpose of the baseline monitoring program is to validate the models. In paragraph 181 he explains that the baseline measurement are fed into the model to "'validate and refine' the outputs in order to continually demonstrate that the project derived SSC is not resulting in adverse effects." Yet these are exactly the processes that should have been carried out before the application was made. If the plume is indeed greater than forecast, then only an adaptive management model could save the project. At paragraph 192, Dr Mitchell explains that "As with the BEMP, the EMMP is of fundamental importance as it stipulates the effects of the project will be monitored, identified and, if required, result in project activities being refined." Refining project activities is classic adaptive management. If the conditions of the consent are to be changed based on the monitoring of the effects, that is exactly what section 64(2) describes: "any other approach that allows an activity to be undertaken so that its effects can be assessed and the activity discontinued, or continued with or without amendment, on the basis of those effects." The conditions on the bottom of page 6 in Attachment 1 again describe classic adaptive management. On paragraph 194, Dr Mitchell describes condition 28 and the Technical Review Group (TRG): (c) Consider and make recommendations on the following matters:

> The appropriateness of the numerical values of the 'Response Limit' and 'Compliance Limit' in Schedule 2, and the ISQG-Low and ISQG-High values."
> (iv) The need for any new 'Response Limit' and / or 'Compliance Limit' for any parameter, or for any new ISQG-Low and ISQG-High values, being monitored in accordance with Condition 20; and / or
> (v.) Any revised numerical values of the 'Response Limit' and / or 'Compliance Limit' determined in accordance with Condition 17.

These are critical values and since they can be changed as a result of the monitoring, this again describes classic adaptive management.

55. Nor can the plume be separated from the rest of the mining. As Dr Mitchell said, "33. The sediment plume, particularly its scale and extent (including how it changes over time) (Point 2 in paragraph 30 above), is at the heart of this hearing and virtually all of the effects of the proposal are as a result of the sediment plume." (paragraph 33)

56. In summary, the proposed conditions of consent, in our submission, show the uncertainties in the baseline, which the Applicant has attempted to resolve through their conditions, with further testing to validate their models, meetings with groups and ultimately altering parameters, which itself amounts to adaptive management.

57. For completeness, should the DMC not accept these submissions, we submit that the position has not changed since the first application. That is, following the Supreme Court in *SOS* at [125], there is first a threshold question of whether an adaptive management regime can even be considered: there must be an adequate evidential foundation to have reasonable assurance that the adaptive management approach will achieve its goals of sufficiently reducing uncertainty and adequately managing any remaining risk. (1st DMC para.

848). That evidential foundation is still not there so as to allow the approach to achieve its goals of sufficiently reducing uncertainty and adequately managing any remaining risk.

58. Put simply, there is far from sufficient evidence on benthic effects, other ecological effects and marine mammals - this is almost self-evident, since further work has not been done since the first application. The DMC are left with the HR Wallingford plume work, which carries its own uncertainties, as our evidence shows. But even putting aside those uncertainties and taking it at face value, the Applicant's proposed adaptive management approach would allow mining to continue even if the plume is larger than the model predicts, by changing the values down the track. But the DMC does not know the effects on marine mammals, benthic or ecology matters even if the plume is as predicted. If the plume is even bigger, the uncertainties are even greater, and beyond the evidence it has before it: the DMC must make its decision on the evidence it has now. Any monitoring could only be to confirm compliance. In terms of the four-part Supreme Court SOS tests, the extent of the environmental risks are too great, the economic evidence does not bear out the importance of the activity, there is too great a degree of uncertainty and the adaptive management approach will not sufficiently diminish the risk and the uncertainty. The first DMC addressed these at paras 799-804. The crucial issue here is, as the first DMC said, "Put simply, we do not know enough about the existing environment (and in particular its temporal variability under existing conditions) and how that environment may be affected by the proposed mining to be confident that the stated qualitative Environmental Performance Objectives will be achieved." (134) This is not about the plume:

this is about benthic and other ecological effects. And as the Supreme Court said at para 133, the DMC has to be satisfied that there will be good baseline information about the receiving environment. It cannot be so satisfied, just as the first DMC was not (1st DMC 803).

