

**Before the Decision-Making Committee of the
Environmental Protection Authority**

**Application for Marine Consent by
Chatham Rock Phosphate Ltd**

IN THE MATTER OF the Exclusive Economic Zone and
Continental Shelf (Environmental
Effects) Act 2012

AND

IN THE MATTER OF An application by Chatham Rock
Phosphate Ltd for a marine consent
application made to mine phosphate
nodules from the sea floor of the
Chatham Rise restricted by the
Exclusive Economic Zone and
Continental Shelf (Environmental
Effects) Act 2012

Closing Submissions by KASM, Greenpeace and Deep Sea Conservation

Coalition

November 17, 2014

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Introduction

1. These closing submissions are made on behalf of Kiwis Against Seabed Mining, Inc. (KASM), Greenpeace New Zealand, Inc. (Greenpeace) and Deep Sea Conservation Coalition, Inc. (DSCC).
2. These submissions supplement our opening submissions and our submissions made in Hamilton on October 29th, and for the most part avoids repeating matters contained in those submissions, although some relevant submissions are quoted for ease of reference. KASM, Greenpeace and DSCC oppose the proposed activity. We submit that the application should and indeed must be refused.
3. The submission discusses legal matters and supplements our Hamilton submissions on evidential matters. The legal submissions focus in particular on international legal considerations, the claimed spatial management approach, uncertainties, adaptive management and the overall approach.

International Law

4. Three points of contention have arisen with respect to international law, as discussed in the Memorandum of Counsel for EPA of 12 November 2014.
 1. What is the relevance (to the decision) of New Zealand's obligations under international instruments? Under this, two specific matters arose:
 - a. the relevance of New Zealand's obligations under the Noumea Convention and
 - b. the relevance of the precautionary principle/approach.
 2. What is the relevance of a foreign flagged vessel carrying out the mining?
5. We will not restate our opening submissions, but will address the submissions for EPA, and add one additional consideration that we raised in both our

submissions, and which Mr Ross-Watt raised, which is the relevance of the International Seabed Authority.

Relevance of New Zealand's Obligations

6. S 11 provides that:

“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.”

7. The interpretation suggested by EPA Counsel, with respect, is not supported by the wording of the Select Committee Report which reads as follows:

“Government members **sought** to amend clause 11 to remove wording that would make it constitute an interpretation clause and give UNCLOS independent operating effect, which they believed could cause it to become subject to international obligations not considered by Parliament.

In order to progress clause 11 we have endeavoured to come to an agreement on the wording. However, the final wording of clause 11 **does not reflect** the Government members' preferred final wording of this clause.”

8. In other words, the wording which the Government members wanted – which would NOT make it constitute an interpretation clause and give UNCLOS independent operating effect – was not accepted. The quotation from the Supplementary Order Paper –to the opposite effect:

“New clause 11 records that the Act continues or enables the implementation of New Zealand's international obligations so that a decision-maker under the Act does not need to look beyond the Act to be sure that he or she is complying with those obligations.”

therefore the EEZ/CCS Act must be seen in that light. It was a Select

Committee compromise, not the wish of the Government members (who drew up the SOP), that formed the wording of the final Act.

9. It is our submission, therefore, that the words “continues or enables the implementation of New Zealand's obligations” must be seen as evincing an intent that decision-makers under the Act should comply with New Zealand’s international obligations. Therefore the DMC should both take into account New Zealand’s international obligations and international best practice, and in the exercise of its statutory discretion, strive to reach a decision consistent with them.

10. However, the point of difference between the three Submitters and EPA Counsel may not be of great moment, since, as we submitted in paragraph 32 of our Opening Submissions, “In addition, s 59(2) requires the EPA to take into account “(l) any other applicable law; and (m) any other matter the EPA considers relevant and reasonably necessary to determine the application.” Taking into account these and other provisions of s 59(2) and s 11, international obligations are, in our submission, relevant matters which the DMC should take into account.” EPA Counsel seems to agree and puts it in this way (para 10): “relevant and authoritative guidance on one or more of the s 59 subjects can be taken from an international instrument, then having regard to that material seems consistent with the 'enabling' function referred to in s 11.” So we have, it seems, reasonably common ground that international instruments are relevant.

The relevance of New Zealand's obligations under the Noumea Convention

11. Dr Santillo explained in his evidence (para 13):

“According to Article 1 of the London Protocol, “The disposal or storage of wastes or other matter directly arising from, or related to the exploration, exploitation and associated offshore processing of

seabed mineral resources is not covered by the provisions of this protocol.”

Dr Santillo explained the specific relevance, however, of the Noumea

Convention: (para 15):

“The Noumea Convention uses a very similar definition of the term “dumping” as that used under both the London Convention (1972) and the London Protocol (1996), with one notable exception being that **there is no exclusion** provided from the terms of the Noumea Convention for the disposal or storage of wastes or other matter arising from or related to the exploration, exploitation or off-shore processing of seabed mineral resources. It must therefore be assumed that the disposal of such wastes or other matter under the terms of the Noumea Convention (1986) would be treated as dumping and regulated accordingly.”

He concluded that the DMC should take into account, *inter alia*, “recently updated Guidelines developed by the IAEA which enable the conduct of a *de minimis* assessment and, where appropriate, a more detailed specific assessment of the potential for radiological impacts, including on marine flora and fauna.”

12. EPA Counsel submitted that (para 21)

“In our view it is not possible to read the provisions of the Radiation Protection Act so as to be consistent with the standards referred to in the Noumea Convention. Accordingly the statutory language in the Radiation Protection Act should prevail. Parliament has set clear levels as to what will constitute radioactive material and what will not. There is therefore no need, nor authority, to seek external scientific advice as to what is radioactive and what is not as the Noumea Convention contemplates.”

13. However, the Maritime Transport Act does not require or even permit this outcome. The Applicant in its EIA stated that (2.4.5)

“The Maritime Transport Amendment Act 2013, previously referred to as part of the Marine Legislation Bill, which passed into law in October 2013 transferred responsibility for regulation of specific discharges and the

dumping of waste under the MT Act from Maritime NZ to EPA and the EEZ Act. This change enabled such activities to be assessed as part of the consent application and also to be assessed as part of one consenting regime.”

However CRP did not cite specific provisions to explain why that is so.

14. However, it can be said that the Exclusive Economic Zone and Continental Shelf (Environmental Effects) Amendment Act 2013 inserted a new (yet to be in force) section 20G into the Act which provides that “(3) However, a person may dump waste or other matter (including ships, aircraft, or structures) if—
“(a) regulations allow the dumping to be authorised by a marine consent and the dumping is authorised by a marine consent.” Wastes, including waste, containing radioactive substances are to be addressed by this DMC. This, then, puts submissions of EPA counsel into context: it would only be that “radioactive material” cannot be dumped when that section is in force. Material below the statutory threshold would be addressed by the DMC along with other toxic materials.
15. Under section 4 of the EEZ/CCZ Act, as amended by the 2013 Act, “radioactive waste or other radioactive matter means any waste or other matter that contains any radioactive material within the meaning of the Radiation Protection Act 1965”. The only reference to “radioactive substances” is under s 20(5), which provides that s 20 (b) does not affect the following activities that are regulated or prohibited by the Maritime Transport Act 1994: (i) the dumping or storing of radioactive waste or other radioactive matter” or (ii) the storing of toxic or hazardous waste; or (iii) the dumping of waste or other matter.” So clearly where waste (such as the subject of this application) does

not rise to the threshold of “radioactive waste or other radioactive matter” then it is to be treated as other waste under the EEZ/CCZ Act.

16. The new section 20G, when it enters into force,¹ makes this clear:

This section applies to waste or other matter other than: (a) radioactive waste or other radioactive matter.

(3) However, a person may dump waste or other matter ... if (a) regulations allow the dumping to be authorised by a marine consent and the dumping is authorized by a marine consent.”

While s 11 of the 2013 Amendment Act, and thus s 20G, is not brought into force, which leaves much of the issue of discharges in limbo,² this does not change the position that waste which contains matter which is radioactive, but which is below the threshold of the Radiation Protection Act, is still to be addressed by the DMC.

17. Section 59(2) of the EEZ/CCS Act requires the EPA to take into account (a) any effects on the environment or existing interests of allowing the activity; (c) the effects on human health that may arise from effects on the environment; (d) the importance of protecting the biological diversity and integrity of marine species, ecosystems, and processes and (m) any other matter the EPA considers relevant and reasonably necessary to determine the application. The statutory language governing this application is clear. There are no grounds for excluding a matter or effect which falls under a threshold set in another Act for another purpose.

¹ The Exclusive Economic Zone and Continental Shelf (Environmental Effects) Amendment Act 2013 Commencement Order 2014 brought into force sections 4(2), 5(10), 13(1), 15,18, 25-32, 35-38, 43, 45 and 46 of the 2013 Amendment Act, on 28 February 2014. So that included the new definition of radioactive waste etc, but not s 11.

² The issue of the status of dumping and discharge under the current regime in the absence of the new Part 2 was discussed by the TTR DMC in the TTR Decision in paragraphs 98 ff.

18. Therefore, our submission is that Dr Santillo's approach should be preferred. The Noumea Convention is relevant to this application. For instance, article 5.1 requires New Zealand, as a 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". So in our submission, the DMC should take notice of the Noumea Convention and strive – consistent with its other obligations under the EEZ/CCZ Act – to do just that. Specifically, article 8 requires New Zealand to "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."
19. In summary, it is our submission that given all the above, the DMC should take all appropriate measures to prevent, reduce and control pollution resulting from the proposed mining, as well as apply internationally recognized standards. There is no exception for radioactive substances below the Radiation Protection Act threshold.

The relevance of the precautionary principle/approach.