# Evidence

## Economic

59. Expert evidence on economic matters is given by Jim Binney. He says that

- The use of an inappropriate approach to the economic analysis, a lack of transparency, and no real attempt to incorporate environmental risks into the economic analysis, means that the economic analysis does not demonstrate that the project would deliver a net benefit to New Zealanders. (Binney paras 13, 38)

- The current economic analysis used to justify the project (Martin Jenkins and Associates) uses an I-O approach. This approach is generally considered to be an inferior approach to estimating impact assessment as it tends to overestimate impacts. (Binney para 10)

- The use of I-O modelling is specifically used to demonstrate the flow-on impacts of projects (the multiplier effects). This is the central analytical approach used in the proponent's economic analysis. This approach is also heavily criticized by NZ Treasury. (Binney rebuttal para 6)

- A comprehensive benefit-costs analysis (BCA) is the only appropriate economic assessment methodology to inform the regulatory approvals

process. This should include all relevant environmental and social values that could be adversely impacted by the project. Given the scale of this proposed project and the potential environmental and social risks, the requirements and guidelines outlined by NZ Treasury, and the fact a robust benefit-cost analysis could be undertaken, there is no reason why this should not be done. (Binney rebuttal para. 11)

- The majority of the claims relating to local employment would appear to be modelled outcomes from a model that has had no independent peer review. (Binney rebuttal para. 14)

- The analysis used does not formally incorporate environmental or social risks or values (e.g. fishing, recreation, impact on natural capital) and cannot be used to demonstrate the net worth of the project to New Zealanders. The environmental risks do have economic values. (Binney paras 11,12) including ecosystem functions, goods and services (para 39). He has estimated that the present value of the environmental damage could be in the range of $28 – 543 million. (Binney para 12)

- The suggested figure of $11,000 by Mr Leung-Wai appears impossibly low considering the area to be mined is around 12,000 hectares over the life of the project. The uncertainty in the potential environmental costs of the project actually reinforces the rational for a need for a proper and robust BCA that includes the broad scope of benefits and costs. (Binney rebuttal para. 9)

- The lack of analysis of commercial fisheries is just one of the many externalities that have not been incorporated into the analysis that should be. This further reinforces the need for a proper BCA. (Binney rebuttal para. 16)

- TTR have measured activity, not net benefits (Binney para 35).

- The bulk of return on investment will flow offshore, significantly reducing the benefits accruing to New Zealanders. (Binney para 36)

- In conclusion, consistent with best practice and NZ Treasury guidelines, a robust benefit-cost analysis (BCA) is required. (Binney rebuttal para 7). It was not done.

## Seabirds

60. John Cockrem gives evidence on the effects of sand mining on little penguins and other seabirds in the South Taranaki Bight. He shows that:

- Little penguins generally forage within 20 km of their nests when feeding chicks, so penguins breeding on the South Taranaki coast are dependent on feeding areas that would be affected by the proposed sand mining (Cockrem para.16). There have not been systematic observations so the abundance and distribution of little penguins in the STB throughout the year is not known. (Cockrem para.18, rebuttal para. 4). The extent of adverse effects of sand mining on little penguins and other seabirds cannot be accurately predicted from the available information. (Cockrem rebuttal para 8) Twelve species of threatened and at risk species of seabirds have been seen in the South Taranaki Bight. There have not been systematic surveys of seabirds in the STB and it is

likely that other threatened and at risk species also use this area. (Cockrem para 26) The area of the STB that would be affected by sand mining is within the likely daily foraging range of fairy prions from Stephens Island and very large numbers of prions have been seen in this area. (Cockrem para 27) Monitoring of seabirds was not conducted by TTR even though the STB is within the Cook Strait Important Bird and Biodiversity Area and hence is an area of international significance for the conservation of the world's birds. (Cockrem rebuttal para. 6)