20. EPA Counsel's Memorandum submits (para 25) that "the language used in s 61 can be taken to embody the precautionary principle/approach" and that "there appears to be no compelling reason to complement s 61(2) with an extraneous precautionary ideal, and nor is it clear from the submissions of KASM, Greenpeace and DSCC in what way that exercise would alter the express requirements in the statutory provisions."

21. EPA Counsel (para 26) quoted from Ministry for the Environment advice to the Select Committee to the effect that “Rather than merely noting the term “precautionary principle” or “precautionary approach”, the EEZ Bill aims to provide more meaning as to what the concept entails for regulators, the EPA and those applying for, and objecting to, marine consent applications.” We would first observe that this does suggest that the MFE at least considers that the Bill intends to incorporate the precautionary approach. But we would also caution that that was merely advice, and one step removed from a statement from the Select Committee accepting that advice. The Select Committee report noted that the Labour Party minority view was that “We are also concerned that new terms such as "favour caution" have been included in the bill without defining what this means or whether it is meant to be more or less stringent than the widely recognised "precautionary approach". (page 8) The Green Party observed that: (page 13)

“The precautionary approach is a well understood and basic principle of environmental protection in international law. Where there is risk and uncertain information, the onus is on those wanting to undertake the activity to show that it will not cause significant harm.

Instead of requiring a precautionary approach to decision-making where there is uncertainty, the bill requires decision-makers to "favour caution and environmental protection". Favouring "caution" is a novel concept which is not defined in the bill and no case law has developed to interpret it, leading to legal uncertainty for all parties and unnecessary litigation.

It was suggested that the bill was consistent with the precautionary approach without explicitly stating it. Clear drafting is desirable. Like a number of submitters, the Green Party recommends that new clauses 33A and 60A require the application of the precautionary approach instead of "caution".”

22. We submit, therefore, that the matter is less clear-cut than EPA counsel suggests. We submitted in our opening submissions that (para 15):

“It may be thought that s 61 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).”

After citing Paragraph 25 of the Rio Declaration, we observed that

“27. 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.

28. 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. In fact s 62(2) better encapsulates the precautionary approach: “(2) 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.” S 62(2), in our submission, provides the scope and context for the application of the precautionary approach – in addition to the directives in s 61.”

23. We supplemented those submissions by reference to international law and practice, and (para 42) observed that the International Court of Justice noted the relevance of the precautionary approach in interpretation of a statute, and has also stated that “The Court is mindful that, in the field of 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.”

(Gabčíkovo-Nagymaros Project (Hungary/Slovakia) para 140)”

24. The practical application of these observations and our submissions are, in our view, straightforward.

Firstly, under 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.” We do submit that this is not itself a

formulation of the precautionary approach, which instead is PRE-cautious: it anticipates damage. But that being said, it is without question that this DMC must favour caution and environmental protection, when information available is uncertain or inadequate.

Secondly, under section 62(2), “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.” In our submission, this actually does give the DMC scope to apply the precautionary approach. In the words of Principle 15 of the Rio Declaration, “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.” In other words, where there is inadequate information, the EPA may for that reason refuse the consent. In our submission, as we will state further in our submissions, the EPA should refuse the application for the consent, since it does not have adequate information to determine the application.

25. We submit that these submissions both rely on the express words of the EEZ/CCZ Act and accurately reflect international law. We will touch on this also in the context of the adaptive management approach later in these submissions.

The relevance of a foreign flagged vessel carrying out the mining

26. Firstly, we submit that it is clear that the Health and Safety in Employment Act 1992 would not apply to a foreign flagged ship. Under section 3B(1)(i) employed or engaged under an employment agreement or contract for

services governed by New Zealand law to work **on board a New Zealand ship** or **on board a foreign ship carrying coastal cargo** while the foreign ship is on demise charter to a New Zealand-based operator”. A foreign flagged mining vessel will not be a New Zealand ship³ nor will it be a cargo carrying ship, nor will it be carrying out a petroleum operation. We also submit that it cannot be assumed that either (1) the Bill will be passed in its current form or (2) the mining ship will be a “foreign ship on demise charter to a New Zealand-based operator when it is operating in New Zealand.” (Clause 8) In passing, we observe that “New Zealand” is defined to mean “New Zealand includes all airspace within the territorial limits of New Zealand”. So it is not even clear that a vessel operating outside territorial waters is “in New Zealand”.⁴

In short, all these matters relating to the pending Bill are speculative and cannot be relied on by the DMC.

27. Secondly, while we share ECO’s concerns, the Three Submitters’ concerns with a foreign flagged vessel go far beyond health and safety legislation. Firstly, it introduces significant uncertainties. While the EPA has jurisdiction over the applicant, it would not have jurisdiction over a foreign flagged ship.

³ S 2 of the HSE Act defines a New Zealand ship as “New Zealand ship has the same meaning as in section 2(1) of the Ship Registration Act 1992”. That Act in s 2 defines New Zealand ship as “New Zealand ship means a ship that is registered under this Act; and includes a ship that is not registered but is required or entitled to be registered”.

⁴ Under the Maritime Transport Act 1994 “

New Zealand continental waters means—

(a) New Zealand marine waters; and

(b) the waters beyond the outer limits of the exclusive economic zone of New Zealand but over the continental shelf of New Zealand

New Zealand marine waters means—

(a) the territorial sea of New Zealand; and

(b) the waters of the exclusive economic zone of New Zealand.

So “in New Zealand” would mean within New Zealand territorial limits.

In the case of an accident or incident, New Zealand authorities may face jurisdictional hurdles in either arresting a foreign ship or applying penalties with respect to a ship or holding the ship liable for compensation. Fines of up to \$10 million can be levied under section 133. Offences are prescribed in section 132. “A person commits an offence against this Act who **breaches, or permits a breach of**, any of the following: a) section 20 (which imposes restrictions on activities): (b) an enforcement order:(c) an abatement notice: (d) section 24 or 167 (which require a person to comply with the EPA's instructions when stopping an activity).” We can conceive of a situation where **CRP** claims it did not breach, nor did it permit a breach, as the Boskalis’ ship’s master operated independently, or in breach of its contract with CRP, or in breach of instructions, for example.

28. Analysing this foreign flag issue could be the subject of a lengthy dissertation on international and maritime law. We will merely observe that numerous enforcement and compensation issues, as well as health and safety issues, arise with a foreign flagged ship operating outside New Zealand territorial waters. These issues are compounded by Boskalis’ practice of flying a Cyprus flag: a flag of convenience. (Dr Steenbrink, transcript page 534-5). Flags of convenience are typically used to avoid stricter administrative and regulatory controls of more responsible countries such as New Zealand or the Netherlands.

The relevance of the International Seabed Authority

29. In our opening submissions and Hamilton submissions we noted that UNCLOS in art 208.3 requires that for seabed activities within national

jurisdiction, laws, regulations and measures shall be no less effective than international rules, standards and recommended practices and procedures and that States must also enforce such laws.⁵ We outlined in our opening submission matters which must be covered, which include protecting and preserving rare or fragile ecosystems and habitats,⁶ preventing, reducing and controlling pollution from seabed activities⁷ and conserving biodiversity.⁸ Certainly the exploration regulations and the Environmental Management Plan explicitly incorporate the precautionary principle. The DMC is somewhat hampered in this regard since the ISA has only developed exploration regulations and has not yet developed exploitation regulations, but this underlines the uncertainties that characterise seabed mining at present.

Approach to Uncertainty

Favouring Caution

30. The TTR DMC had this to say about uncertainty and section 61(2):

“139. Section 61(2) contains an important direction. We must “favour caution and environmental protection” where the information is uncertain or inadequate. This provision is an explicit statement that, within the context of the EEZ Act, the promotion of sustainable management requires a cautious approach. The taking of risks in this environment is not encouraged, and we note that this direction is not to be traded off against the attainment of economic wellbeing. In other words, the requirement to favour caution and environmental protection in the face of uncertain or inadequate information is an absolute one, and we remind ourselves of section 10(3), which makes it clear that applying the information principles in section 61 is one of the ways the purpose of the EEZ Act is achieved.

⁵ UNCLOS arts. 214, 215.

⁶ UNCLOS Art. 194(5). Also see Noumea Convention art. 14.

⁷ UNCLOS Arts. 194(3)(c) (marine environment generally), 208(1) (national jurisdiction), 209(2) (the Area). See also Noumea Convention art.8.

⁸ CBD Arts. 5, 6, 8.

31. In our submission, this is correct. Section 61(2) is mandatory. There is an additional consideration: Section 61(2) addresses information available in the present tense: if it “*is*” uncertain or inadequate, the EPA must favour caution and environmental protection, and section 62(2) provides that “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.” Both are in the present tense: they do not contemplate that the EPA may, sometime in the future, get certain or adequate information – after it has “determine[d] the application.”
32. Firstly, the DMC must base decisions on the “best available information”⁹ (s 61(1)(b)). Then it 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. Since this, at least in our submission, would mean that the mining is likely to be refused, the EPA must under s 61(3) first consider whether taking an adaptive management approach would allow the activity to be undertaken. It should then, for the reasons given, apply the *SOS* Supreme Court 4 point test. In particular, it should consider under leg (d) the extent to which an adaptive management approach will sufficiently diminish the risk and the uncertainty. For reasons we discuss below, we believe it is clear that the Applicant’s proposed ‘adaptive management’ will do neither.

Therefore, the overall question: - whether any adaptive management regime can be considered consistent with a precautionary approach, or, in the words

⁹ “Best available information” means the best information that, in the particular circumstances, is available without unreasonable cost, effort or time.”

of the Act, “would allow the activity to be undertaken” – must be resolved in the negative. 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.

Key Uncertainties

Boskalis

33. We submitted in our Hamilton Submission that the intention of CRP to use an independent contractor introduced numerous uncertainties and problems. The involvement of Boskalis brings issues of execution of any consent, compliance and enforcement. Key among them is that the DMC can have no confidence that Boskalis will in fact even carry out the mining. It may grant a consent and then a completely different company will arrive to carry out the mining, using different techniques and equipment. So the evidence, from the overall technique, to the equipment and materials used, and of course the consequential effects, are all subject to that overall rider: this all may change. And obviously adaptive management cannot resolve this uncertainty.
34. Even if they do get the contract and execute it, the evidence Boskalis executives presented was of a concept only – “a good drawing of the idea how it works, the processes described” - not even a detailed design.¹⁰ This is compounded by the fact that deep seabed mining has never been carried out, anywhere in the world.¹¹ Neither the system nor even the ship has been built, or modified, yet. Notable, in our submission, are two issues: the risers and the

¹⁰ Mr Van Raalte transcript day 5 1/10/14 page 590, 605,

¹¹ Current diamond mining uses a drill, and is 150 metres. Transcript Day 2 26/9/2014 Mr Falconer page 216, 219.

processing. The risers are only a concept and have never been built. JASCO did not even try to model the frequency and noise they would create. The processing was tested in a laboratory setting, untested.¹² The diffuser has not been designed and the outflow velocity from the pipes has yet to be determined.¹³ This would, in our submission, affect the plume, and is a significant uncertainty: how and even whether they will achieve the speeds used by the plume models is unknown.

35. This also means that the party appearing before the DMC is not the operator that will be carrying out the activity on the water. There will always be a degree of separation between CRP and its contractor. Dr Steenbrink acknowledged to Mr Christensen that the binding commitment is with CRP, rather than Boskalis.¹⁴ When the contractor will fly a foreign flag of convenience, Cyprus, and when Boskalis failed to disclose in its evidence convictions as well as active investigations for environmental infractions, this adds to the concerns. They have even been convicted of bribery in one country.¹⁵ The implementation of the conditions are going to be reliant in the water on the execution by Boskalis, yet it is CRP that has the legal obligation, and Boskalis will be in a private contractual relationship with CRP.

¹² Mr Van Raalte transcript day 5 1/10/14 page 607.

¹³ Mr Van Raalte transcript day 5 1/10/14 page 607. "I have not been informed yet about the latest test results about a Jet 3D model whether it should be seven or eight metres or something or even four metres per second outflow velocities. That is something that still depends on final modelling but the modelling shall determine what we have to achieve and that number has been the input for the plume modelling,"

¹⁴ Dr Steenbrink transcript day 5 1/10/14 page 543.

¹⁵ Dr Steenbrink transcript day 5 1/10/14 page 727.

Marine Mammals

36. Inexplicably, the Applicant failed to undertake the most basic of marine mammal surveys: a systematic survey.¹⁶ Not only did it not conduct aerial surveys, acoustic or visual surveys; it did not even put marine mammal observers – “a couple of marine mammal observers and one person with a hydrophone array”¹⁷ on its cruises. It cannot be said to have provided the “best available information.” Insufficient information has been provided.¹⁸ That leaves uncertainty about what marine mammals are present, which are there for feeding, and whether they are transient or migratory.¹⁹ The example was given of the research which found that the South Taranaki Bight is an important habitat for blue whales: not even the most basic field research has been done.²⁰ Instead, the DMC only has opportunistic data which is not a substitute for dedicated systematic surveys.²¹ Even Mr Cawthorn said he would “prefer” to see some dedicated surveys over the Chatham Rise area “ideally” before mining takes place.²² Mr Cawthorn acknowledged that the lack of funding and observers he referred to in his evidence related to the past, and that trained observers are now available.²³ Mr Hawthorn confirmed that an aerial survey was done for the TTR application, and could have been done in the Chatham Rise:²⁴ in fact he specifically agreed that it was a matter of

¹⁶ Transcript pg 1489 Mr Ross-Watt, pg 1552 1554 Dr Childerhouse.

¹⁷ Ass. Prof. Liz Slooten day 13 Transcript 21/10/14 page 1459.

¹⁸ Ass. Prof. Liz Slooten day 13 Transcript 21/10/14 page 1448.

¹⁹ Dr Ketten day 13 Transcript 21/10/14 page 1537.

²⁰ Dr Childerhouse, day 13 Transcript 21/10/14 page 1575. “But those whale have probably been there for a lot longer. But it is only we have collected enough data to actually look out there that we have been able to confirm that they are there.”

²¹ Dr Childerhouse, day 13 Transcript 21/10/14 page 1583.

²² Mr Hawthorn, day 13 Transcript 21/10/14 page 1592.

²³ Mr Hawthorn, day 13 Transcript 21/10/14 page 1596.

²⁴ Mr Hawthorn, day 13 Transcript 21/10/14 page 1596.

resources and also that it would “be a reasonable thing to do.”²⁵ Placing marine mammal observers onboard survey vessels “could and should have been done” at little additional cost, since vessels were already chartered.²⁶ Yet not even this simple step was not taken.

37. Nor did the applicant obtain any ambient noise measurements, despite knowing, as Mr Hawthorn stating in his evidence, that whales are sensitive to any sounds different from or above the ambient (natural background) level.²⁷ The best explanation he could give for that omission is that he was commissioned by CRP some considerable time after all the survey work had been completed.²⁸ We have had no explanation from CRP. Instead CRP provided an estimation from other regional seas and similar depths,²⁹ whereas Dr Keetten said that an ambient noise measure would require actual recordings over time to provide an ambient measurement,³⁰ and this was not done.³¹
38. We do know that the lack of data is a problem: experts agreed that the area is significant for feeding marine mammals³² and that the area could be significant.³³
39. Noise is a significant uncertainty. The JASCO modeling simply did not model noise from the risers, so there is no evidence on the noise. Expert at the Joint Witness statement were unable to reach agreement re the significance of noise

²⁵ Mr Hawthorn, day 13 Transcript 21/10/14 page 1596.

²⁶ Transcript pg 1554 Dr Childerhouse.

²⁷ Mr Hawthorn, day 13 Transcript 21/10/14 page 1596.

²⁸ Mr Hawthorn, day 13 Transcript 21/10/14 page 1596.

²⁹ Dr Ketten day 13 Transcript 21/10/14 page 1521.

³⁰ Dr Ketten, day 13 Transcript 21/10/14 page 1540.

³¹ Dr Ketten, day 13 Transcript 21/10/14 page 1540.

³² At 5, pg 1461 of the Transcript, Evidence in chief of Associate Professor Slooten. Paragraph 23 of Mr Cawthorns Evidence, 25 august 2014.

³³ At 25, pg 1638 of the Transcript, Evidence in chief of Dr Huber.

from the riser pipes.³⁴ The experts at the Joint Expert conference had that there will be high frequency noise from materials banging against the side of the riser.³⁵ While Dr Ketten thought the noise will not exceed the noise of the pumps,³⁶ with respect, that is a high bar: the pumps are estimated to emit 195.8 dB.³⁷ While the experts may not expect that the risers would not emit an additional 195.8 dB, with respect that should give DMC little comfort. And while she believed high frequency noise will drop out (with distance), she could not estimate the lowest frequency emitted.³⁸ Thus in our submission, the noise of the risers is a significant uncertainty. The “best available information” is simply not good enough.

In addition, the JASCO evidence was based on recordings where the original recording equipment could not record over 40 kilohertz.³⁹ Marine mammals can hear well above 40 khz and even above 100 khz.⁴⁰

40. While JASCO and Dr Ketten expressed confidence in their noise modelling, they are modelling an activity which has never taken place, at depths that have never seen seabed mining, no effort was made to model the noise made by the risers, the very large 12 MW pumps were extrapolated from 2.7 MW pumps, and the modelers were not produced as witnesses. In our submission, very little weight can be placed on the modelling. Even taken at face value, the

³⁴ Issue 1. Schedule 1, Joint Witness Statement expert conferencing for Marine mammals (Wednesday 15 October 2014).

³⁵ Dr Ketten, day 13 Transcript 21/10/14 page 1527.

³⁶ Dr Ketten, day 13 Transcript 21/10/14 page 1527.

³⁷ Dr Childerhouse, day 13 Transcript 21/10/14 page 1555

³⁸ Dr Ketten, day 13 Transcript 21/10/14 page 1527.

³⁹ Dr Humheson, day 14 Transcript 22/10/14 page 1602, 1604.

⁴⁰ Dr Ketten, day 13 Transcript 21/10/14 page 1544

estimate of 195.8 db is a very loud noise, which can cause TTS all the way to 3 km from source.⁴¹

41. Nor can these uncertainties be resolved through mitigation. Mining will take place at night when it is very difficult to see a whale.⁴² Assoc. Prof. Slooten's evidence is that the probability of detecting beaked whales is very low. Mitigation monitoring detects fewer than 2% of beaked whales if the animals are directly in the path of the ship⁴³ and the probability of a marine mammal observer on a seismic survey vessel detecting a beaked whale directly on the transect line of the vessel is 1-2%. As beaked whales spend only 25% of the time vocalizing, even a combination of visual and acoustic methods still leaves a low probability of detection.⁴⁴ And even if all marine mammals were detected within a 1.5 km safety zone, the vast majority affected are likely to be far beyond that, and may experience temporary threshold shift, physiological stress or behavioural disruption.⁴⁵ Since there is a risk – either possibly moderate, or moderate – of TTS within 3 km, a 1.5 km safety zone is plainly inadequate, in any case, in our submission.
42. Section 34(4) of the Act provides that “In this section, best available information means the best information that, in the particular circumstances, is available without unreasonable cost, effort, or time.”

⁴¹ Prof. Slooten, day 13 Transcript pg 1456 ()

⁴² Mr Hawthorn, day 13 Transcript 21/10/14 page 1595.

⁴³ Assoc. Prof. Slooten Supplementary evidence para 50.