- Food shortages are thought to be an important contributing cause of large mortalities of fairy prions that occur along the west coast of the North Island. (Cockrem para 29) There is insufficient information for the magnitude of adverse effects of this reduction in primary production on food availability for fairy prions in the STB to be estimated. (Cockrem para 28)

- Sand mining would reduce horizontal visibility and water column light intensity in the STB. Little penguins are visual foragers, so any reduction in light intensity in the water and any reduction in visibility in the water caused by sand mining would reduce foraging opportunities for little penguins. The reductions in visibility and light intensity in the water that would be caused by sand mining would adversely affect the foraging of penguins both directly, by reducing the ability of the birds to see and catch fish, and indirectly by reducing the availability of prey fish which themselves might be adversely affected by a reduction in water visibility. Sand mining over 35 years could cause a reduction in population size or even cause the extinction of little penguin populations that breed along the coast of the STB and in the

Marlborough Sounds. (Cockrem para. 22) Similar considerations about food availability and foraging apply to other birds. (Cockrem para 30). We do not have a comprehensive knowledge of what species of seabirds use the STB, do not know how the use of the STB by seabirds changes throughout the year and from year to year, and cannot predict the extent to which reductions in visibility, light intensity and primary production in the STB would adversely affect seabirds. (Cockrem para. 10)

- There is thus the potential for significant mortality of seabirds attracted to lights at an iron sands extraction vessel. (Cockrem para 31)

- Sand mining would have adverse effects on seabirds including species that are threatened or at risk. The full extent of the adverse effects cannot be accurately predicted as we do not have a comprehensive knowledge of what species of seabirds use the STB and do not know how the use of the STB by seabirds changes throughout the year and from year to year. (Cockrem para 33)

- There is not comprehensive monitoring programme proposed. The proposed Seabirds Effects Mitigation and Management Plan within the EEMP does not include any monitoring of seabirds other than recording the number of birds that were killed or injured due to collision with mining vessels. (Cockrem para. 14).

**Plume**

61. Evidence on the plume is given by Dougal Greer. He says that:

- The modelling study uses results from lab experiments which are based on three sediment sample and it is unclear if the samples are representative of sediments that will be found in the area to be mined. (Greer para 13)
- The quantity of sediment that leaves the pit in the form of a passive plume will vary over time leading to greater variability in the size of the plume than is represented in the subsequent far field modelling, due to modelling of waves assuming a constant wave height, a low wave period and an assumption that the current and wave directions are at right angles to each other, a condition which maximises the amount of material that remains in the pit. (Greer paragraph 16)
- Different settling speed fractions were used by Wallingford and NIWA, which would have led to a considerably larger plume. (Greer paragraph 17) The slower NIWA settling speed would result in a considerably larger plume and is more conservative. This shows that the use of different methods for determination of the source term can lead to considerable differences in model results. (Greer rebuttal para 4)
- Background levels may be underestimated in the model by up to a factor of two (Greer paragraph 23)
- There will be a degree of error surrounding the modelling of the plume, but this remains unquantified. (Greer paragraph 24)
- Sensitivity analysis has not been carried out in this modelling (Greer paragraph 25). That would have provided experts with a sense of the error associated with the model results. Without this experts are driven to the model error underpredicting measured SSC by a factor of up to 2 at the sea surface and larger error associated with the model calibration at the sea floor. (Greer rebuttal para 6)
- Sedimentary rates should have been increased beyond 3 km (Greer paragraph 26)
- Background sediments are not natural as they are anthropogenic (Greer paragraph 27) Background levels are heavily impacted by human activity so they should not be used as a bench mark with which to establish acceptable increases to SSC from the proposed mining operation (Greer paragraph 29) These are classic cumulative impacts.