⁴⁴ Assoc. Prof. Slooten Supplementary evidence para 50.

⁴⁵ Assoc. Prof. Slooten Supplementary evidence para 53.

Benthic Ecology

43. There are substantial uncertainties around the benthic communities in the marine consent area and this prevents a sound assessment of the potentially adverse effects of the proposed mining activity on the Chatham Rise.⁴⁶ The lack of data includes detailed descriptions of major components of the benthic community, organisms and community responses to mining impacts, and the recovery and recolonisation potential of organisms that would be removed or affected by the mining.⁴⁷
44. The benthic ecology experts agree that “inadequate geographical coverage of information in the surrounds means that we cannot predict with confidence the overall impacts of mining on organisms, communities and ecosystems at the broader Chatham Rise scale.”⁴⁸
45. Uncertainty about the distribution and presence of these communities in the proposed marine consent area (outside of MP55549) and elsewhere on the Chatham Rise will limit the DMC’s ability to assess the potential scale and significance of the adverse effects and to adequately take into account section 59 (2)(d) and (e) of the Act.

Sedimentation

46. The experts in the benthic ecology and spatial planning conference state that there is insufficient information to assess the indirect effects of changes to the

⁴⁶ At 5, pg 296 of Transcript, Evidence in chief of Dr Berkenbusch.

⁴⁷ Ibid.

⁴⁸ Issue 1, Schedule 1, Expert Conferencing for Benthic Ecology and Spatial Planning (Tuesday 16 and Saturday 27 September 2014).

sediment regime (sedimentation and total suspended solids (TSS)) on benthic communities.⁴⁹

47. Professor Peake in his evidence raised the issue of the sensitivity of the sediment plume model and that there was variability about the height of the plume. Given the swell height out at the Chatham rise “keeping them in more than 10 metres I think are almost impossible. And so it comes down to the sensitivity of the modeling and that’s an issue which the radiochemistry group were concerned about, the uncertainties associated with many of the estimates that came out of the modeling there.”⁵⁰ While the Boskalis witnesses claimed⁵¹ that with a heavy (40/50/60 tonne) weight the diffuser will stay 10 metres from the seafloor, we submit that this is new technology, that there is a 400-450 metre pipe behind a moving ship in often heavy seas and that the DMC can have no confidence that the diffuser will stay 10 metres from the bottom. Whether it is 10, 20, or 30 metres nobody can say. This matters, since the modelling is based on diffusing from 10 metres. This is a significant uncertainty.⁵²
48. Adding to this is the fact that only 7 months monitoring was done – Dr Spearman said “the model works very well for the six months that you have got”⁵³ and the modelers used a global model, not local measurements, for tidal and eddy information.⁵⁴ The measurements that were done were done at 30

⁴⁹ Issue 3, Schedule 1, Expert conferencing for Benthic Ecology and Spatial Planning (Tuesday 16 and Saturday 17 September 2014).

⁵⁰ At 10, pg 824 of Transcript, Evidence in chief of Professor Peake.

⁵¹ Transcript pg 595 Van Raalte

⁵² If there was a condition averaging the distance, then the averaging must be effective to control effects: e.g. average over a day, a week or a month would clearly not be effective.

⁵³ Transcript page 516 Dr Spearman

⁵⁴ Transcript page 559.

metres above the seabed⁵⁵ where the currents are different. So the model is only as good as its inputs, which in our submission are inadequate.

49. Prof. Les Watling discussed the impact of the sediment being in the nature of a “soupy content” and that it may take years or even decades for that to be consolidated. This was agreed to by other experts⁵⁶ and is unchallenged evidence.

Toxicity

50. The experts agreed⁵⁷ that CRP should undertake research to establish toxicity values based on species relevant to the site, that the size of the plume will be a factor determining the effects of multiple stressors on CR ecology over the long term,⁵⁸ baseline data on metal concentrations in key commercial/customary species must be collected before any mining is undertaken, and there is no internationally recognized toxicity threshold for uranium in the marine environment.⁵⁹
51. The experts also agreed that background levels of trace metal concentrations in the water column, or the levels of trace metals in sediments outside of the mining permit area (MP55549) have not been characterised.⁶⁰ It would be difficult to set any conditions to mitigate because CRP haven’t identified whether there definitely are no toxic effects.⁶¹

⁵⁵ Transcript page 638 (Dr Nodder) and see page 660 (2 October) Dr Longdill

⁵⁶ At 20, pg 410 of Transcript, Evidence in chief of Les Watling.

⁵⁷ JWS Toxicity Issue 3

⁵⁸ JWS Toxicity Issue 4

⁵⁹ JWS Toxicity Issue 5,6

⁶⁰ Issue 1. Schedule 1, Expert conferencing for toxicology and Water quality (Friday 19 September 2014).

⁶¹ At 25, pg 805 of the Transcript, Evidence in chief of Dr Philips.

52. There is also a total absence of baseline data on bioaccumulation of metals in important customary and commercial fisheries undertaken on the Chatham Rise.⁶² This is a significant issue as the area supports a significant commercial and customary fishery and such baseline data would enable monitoring of the medium to long-term effects of the operation.⁶³

Uranium

53. Uranium is chemically toxic to humans, plants, animals at some elevated level of intake or exposure.⁶⁴ Assoc. Prof. Peake believes that it is necessary to establish a uranium toxicity level for species and then compare that with the maximum – a starting point would be the maximum possible level of uranium that would be discharged after processing on the ship.⁶⁵ Measuring the toxicity for the four pelagic species, comparing it with the total possible uranium content in the water at the point of discharge from the discharge pipe, must be done before any mining starts.⁶⁶ “In the absence of a value we just don’t know in terms of toxicity and also the background content of uranium in those four pelagic species at present.”⁶⁷

54. If the uranium levels discharged from the pipe are not very much less than the toxic levels, no mining or any shape or form should take place.⁶⁸ If mining has already started, what happens if the results of this research indicate that toxicity may be an issue for the species more relevant to the site?⁶⁹ Globally there is limited information on the toxicological effects of uranium in marine

⁶² Issue 5, Schedule 1, Expert conferencing for Toxicology and Water Quality (Friday 19 September 2014).

⁶³ Issue 5, Schedule 1, Expert conferencing for Toxicology and Water Quality (Friday 19 September 2014).

⁶⁴ At 25, pg 864 of the Transcript, Evidence in chief of Dr Bull.

⁶⁵ At 5 pg 830 of the Transcript, Evidence in chief of Assoc. Professor Peake.

⁶⁶ At 5 pg 831 of the Transcript, Evidence in chief of Assoc. Professor Peake.

⁶⁷ At 5 pg 830 of the Transcript, Evidence in chief of Assoc. Professor Peake.

⁶⁸ At 30, pg 823 of the transcript, Evidence in chief of Assoc. Professor Peake.

⁶⁹ Issue 3, Schedule 1, Expert conferencing for Toxicology and Water Quality (Friday 19 September 2014).

environments and what has been undertaken indicates significant variability in different groups of organisms.⁷⁰

In terms of radiation, there is a need for an assessment⁷¹ involving the National Radiation Laboratory.

Adaptive Management

55. A crucial issue in this hearing is adaptive management. As the TTR DMC noted in its decision (para 10), s 61(2) and (3) provide that:

“(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 undertaken.”

56. The Supreme Court in *Sustain Our Sounds v NZ King Salmon* SC 84/2013 [2014] NZSC 40 (‘SOS’) “[t]he overall question is whether any adaptive management regime can be considered consistent with a precautionary approach.” If the DMC preferred, this could be rephrased for this application as “[t]he overall question is whether any adaptive management regime can be considered consistent with favouring caution and environmental protection in the face of uncertain information”. While we submit that the Supreme Court’s approach is to be preferred, the latter approach is clearly consistent with the words and context of the Act.⁷²

⁷⁰ At 25, pg 796 of the transcript, Evidence in chief of Dr Philips.

⁷¹ Transcript pg.1193 of David Santillos evidence

⁷² We discussed this in greater detail in our opening submissions:

“73. At para [139] the Supreme Court found that “The answer to the overall question from [129](d) of whether risk and uncertainty will be diminished sufficiently for an adaptive management regime to be consistent with a precautionary approach will depend on the extent of risk and uncertainty remaining and the gravity of the consequences if the risk is realised. For example, a small remaining risk of annihilation of an endangered

57. We submitted in our opening submissions that:

“70. Section 64 (2) provides that 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.

(3) In order to incorporate an adaptive management approach into a marine consent, the EPA may impose conditions under section 63 that authorise the activity to be undertaken in stages, with a requirement for regular monitoring and reporting before the next stage of the activity may be undertaken or the activity continued for the next period.

(4) A stage may relate to the duration of the consent, the area over which the consent is granted, the scale or intensity of the activity, or the nature of the activity.

In our submission, this means adaptive management requires a small scale or a short period –or “(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.**” Being able to assess effects, and discontinue the mining activity, or amend the activity, are essential.”

58. It is the effects of the activity that must be assessed: in this case, the actual effects of the mining that are of concern – the destruction of the benthos, the

species may mean an adaptive management approach is unavailable. A larger risk of consequences of less gravity may leave room for an adaptive management approach.”