### Benthic

62. Benthic evidence is given by Dr Shaw Mead. He says that:

- The application includes a more extensive monitoring and management framework which would be implemented if the consents are granted. However, no effort has been made to gather more information about benthic habitats and communities of the STB and to combine the modelling information with field observation and experimental data. (Mead para. 12) Despite strong comments made by the former DMC, no further benthic data has been collected. The distribution and importance of habitats and species in the area of extraction and potential impacts is relatively sparse (e.g. only 17 samples within the >65 $km^2$ of the extraction site), while the actual effects remain largely unknown. (Mead rebuttal para. 4)

- There is little to no understanding of how >65 km2, that is 5 km2 per year, of benthic habitat that has been dredged, ground, iron ore extracted and return to the seabed will recover over time. The kind of data collection/studies that could have provided this kind of understanding of the impacts on the benthic communities were not undertaken. The Wellington Harbour experiments bear no relationship to the activity, the processed material or the location. (Mead rebuttal para. 5)

- The extraction process fundamentally changes the benthic habitats of the Patea Shoals, which suggests that there is a likelihood that the mined area will never recover to its pre-extraction. Adequate investigations have not been undertaken to determine the effects on the benthic ecology at the extraction site. However, the removal of all benthic organism and the fundamental changes to the substrate/habitat over an area >65 $km^2$ cannot be considered

negligible or minor, but rather major or catastrophic by the NIWA definition – some components may never recover/recolonize. (Mead rebuttal para. 6)

- Since no information is provided about how the operations will move through the proposed project area, it is unclear where the plume will originate at any given time. In addition, it is impossible to establish whether increased sedimentation down-current from the excavation site will keep impacting areas already mined (thereby affecting the recovery process) and/or non-mined areas (which are expected to act as a source of larvae to repopulate the mined areas). (Mead para 19)

- The reports do not provide any indication about the distribution and abundance of microphytobenthos (MPB). The lack of information about this group of organisms is an important knowledge gap, including for impacts from reduced light (Mead para. 19.5)

- The revised plume model is based on laboratory tests done by HR Wallingford on three different sediment types with only one sample for each sediment type. In his opinion, this violates basic principles for the design of meaningful tests and the interpretation of their results. (Mead para. 23)

- There is no evidence available about the responses of benthic communities to natural disturbance events in the STB because no study has assessed the temporal variability of these communities, and there is no strong ground for any solid inference into the stability, resistance and recovery capacities of these communities. (Mead para. 25)

- Sediment discharge from the proposed activities will have no downtime 'press' type impact) and will constantly superimpose its effects on natural disturbance. This will result in an altered disturbance regime which could last up to 35 years. Predicting the responses of benthic communities to this unprecedented event is impossible given our lack of understanding of their current dynamics under normal conditions. (Mead para 26)

- Current elevated sediment inputs from the rivers are not natural, but result from anthropogenic degradation of freshwater quality through intensive land use and the SSC generated by the activity will be orders of magnitude greater that the 'natural' levels currently present. (Mead 27, 28). This is a classic cumulative impact.

- No indication is provided about reproduction and early life history of the organisms which would be expected to recover. (Mead para 38.4)

- The Wellington recolonisation experiment provides no indication relevant to the application. This is because of the obvious differences in biota and physical environment between the Wellington Harbour and the STB, in addition to a number of artefacts associated with the experimental procedures. (Mead para. 38.5).

## Marine Mammals

63. Expert evidence on marine mammals is given by Professor Liz Slooten and by Assistant Professor Leigh Torres. Liz Slooten says that:

- The proposed mining operation involves a number of potentially serious impacts on Maui's dolphins, blue whales and other marine mammals. The

potential high risk and lack of data on critical issues (e.g. impacts on marine mammals) require a precautionary approach. A more rigorous environmental impact assessment would be needed to carry out a scientifically robust assessment of the potential impact of this development on marine mammals in the area. (Slooten para. 20)

- Insufficient information has been provided on the numbers and species of marine mammals in the area, as well as their likely reactions to the noise, habitat destruction, sedimentation and flow-on ecological impacts associated with the proposed mining operation. The information provided by TTR includes a population survey which is inadequate for the purpose, and some habitat modelling based on anecdotal information. (Slooten para 13)