74. While that case was under the Resource Management Act 1991, the reasoning of the Supreme Court and the wording of the EEZ/CCZ Act show that the principles laid down there are applicable under the EEZ/CCZ Act. We submit that the Supreme Court’s decision is highly relevant because the underlying principles are equally applicable to this legislation. In fact, they are applicable a fortiori. We submit this because of the specific provisions in the EEZCS Act:

a. Under s 61(2), if the information available is uncertain or inadequate, the EPA must favour caution and environmental protection and not only caution, but also environmental protection must be favoured.

b. Under s 61(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 undertaken. In other words, the governing principle is that the EPA must favour caution and environmental protection. The adaptive management approach is only to be taken – conditionally – if it would allow the activity to be undertaken.

c. S 62(3) puts the matter beyond doubt: “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.” As submitted earlier, this is entirely consistent with the precautionary approach, which was endorsed by the Supreme Court.”

sediment and the plume, its toxicity and the noise and other effects on marine mammals. That is one reason we say that the Applicant's proposed paragraph 41 is not adaptive management. It merely draws a line around the mining and suggests that if effects beyond the mining are greater than predicted, the consent be reviewed. Adaptive management, on the other hand, looks at not only 'outside envelope' effects but the core effects: the uncertainties. In this case, the mining. That is why we say that staging is the essence of the adaptive management approach. Simply put, it is starting small, seeing what the effects are, and increasing if the effects are found to be consistent with the Act. Once that is done, being able to assess effects, and discontinue the mining activity, or amend the activity, are essential.

“(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.”

Subsection 3 of s 64 describes how this can occur: through staging:

“(3) In order to incorporate an adaptive management approach into a marine consent, the EPA may impose conditions under [section 63](#) that authorise the activity to be undertaken **in stages**, with a requirement for regular monitoring and reporting **before the next stage of the activity** may be undertaken or the activity continued for the next period.

(4) A stage may relate to the **duration** of the consent, the **area** over which the consent is granted, the **scale or intensity** of the activity, or the **nature** of the activity.”

59. Staging is a clear thread running through s 62(2) and(3): starting small, or for a short duration, scale or intensity, or nature: all of which allow monitoring so

effects of concern can be monitored, assessed, and the activity discontinued, or continued with or without amendment. However s 64(2)(b) makes it clear that the essence is

(i) an approach that

(ii) allows an activity to be undertaken

(iii) so that its effects can be assessed and

(iv) the activity (a) discontinued, or (b) continued (with or without amendment), on the basis of those effects.

We also emphasise here that the activity must be able to be (1) discontinued (2) continued with amendment or (3) continued without amendment.

The Applicant's Proposed Approach

60. The approach the Applicant calls the 'Adaptive Management Approach' in its paragraph 41 is, in our submission, not only not an adequate adaptive management approach: it is not an adaptive management approach at all. There is no staging. It sets environmental thresholds in Schedule 1, and is triggered only when one of the thresholds is exceeded, or "an unexpected adverse impact" associated with the mining operation occurs.

61. With respect to the latter: an adaptive management approach would address expected as well as unexpected adverse impacts. The Applicant could argue later on that any of the adverse impacts identified in this hearing are 'expected'. The problem with the application is not *unexpected* adverse impacts. It is that adverse impacts are indeed expected: what we do not know

is the magnitude, severity and duration of them, particularly in the case of benthic damage. We know that corals and sponges will be destroyed. We know that habitat will be destroyed. We know that a 'soupy' sediment will result in which benthic life cannot be properly sustained. We know that noises will be emitted harmful to marine mammals, and we know that toxicity will be increased. None of these are unexpected impacts. They are expected, and indeed virtually inevitable. It is their extent and nature of the effects that are unknown or uncertain.

With respect to the stated exceedances: we said in our Hamilton submissions that

“60. Simply reporting exceedance of an “environmental threshold” or an “unexpected adverse impact” and then proposing measures presupposes that the environmental thresholds are known and acceptable, that the expected adverse impacts are also known and acceptable. Neither are the case, in our submission. The condition proposed by the applicant is simply a normal consent condition stating that the applicant will keep within stated parameters and expected effects, given an adaptive management name.”

62. Nor can the Applicant claim that the uncertainties of crucial concern are within environmental thresholds. Sedimentation would be covered only where there is “no observed impacts on benthic organisms beyond the distance predicted for 1 mm sedimentation from the mining of one mining block”, determined at a point no more than 7 km from the edge of a mined mining block. In other words, anything within that distance would be considered acceptable. Quite simply, the consent would allow smothering of all benthic life for 7 km around the mining. Unlimited turbidity would be permitted up to 5 km from the mining site, or 50 metres above the seabed. Again, all marine life can be smothered, up to 50 metres, for 5 km in each direction.

That is not adaptive management. It assumes all effects within that “black hole” are both known and environmentally acceptable, whatever they are.

63. If the DMC considers that it is adaptive management – and it can only be to the extent that it addresses sediment and TSS at the stated distance from the mining - then it is only adaptive management applied to the extent of the plume (sediment and turbidity), and seabirds. Nothing more. No other uncertainties are addressed.
64. There is no proposed marine mammal ‘environmental threshold’ and no toxicity ‘environmental threshold’; nor are a long list of uncertainties addressed.

A list of some Uncertainties

We have listed some of the uncertainties we have covered in these submissions. There will be others.

1. Boskalis as contractor – whether evidence accurate at all – responsibility of Boskalis as third party –environmental track record of Boskalis
2. Marine mammals:
 - a. Marine mammals present: habitat, feeding species, behaviour, etc.
 - b. Effects of plume etc on marine mammals/food chain
 - c. noise especially the risers, frequencies > 40 khz and the magnitude of the pumps (3 pumps, 12 MW, extrapolated from a2.7 MW pump)
3. Benthic:
 - a. detailed descriptions of major components of benthic community, organisms and community responses to

mining impacts, and recovery and recolonisation potential⁷³

- b. Inadequate geographical coverage of information in the surrounds so we cannot predict with confidence the overall impacts of mining on organisms, communities and ecosystems at the broader Chatham Rise scale.”⁷⁴

4. Sedimentation:

- a. insufficient information to assess the indirect effects of changes to the sediment regime (sedimentation and total suspended solids (TSS)) on benthic communities.⁷⁵
- b. Modelling done measurements of 7 months data (no seasonal);⁷⁶ not tides or eddy data⁷⁷ and 30 metres above seabed.⁷⁸
- c. ‘Soupy’ nature hence uncertainties of recolonisation⁷⁹

5. Toxicity:

- a. -no toxicity values based on species relevant to the site
- b. the size of the plume will be a factor determining the effects of multiple stressors on CR ecology over the long term.⁸⁰
- c. no baseline data on metal concentrations in key commercial/customary species.
- d. no internationally recognized toxicity threshold for uranium in the marine environment.⁸¹
- e. background levels of trace metal concentrations in the water column, or the levels of trace metals in sediments outside of the mining permit area (MP55549) have not been characterised.⁸²

⁷³ Ibid.

⁷⁴ Issue 1, Schedule 1, Expert Conferencing for Benthic Ecology and Spatial Planning (Tuesday 16 and Saturday 27 September 2014).

⁷⁵ Issue 3, Schedule 1, Expert conferencing for Benthic Ecology and Spatial Planning (Tuesday 16 and Saturday 17 September 2014).

⁷⁶ Transcript page 516 Dr Spearman

⁷⁷ Transcript page 559.

⁷⁸ Transcript page 638 (Dr Nodder) and see page 660 (2 October) Dr Longdill

⁷⁹ At 20, pg 410 of Transcript, Evidence in chief of Les Watling.

⁸⁰ JWS Toxicity Issue 4

⁸¹ JWS Toxicity Issue 5,6

⁸² Issue 1. Schedule 1, Expert conferencing for toxicology and Water quality (Friday 19 September 2014).

- f. a total absence of baseline data on bioaccumulation of metals in important customary and commercial fisheries undertaken on the Chatham Rise.⁸³
- g. Globally there is limited information on the toxicological effects of uranium in marine environments and what has been undertaken indicates significant variability in different groups of organisms.⁸⁴

Application of the SOS Four Part Test

65. The factors endorsed by the Supreme Court “at least in this case” were:

- (a) there will be good baseline information about the receiving environment;
- (b) the conditions provide for effective monitoring of adverse effects using appropriate indicators;
- (c) thresholds are set to trigger remedial action before the effects become overly damaging; and
- (d) effects that might arise can be remedied before they become irreversible.

We draw particular attention to (c) and (d), since, in our submission, they are consistent with the essence of an adaptive management approach incorporated in s 64(2). Leg (d) of the *SOS* test was the “part of the test deals with the risk and uncertainty and the ability of an adaptive management regime to deal with that risk and uncertainty.” (*SOS* para 133).

66. We now turn to those criteria. We noted in our opening submissions that:

“72. The Supreme Court in *SOS* laid down a 4 part test for adaptive management. 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:

⁸³ Issue 5, Schedule 1, Expert conferencing for Toxicology and Water Quality (Friday 19 September 2014).

⁸⁴ Dr Philips pg 796 of the transcript,

- (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.

73. At para [139] the Supreme Court found that “The answer to the overall question from [129](d) of whether risk and uncertainty will be diminished sufficiently for an adaptive management regime to be consistent with a precautionary approach will depend on the extent of risk and uncertainty remaining and the gravity of the consequences if the risk is realised. For example, a small remaining risk of annihilation of an endangered species may mean an adaptive management approach is unavailable. A larger risk of consequences of less gravity may leave room for an adaptive management approach.”

67. We then turn to an application of those tests.

- (a) *the extent of the environmental risk (including the gravity of the consequences if the risk is realised);*

The Chatham Rise is one of the most obvious and distinct ecosystems we have in the EEZ and it is one of the most productive.⁸⁵ Extinction of species: species such as amphipod taxa⁸⁶ unique to the area could be destroyed;⁸⁷ as will unique coral communities.⁸⁸ Limited sampling means you may not even find all of the endemic species that are in the area.⁸⁹ Mining will cause a “significant adverse impact” on vulnerable marine ecosystems: something the United Nations Food and

⁸⁵ Dr Rowden transcript pg. 2032: “Well certainly the Chatham Rise is one of the most obvious and distinct ecosystems we have in the EEZ and it is one of the most productive, so there is no debate I don’t think from anyone on that.”

⁸⁶ Transcript Day 21 6/11 Dr Rowden page 1996

⁸⁷ “It is hard to tell for sure why it might be the case, but at least in terms the comparisons we made, this one particular infaunal community doesn’t appear to occur anywhere else on the Chatham Rise or any of the other data that we have looked at... So this is a community obviously which is based upon the presence of phosphorite nodules, so that is not then going to be a surprise for you when you have phosphorite nodules relatively abundant within this particular area then the likelihood of development in this community is potentially going to be restricted to this area.” Pg 1997.

⁸⁸ “The type of community is represented by community L, a coral dominated community in this sort of form does not seem to appear anywhere else in the New Zealand EEZ.” Pg 1998.

⁸⁹ Transcript pg 2029.

Agriculture Deep Sea Guidelines direct fishing industry should strive to avoid.⁹⁰ It may even cause a regime shift.⁹¹

Damage to the benthic communities on the sea floor, removal of the sediment and the phosphorite nodules thus the habitat for those communities; change to the nature of the sediment by injecting water into that sediment, that will change its consistency at least for some time; the sediment plume will be distributed and that will also have an impact on the organisms, through potentially influencing their biological function through their feeding and reproduction.⁹²

(b) the importance of the activity (which could in some circumstances be an activity it is hoped will protect the environment);

It would clearly not protect the environment, in our submission.

75% of the phosphate will be exported.⁹³ Therefore the benefits to New Zealand agriculture⁹⁴ are substantially lower than claimed, and the claimed climate miles would be reduced.⁹⁵ Most benefits will accrue to the company, while New Zealanders take all the risk and eventually also pay the cost of environmental harm.

(c) the degree of uncertainty

Deep seabed mining at these depth is a new activity

Boskalis: the uncertainties that Boskalis will even get the contract to do the mining, or execute the contract; the conceptual nature of the proposed mining system and details; its third party status; the Cyprus flag of convenience.

Marine mammals: Uncertainty is very high, since the required research was not done. We do not know what marine mammals are

⁹⁰ Transcript pg 2029.

⁹¹ Transcript pg 2020. "A regime shift, that is definitely a bigger question, but that is something which really is and again, the purview of Matt Pinkerton because he looked at something on a much bigger scale than we did, so a regime shift, almost by definition, is something that is very large and of course, there is always a possibility that if you have a human disturbance on a large scale, that it can turn the ecosystem into something else, as you say, there is a shift, and there are examples of regime shifts around the world which have been caused by human disturbance but also by natural changes like climate change and such like."

So our work is much too tight an area to postulate whether or not the changes on the benthic communities at that scale would result in a regime shift"

⁹² "Obviously the mining will have a direct impact on the benthic communities on the sea floor, and if you are going to remove the sediment and the phosphorite nodules then clearly you are removing a habitat for those communities. You are also going to change the nature of the sediment as you for instance during the mining you are going to inject water into that sediment, that will change its consistency at least for some time. The sediment plume of course will be distributed and that will also have an impact on the organisms through for instance potentially influencing their biological function through their feeding and reproduction and such like. So there is a number of impacts which are going to occur as a result of mining." Pg 1998. Transcript, Dr Rowden.

⁹³ Chris Castle Supplementary evidence para 20.

⁹⁴ Chris Castle evidence para 31.

⁹⁵ Chris Castle initial evidence para 31. (transcript 26/9).

there. There is either a possible risk or a moderate risk of TTS to 3 km, based on the noise modeling.

Noise: Lack of ambient measurement, no modeling of noise from the risers or frequencies above 40 dB, and extrapolation of the 12 MW three engines from a 2.7 MW engine.

Benthic and sedimentation: no detailed descriptions of major components of benthic community, organisms and community responses to mining impacts, and no recovery and recolonisation potential;⁹⁶ inadequate geographical coverage of information in the surrounds so we cannot predict with confidence the overall impacts of mining on organisms, communities and ecosystems at the broader Chatham Rise scale.⁹⁷

We have made a list of uncertainties on page 30.

Toxicity: Again, refer to the list, toxicity values based on species relevant to the site;⁹⁸ no internationally recognized toxicity threshold for uranium in the marine environment;⁹⁹ baseline data on metal concentrations in key commercial/customary species must be collected before any mining is undertaken.¹⁰⁰ Total absence of baseline data on bioaccumulation of metals in important customary and commercial fisheries undertaken on the Chatham Rise.¹⁰¹

(d) the extent to which an adaptive management approach will sufficiently diminish the risk and the uncertainty.

This can be broken down to:

(a) there will be good baseline information about the receiving environment;

The baselines for marine mammals are almost entirely non-existent, and this is also the case for toxicity, notably uranium. The baseline information about the benthic community is in essence limited to that area sampled. The currents were sampled for 7 months and at 30 metres.

(b) the conditions provide for effective monitoring of adverse effects using appropriate indicators;

With the proposed conditions, this is the case only beyond 5 km / 50 m (TSS) and 7 km (sediment)

(c) thresholds are set to trigger remedial action before the effects become overly damaging; and

⁹⁶ Ibid.

⁹⁷ Issue 1, Schedule 1, Expert Conferencing for Benthic Ecology and Spatial Planning (Tuesday 16 and Saturday 27 September 2014).

⁹⁸ JWS Toxicity Issue 3

⁹⁹ JWS Toxicity Issue 5,6

¹⁰⁰ JWS Toxicity Issue 5,6

¹⁰¹ Issue 5, Schedule 1, Expert conferencing for Toxicology and Water Quality (Friday 19 September 2014).

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With the proposed conditions, this is the case only beyond 5 km / 50 m (TSS) and 7 km (sediment).

(d) effects that might arise can be remedied before they become irreversible.

Once the plume has been created, even before it reaches 5 km/7 km and/or 50 metres above the seabed, the effects on the benthos, in our submission, are in essence irreversible. The evidence shows that the damage caused will be in the order of decades, or much longer in the case of coral.

In summary, the Applicant's proposed approach will not, in our submission, diminish the risks or uncertainty of the mined area at all. It only applies to exceedance of one of the environmental thresholds stated in Schedule 1 (TSS, seabirds, sedimentation, an 'unexpected adverse impact'). It does not even mention marine mammals. The only uncertainties identified in this submission that it addresses is the extent of the plume, in terms of sediment and in terms of turbidity. For those, it does not apply at all to the actual mined area: it only applies to areas at the margins: 7 km in the case of sediment and 5 km, or 50 metres above the mined area, in the case of TSS/turbidity.

But it is not an 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." (s 64(2)(b)).

68. We submit that the DMC would come to the conclusion that the adaptive management approach proposed by the Applicant is not an adaptive management approach at all, or if it is, it is only with respect to the stated effects (sediment/turbidity at the margins). Should they not take that view, we also submit that the answer to the overall question from test (SOS para 129(d)) of whether risk and uncertainty will be diminished sufficiently for an adaptive management regime to be consistent with a precautionary approach must be 'no'. Almost all the risk and uncertainty is remaining. There is, indeed, "a small remaining risk of annihilation" of an endemic species, as well as massive destruction of the benthic environment.

69. We noted that the activity must be able to be (1) discontinued (2) continued with amendment or (3) continued without amendment under s 64(2)(b). It is far from clear whether the Applicant's proposed wording would in fact allow the activity to be discontinued. If not, it would not be adaptive management.
70. Putting the Applicant's proposed conditions aside: The Applicants have not established a baseline in crucial respects – benthic life, toxicology, marine mammals, noise - and have not established that the possible effects and stated outcomes will be acceptable and comply with the Act. Since there is no or an inadequate baseline in many respects, and since effects on the benthos will take years if not decades to be able to be assessed, and also since monitoring of these matters at 450 metres will pose real challenges, we submit that the evidence shows that this project simply cannot be saved by adaptive management. The DMC does not have enough information to allow this mining to go ahead as proposed. Any adaptive management approach would need to be such that the DMC has confidence that it can properly assess the effects. In our submission, it cannot do so for marine mammals (as there is no baseline or survey), or toxicity (as the information has not been collected). On other benthic matters, the DMC would need to be confident that the effects of mining on the benthos, and the effect of the plume – even of the plume as predicted – can be assessed. The depths and timescales mean, in our submission, that they cannot be meaningfully assessed.
71. This gives rise to another legal question: if the DMC only addresses the Applicant's paragraph 41, whether or not it considers it to constitute adaptive management, has it complied with section 61(3) which require it to consider

whether an adaptive management approach would allow the activity to be undertaken? Very little or no evidence, to our knowledge, has been submitted or discussed about staging. Therefore whether the DMC has the best available information to make a decision on adaptive management seems to be a difficult question. If the Applicant had called evidence on adaptive management approaches, such as test mining, short term mining and/or small scale mining, then the matter would be different. We can only speculate why it did not. In any case, we submit that the proper course for the DMC would be to find that based on the evidence it has before it, an adaptive management approach would not allow the activity to be undertaken.

Exclusion Areas

72. We addressed the ‘exclusion areas’, or the so called ‘spatial management’, proposal in our opening submissions. There we said that:

50. Greenpeace, DSCC and KASM strongly submit that the DMC should resist the attempts by CRP to frame this exercise as one of spatial management. The DMC simply does not have the statutory mandate to undertake that role. Any offset, or areas not mined, are by way of avoidance and mitigation under s 25(1)(a). It is not spatial planning. The decision to be made is under s 59-63 of the Act. Specifically, under s 62(1), “After complying with sections 59 to 61, the EPA may (a) grant an application for a marine consent, in whole or in part, and issue a consent; or (b) refuse the application.” Nor may the DMC through conditions purport to engage in spatial management. Under s 63(1), the EPA “may grant a marine consent on any condition that it considers appropriate to deal with adverse effects of the activity authorised by the consent on the environment or existing interests.” S 63(1) does not allow the EPA to allow adverse effects – of mining in a particular area – to carry on, justified by prohibiting mining in another area within the footprint of the application area. This is also common sense: otherwise any applicant can simply apply for a larger area than wanted, and then offer not to mine in part of it. Finally, any condition would not control other sectoral activities such as fishing. It would be *ultra vires* the DMC to impose a condition on the fishing industry, for example, to mitigate the effects of seabed mining by the applicant.