- The potential impacts of sand mining include noise (discussed in detail below), collisions with vessels and mining equipment, habitat damage (including habitat destruction within the mining area and the sediment plume extending well beyond the mining area) and pollution such as from antifouling agents and oils. The potential physical impacts on marine mammals, include injury and hearing impairment. Behavioural responses include displacement and stress. (Slooten para 14)

- TTR have failed to provide either measurements of the noise made by the proposed mining operation (ships, generator and dredge to be used) or measurements of the background "ambient" noise off Taranaki. (Slooten para 15) The noise assessment conducted by Hegley (2015) was insufficient due to (a) the lack of ambient noise measurements in or near the proposed mining site, and (b) a lack of actual noise measurements of the mining equipment to

be used. These are crucial matters to adequately assess the noise impacts of the mining operation, and lead to significant problems with the noise assessment conducted in Childerhouse (2016). It is generally inappropriate to extrapolate noise levels measured in a harbor to a more open water setting due to variation in bathymetry and oceanographic properties. Furthermore, Childerhouse (2015) recognizes that the proposed equipment to be used by TTR will be significantly more modern and larger, and larger equipment typically means louder. (Torres rebuttal para 5)

- The conservation status and cumulative impacts for Maui dolphin are of serious concern. There is still considerable overlap between Maui dolphins and fisheries in the area, which is likely to be exacerbated by the mining and the sediment plume resulting from the mining. (Slooten para 18)

- The data gathered on marine mammals in the area so far are not sufficiently detailed or robust for a before, during, after comparison of the impacts of mining. A considerable amount of additional research will be needed to gather realistic baseline data, as well as data essential to allow the DMC to make a science-based assessment of the likely impacts on marine mammals. (Slooten para 19)

- The potential impacts of the proposed mining activity include sediment with higher heavy metal content being brought to the seabed surface, making it available for consumption by deposit feeders, filter feeders and therefore indirectly to higher trophic levels including fish, marine mammals and birds through food web transfer (Slooten para 16) and potential ecological impacts, include heavy metals affecting benthic communities, plankton and fish, which

have the potential to cause flow-on effects through the ecosystem on higher level predators including marine mammals and seabirds. (Slooten para 17)

64. Leigh Torres says that:

- The South Taranaki Bight (STB) is important habitat for blue whales, particularly as a foraging area and sightings and acoustic detections indicate that blue whales use this region regularly throughout the year. Blue whales in the STB region may be part of a distinct New Zealand population of whales. (Torres para 9) During her 2014 blue whale survey in the STB, their closest blue whale sighting to the proposed mining site was 34 km. (Torres rebuttal para 13). Torres presented evidence (Torres 2016) of two blue whale records within 13.5 and 19 km of the proposed mining site. (Torres rebuttal para. 13)

- Blue whales in the STB region feed on a krill which aggregate in the area based on nutrient and light availability that influence phytoplankton productivity. Blue whales have high energetic demands and must find dense aggregations of their prey and feed efficiently in order to survive and be reproductively viable. The expected sediment plume from the mining operations may impact the distribution and availability of the krill *N. australis*, thus reducing the foraging ability and efficiency of blue whales. (Torres para 9)

- Whales and dolphins are highly sensitive to ocean noise, as sound is their primary sensory mode with acoustics informing their foraging, communication, and navigation behaviors. Blue whales produce and receive low frequency sounds, some of which can travel hundreds of kilometers to

transfer information. Evaluation by TTR regarding noise impacts from mining operations on low frequency marine mammals (baleen whales) is poor, misleading, and disregards the potential to disturb blue whale behavior, distribution and physiology (stress levels). (Torres para 9)

- Noise produced by the mining operations may directly disrupt blue whale foraging, cause blue whales to move out of important feeding areas, interfere with blue whale communication causing loss of feeding or mating opportunities, cause changes in vocal behavior patterns with subsequent energetic consequences, and induce increased physiological stress that compromises blue whale health. (Torres para 9)