51. To be clear: in another context, the Three Submitters are in favour of a strategic environmental assessment of the Chatham Rise, involving all stakeholders and all sectoral activities. But this, quite simply, is not the place for it. The DMC simply cannot undertake that exercise under this statute and under this consent application. To do so would be *ultra vires*. We note that the Applicant does state that “In all likelihood, such protection would be most achieved through future marine protected areas legislation.” [CRP opening submissions para 159]. This appears to acknowledge that different legislation would be required. We would add that an entirely different process with entirely different participants is required as well. Suffice it to submit that spatial planning is outside the scope of the current hearing and the current Act.

73. The proposed exclusion areas will not avoid, remedy or mitigate any of the affects. They do not directly relate to the adverse effects of mining the proposed mined area. They are not even a financial contribution in a sense sometimes used in the Resource Management Act context: forsaking mining does not cost the applicant anything other than the research done. Simply speaking, the applicant applied for a greater area than it needed, and is prepared to forsake mining some of it. Others may mine it in the future. Again, we submit that spatial management is to be encouraged. But this is not the place for it. The proposed advice note – “Condition 0 [presumably they mean 14] provides a best endeavours approach for the Consent Holder to advocate and support for striving to ensure protection mechanisms from a range of activities, such as mining, for the exclusion areas identified under parts (a) and (b) of this condition.” This, in our submission, is window-dressing to make the ‘exclusion areas’ something they are not: spatial management. To the extent that they would involve non-mining activities, it would probably be *ultra vires*, if it was not only an advice note. The fact that it is in Benthic Protection Area adds irony to the spatial management: fishing is already prohibited. The DMC has seen an active conflict between the mining and fishing sectors play

itself out in this hearing. That is unfortunate, and that should, in our submission, have done so in a spatial management framework. But this is not a framework; it is a hearing on a specific mining proposal in a specific area.

Legal Considerations: RMA Caselaw

74. There is no definition of mitigate in the EEZ/CCZ Act. In the Resource Management Act (RMA) “offset” is used only once, in s 108(10), which is the section addressing conditions of resource consents. Section 108(9) defines “financial contribution” as meaning a contribution of money or land, or a combination.

The High Court in *Royal Forest and Bird Protection Society of New Zealand Inc v Buller District Council* [2013] NZHC 1346 considered whether or not for a mining consent under the RMA, a company could offer to undertake predator control nearby and also in a national park, as a key part of their mitigation measures.

The High Court held that offset is not mitigation as used in s 5(2)(c) of the RMA [para 62]:

“I agree that offset is “mitigation” as the word is used in s 5(2)(c). There is no reason to go beyond the normal meaning of the term mitigate, particularly as it occurs in a phrase, “avoiding, remedying or mitigating.”

We note that mitigate appears in the same phrase in the EEZ/CCS Act in s 10(2)(c), as well as in s 25(a), s 39(1)(g), and s 39 (4)).

The Court also held that offsets do not directly mitigate any adverse effects of the activities coming with the resource consents on the environment.

[72] “So, for example, if open cast mining will destroy the habitat of an important species of snails, an adverse effect, it cannot be said logically that enhancing the habitat of snails elsewhere in the environment mitigates that adverse effect, unless possibly the population that was on the environment that is being destroyed was lifted and placed in the new environment. Merely to say that the positive benefit offered relates to the values affected by an adverse effect is, in my view, applying mitigating outside the normal usage of that term.”

75. Here, CRP is not even proposing lifting up corals and transplanting them (of course this is probably practically impossible), or taking other positive steps. It is far from this scenario, which itself fell short of ‘mitigation’. The closest analogy is that if the mining company was promising not to do any mining in the Kahurangi National park, clearly that would not be considered mitigation. Nor is it an ‘offset’, since ‘offset’ requires some positive action. “The usual meaning of “mitigate” is to alleviate, or to abate, or to moderate the severity of something. Offsets do not do that. Rather, they offer a positive new effect, one which did not exist before.” [72] “[Offsets] “are not mitigating, in that they do not address effects at the point of impact, they are better viewed as a positive environmental effect to be taken into account, pursuant to s 104(1)(a) and (c), and s 5(2).” [74]

76. Fogarty J found that the Environment Court made a material error of law: “The proposed biodiversity offsets in the DEA and the HBEA do not mitigate the adverse effects of the activity on the environment. They cannot also be characterized as offset mitigation. They are offsets and are relevant considerations to be weighed in favour of the application by reason of s 104(1)(a) and (c), and s 5(2).” [78]

77. Clearly, in this Application, the proposal for the exclusion areas is not mitigation, nor is it offset (a term which does not appear in the EEZ/CCZ Act). There is no positive action: the mining company is simply not mining there.
78. In addition, we note that the zonation models have not been ground-truthed, and as such could prove entirely wrong.¹⁰² The experts group said that more work needs to be done.¹⁰³ The experts also said that future work should involve other stakeholders.¹⁰⁴ We agree, but as we submitted in our Opening Submissions, this is not the appropriate forum for such an exercise. Area based management would need a considered approach involving all stakeholders, including iwi, environmental groups, industry, government and community groups, many of which are not present in this hearing, and under a different legislative framework which is not yet established. We also note that moving the BPA¹⁰⁵ would also be well beyond the scope of the powers of this DMC. We would also note that any discussion of moving the BPA – a fisheries matter – would also need to involve all stakeholders, under an appropriate legislative framework.
79. In any case, any areas not to be mined would have to be for the life of the permit, within its boundaries, and (transcript page 1982 Mr McKenzie).

¹⁰² “Dr Ryder: Well if we accepted for a moment that sort of approach in terms of using the modelling approach to identify other areas for protection as mitigation for disturbance or loss of habitat in a mined permit area, that is all very well – we go to validate that, oops the model’s wrong, there is nothing there. There goes your mitigation. DR ROWDEN: Okay, sure.”. Transcript day 21, 6/11, page 2022.

¹⁰³ Benthic JWS Issue 5.

¹⁰⁴ Benthic JWS Issue 5.

¹⁰⁵ See for instance discussion on 17/10/014 on day 11, page 207 Dr. Nelson.

We also note that the no-mining zones areas overall do not encompass habitat which is suitable at a high level for a couple of communities including one of the ones which is a coral based one.¹⁰⁶

Recolonisation

80. In our submission, recolonisation should be given no weight by the DMC. Dr Rowden said the recolonisation cannot yet even be accepted as mitigation, that we know “not much” about recolonisation recovery in the deep sea and for sulphite mining has been estimated at \$700 million per hectare.¹⁰⁷ Mr Wood accepted a possible cost of \$20 billion, which would make the project uneconomic.¹⁰⁸ Prof. Watling estimated that restoration, if possible, would take some 164 million blocks to cover 20% of the mining area (Watling evidence para. 35). None of this evidence has been substantively challenged.¹⁰⁹ The experts concluded “that the likely success of this measure of mitigation is currently unknown” and “the measure needs to be proven successful before it can be proposed as a mitigation technique.”¹¹⁰

¹⁰⁶ Transcript pg 2032: “no mining areas overall do not encompass habitat which is suitable at a high level for a couple of those communities including one of the ones which is a coral based one, that is true.” Dr Rowden.

¹⁰⁷ “So what do we know about re-colonisation recovery in the deep-sea, well unfortunately not very much, And that will be the same sort of process of course, if you take away the phosphorite nodules then you are taking away the habitat for the epifauna, and as you can see there is no nodules in the middle of that path and therefore it is not possible for those communities which are based upon the hard substrate like the manganese nodule or the phosphorite nodule to actually recover. And that picture for example is taken 28 years after that disturbance was created. So you are physically removing part of the habitat for the communities which exist in these sorts of areas. So when you remove the nodules you can’t develop that community again because they rely upon those nodules. For example, it has been calculated that for mitigation measures associated with sulphite mining it might cost you \$5 million and in fact when you scale to a per hectare cost it is over \$700 million, whereas restoration on land is typically around about \$200,000 per hectare. Certainly, the re-colonisation trails need to prove their worth before being expanded and accepted as mitigation, so they are just trials, they have the potential to be a mitigation and strategy but until they have proven their worth, they cannot be accepted as mitigation per se.” Dr Rowden, pg 1998.

¹⁰⁸ Mr Hill transcript Day 2 26/9 pg. 238

¹⁰⁹ Mr Winchester cross-examined on this point. Transcript day 4 30/9 pg. 429.

¹¹⁰ Benthic Ecology JWS Issue 7.

Economic Matters

81. In our submissions at Hamilton on the 29th October we discussed in detail the issues that had been raised around the applicability of the economic modeling to being able to draw a picture of the real economic benefit to New Zealand, we do not wish to address those again other than to state that in Mr Castle's most recent evidence he confirmed that 75% of phosphate would be exported and therefore the benefit to New Zealand which is based on the benefit to consumers would be even further reduced. Nor does the benefit to New Zealand farmers hold as much weight as the applicant suggests. This point was also touched on in the submissions of Maui Solomon from the Chatham Islands, who discredited the claim that phosphate would have the benefit to Chatham Island farming to the extent that the applicant states it will when he stated "the practical means of doing so through this process are limited"¹¹¹. Overall, we submit that the applicant has over-emphasized the benefits of the project. Most benefits will accrue to the company, while New Zealanders take all the risk and eventually also pay the cost of environmental harm.