- The DOC 2013 guidelines are based on impulsive sounds (seismic noise) rather than non-impulsive sounds derived from mining activities and are therefore inappropriately applied. While seismic survey noise is louder than levels expected by the proposed mining, the noise generated by the mining activities will persist for 35 years. (Torres rebuttal para 6) A NOAA table for dredging lists a marine mammal behavioral disturbance threshold of 120 dB for underwater noise from non-impulsive noise, such as dredging, rather than Childerhouse (2016) which inappropriately applies an outdated behavioral effect threshold level of 160dB (Torres rebuttal para 9) Marine mammals may tolerate high noise levels in order to access important feeding, breeding or migration habitats. Research has shown that marine mammals change diving behavior, change calling behavior, and exhibit increased stress levels associated with the exposure to sound. Such stress responses can have detrimental physiological effects on the health and viability of marine

mammal populations. (Torres rebuttal para 10) noise impacts will be restricted to the immediate area around the mining operation". Noise will be audible over larger distances than Childerhouse (2016) presented, and there is significant potential for the noise produced by the mining operation to be above threshold levels of baleen whale behavioral response. (Torres rebuttal para 11)

- Vessel traffic across the STB region will increase due to the proposed mining operation. While collision risk may be minimal during mining operations due to low vessel speeds, large vessels will travel at higher speeds to and from the mining area from major ports (New Plymouth, Whanganui), which will pose a collision risk to whales. Baleen whales, particularly blue whales, are at risk of injury and death from vessel strikes worldwide. (Torres para 9)

- The mitigation plan is incomplete, as there is no offshore sampling based on an assumption of limited spatial impact by mining operations. (Torres para 9)

## Ecotoxicology

65. Expert evidence on ecotoxicology is given by Dr Ngaire Phillips. She says that:

- sediments with elevated concentrations of chromium and nickel will be brought to the seabed surface and hence may represent a risk to biota, particularly if sediment-bound metals become bioavailable as a consequence of the mining process (Phillips para 16(c))

- nickel concentrations derived from elutriate tests were at levels that may be chronically toxic to sensitive organisms, for example, larval aquatic biota, if

insufficient dilution is achieved, such as through prolonged mining operations that results in elevation of background concentrations (Phillips para 16(e)

- copper concentrations may present a long term risk to sensitive biota (e.g. larval aquatic species), for example through prolonged mining activities that elevate background copper concentrations. (Phillips para 16(f)

- There is some uncertainty as to the potential long term effects of elevated nickel and copper on larval stages of aquatic biota. (Phillips para 16(g)

- Potential effects include

    - deeper, more contaminated sediment being brought to the seabed surface, making it available for consumption by deposit feeders, filter feeders, and indirectly to higher trophic levels through food web transfer (Phillips para. 17(a)).

    - Deeper, anoxic, more contaminated sediment being exposed to oxic conditions at the seabed surface, resulting in release of contaminants into overlying water, therey increasing their bioavailability. (Phillips para. 17(b)).

    - Returned de-ored material with the same metal profile but finer grained being more readily available for consumption by deposit feeders and filter feeders. (Phillips para. 17(c)) and

    - Returned de-ored material being anoxic due to high organic content (due to dead dredged organisms) resulting in release of sediment-

bound metals to water where they are more readibly bioavailable. (Smith para. 17(d)).

## Conclusion

66. The DMC must under s 61(1)(c) take into account any uncertainty or inadequacy in the information available. The consequence of this is spelled out in s 61(2): the DMC must favour caution and environmental protection. In our submission, the evidence shows and we submit will continue to show that as with the first application, there is no acceptable baseline – either in benthic, ecology, marine mammals, or economic considerations. With this application, adaptive management is not available. We are then left with s 62(2): the DMC may refuse an application for a consent if it considers that it does not have adequate information to grant the application. Finally, to apply the s 10 purpose test, it will not enable people to provide for their economic wellbeing while maintaining the three environmental bottom lines. For these reasons, we submit that the DMC after hearing the evidence should find that this application must be declined.

Respectfully submitted

DEJ Currie/Ruby Haazen

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