Adverse Environmental Impacts

82. Under section 59, the DMC must consider the importance of protecting biological diversity and integrity of marine species, ecosystems and processes (s 59(2)(d)); and the importance of protecting rare and vulnerable ecosystems and the habitats of threatened species (s59(2)(e)). From the evidence presented before this commission we submit that there are adverse effects to benthic communities, marine mammals, fish and plankton and the overall ecosystem which require the DMC to apply section 59.

¹¹¹ Page 2118 of Transcript, Evidence of Maui Solomon, 10 November 2014.

Effects on Benthic Communities

83. Benthic experts agreed that mining will permanently destroy the coral, its habitat and associated communities within the mined area.¹¹² It was agreed that the data includes potentially unique and ecologically important communities in the marine consent application area¹¹³ but just how unique is still unknown.^{114, 115} Stony coral and other sessile organisms found in the marine consent area provide habitat for other species, thereby increasing overall biodiversity, and their dependence on hard substrate for settlement and attachment means that the removal of phosphorite nodules substantially reduces available habitat.¹¹⁶ Longer-term impacts involve the biodiversity, trophic attachments and ecosystem functions in the marine consent application and adjacent areas.¹¹⁷
84. If we are to consider worst case scenarios, Dr Rowden confirmed that there is always a possibility of a regime shift and there are examples from around the world of regime shifts caused by human disturbance, including from bottom trawling¹¹⁸, whether or not that could happen on the Chatham Rise is unknown but the possibility has not been eliminated by the applicant.¹¹⁹ Certainty the extent of damage that mining will cause makes it at least possible, and where

¹¹² Issue 3, Schedule 1, Expert Conferencing for Benthic Ecology and Spatial Planning (Tuesday 16 and Saturday 27 September 2014).

¹¹³ Evidence for Ann-Katrin Berkenbusch for Ngāi Tahu (11 September 2014) at [21]. See also Evidence of Thomas Hourigan for the Crown (12 September 2014), at [B] to [G]. Evidence of Thomas Hourigan for the Crown (12 September 2014), at [27]

¹¹⁴ Page 1996-1999 of Transcript, Evidence of Dr Rowden, 6 November 2014.

¹¹⁵ Evidence for Ann-Katrin Berkenbusch for Ngāi Tahu (11 September 2014) at [21]. See also Evidence of Thomas Hourigan for the Crown (12 September 2014), at [B] to [G]. Evidence of Thomas Hourigan for the Crown (12 September 2014), at [27]

¹¹⁶ At 40, pg 296 of Transcript, Evidence in chief of Dr Berkenbusch.

¹¹⁷ At 15, pg 297 of the Transcript, Evidence in chief of Dr Berkenbusch.

¹¹⁸ Page 2070 of Transcript, Evidence of Dr Rowden, 6 November 2014.

¹¹⁹ Paragraph 35 page 2030 of Transcript, Evidence of Dr Rowden, 6 November 2014.

this exists again we submit that the DMC must apply a precautionary approach.

85. With regard to ocean acidification, Dr Fulton observed that in the future, the Chatham Rise may become the only suitable habitat for deep sea corals:¹²⁰ as you go deeper in the water, the ocean is more saturated for certain chemical properties, which affects the ability of corals and other things to create their skeleton.¹²¹ Ocean acidification, which is caused by carbon dioxide being dissolved in seawater, is expected to get significantly worse.¹²²
86. Dr Rowden pointed out that ocean acidification will be harder for corals to regenerate in deeper water and in fact, shallow water, because it is the shoaling of the aragonite saturation carbonate in their skeleton. So because it is shoaling, it means that it places more emphasis on the shallow areas for maintaining populations of coral.¹²³ While this statement means that ocean acidification is less of an issue for coral at shallow depths than in deeper waters, at least in the early stages of ocean acidification, it also emphasizes the importance of this benthic community because it is more resistant to ocean acidification than coral at greater depths in other areas of the EEZ.
87. Furthermore in Dr Rowden's evidence he acknowledges that hyperbenthos and meiofauna were just not considered in the work that Niwa undertook, but agreed that those animals are likely to form food sources for the small

¹²⁰ Page 1000 of Transcript, Evidence of Dr Fulton, 5 October 2014.

¹²¹ Page 1004 of Transcript, Evidence of Dr Fulton, 5 October 2014.

¹²² Page 1008 of Transcript, Evidence of Dr Fulton, 5 October 2014.

¹²³ Paragraph 25 page 2032 of Transcript, Evidence of Dr Rowden, 6 November 2014.

demersal fish which Dr Pinkerton identified as being important within his trophic modeling.¹²⁴

Effects on Marine Mammals

88. Marine mammals have some of the greatest uncertainties, as discussed earlier. But we know that at least 27 different marine mammal species are recorded in the area; two of which are listed as nationally critical and two as nationally endangered in New Zealand, and a further four species are listed internationally as endangered and one is vulnerable.¹²⁵
89. We also know that parts of the Chatham Rise are important as foraging and/or feeding areas for some species and are also likely to support mother calf groups for some species including sperm whales and dusky dolphins, as indicated in Torres *et al.* The Chatham Rise has also been identified as an important habitat for Southern Right Whales and Sperm Whales based on modelling of historic distribution of whaling catches by Torres *et al.*
90. The importance of the Chatham rise to marine mammals was set out by Dr Childerhouse in his evidence where he states that:

“The significance of The Rise for marine mammals is consistent with the known high productivity of the area, the high diversity and abundance of marine mammals, historic whaling data, information from non-systematic opportunistic sightings and stranding’s, and

¹²⁴ Paragraph 30, page 2033 of Transcript, Evidence of Dr Rowden, 6 November 2014.

¹²⁵ At 35, pg 1552 of the Transcript, Evidence in chief of Dr Childerhouse.

general understanding of New Zealand marine mammal biology and ecology.”¹²⁶

91. Experts agreed that the area is significant for feeding marine mammals¹²⁷ and that the area could be significant.¹²⁸

92. Potential adverse impacts include:

a. Permanent threshold shift (PTS) or permanent hearing impairment: that could happen close to the mining operation.¹²⁹

b. Temporary threshold shift (TTS) is possible for some species dependent on their sensitivity and proximity to the source.¹³⁰

c. Behavioural responses would range out to about 30 km: that is a more difficult area because different species and even different individuals will react very differently to noise. It is likely there will be some behavioural effects on some species. Behavioural changes could include altered diving, foraging, pod cohesion, masking of significant acoustic cues (e.g communication, echolocation from prey), reproduction, spatial distribution, and habitat use.¹³¹

d. Habituation could induce an animal to come closer to sound.¹³²

¹²⁶ At 35, pg 1552 of the Transcript, Evidence in chief of Dr Childerhouse.

¹²⁷ At 5, pg 1461 of the Transcript, Evidence in chief of Associate Professor Slooten. Paragraph 23 of Mr Cawthorns Evidence, 25 august 2014.

¹²⁸ At 25, pg 1638 of the Transcript, Evidence in chief of Dr Huber.

¹²⁹ Issue 1C. Schedule 1, Joint Witness Statement expert conferencing for Marine mammals (Wednesday 15 October 2014).

¹³⁰ Issue 1C. Schedule 1, Joint Witness Statement expert conferencing for Marine mammals (Wednesday 15 October 2014).

¹³¹ Issue 1D, schedule 1, Joint Witness Statement expert conferencing for Marine mammals (Wednesday 15 October 2014).

¹³² Issue 1D, schedule 1, Joint Witness Statement expert conferencing for Marine mammals (Wednesday 15 October 2014).

- e. Distraction, annoyance and stress responses and habitat degradation, including direct damage to the benthic communities from mining and indirect impacts caused by the sediment plume which will reach far beyond the mining area itself.¹³³
- 93. The experts agreed¹³⁴ that there is potential for TTS within 3 km and particularly within 1.5 km for a sensitive species: Assoc. Prof. estimated that as a “moderate” risk and Dr Ketten agreed that it “is possible for it [the risk] to be moderate.”¹³⁵
- 94. Only noise impacts were discussed in any detail at the marine mammal caucusing meeting and other impacts where not included in the Joint witness statement.

Effects on zooplankton, fish and cephalopods

- 95. Loss of benthic habitats will have a high adverse effect on demersal fishes and cephalopods as the benthic environment provides structural habitat for these groups.¹³⁶ The effect of underwater noise on plankton, fish and cephalopods is low to moderate.¹³⁷ However in Pinkerton trophic modeling, it was shown that zooplankton moved up and down the water column and that zooplankton have a high trophic importance.¹³⁸ Assoc. Prof. Slooten also described the deep scattering layer: a layer of fish, squid and other organisms that migrates up and down during the day the experts had a very brief discussion about the deep

¹³³ At 25, pg 1449 of the Transcript, Evidence in chief of Associate Professor Slooten.

¹³⁴ Marine Mammal JWS Issue 1C

¹³⁵ Dr Ketten, day 13 Transcript 21/10/14 page 1543.

¹³⁶ Evidence of Michael Huber for the DMC (12 September 2014), Annexure B at [5].

¹³⁷ Evidence of Michael Huber for the DMC (12 September 2014), Annexure B at [6].

¹³⁸ From 25, pg 988 of Transcript, Evidence in Chief of Dr Pinkerton.

scattering layer may move into the area of the sediment plume and then may move out again.¹³⁹

Such adverse effects must be taken into account as potentially having a much greater effect over the entire ecosystem and biodiversity of the Chatham Rise.

Cumulative effects

96. The cumulative effect of the mining proposal and existing effects is significant. Clearly the combined effects of bottom trawling and mining are such a cumulative effect, as are noises from shipping, fishing, mining and ocean acidification.

Conclusion

97. The DMC in the TTR case concluded as follows:

14. In summary, on the evidence presented, we are not satisfied that the life-supporting capacity of the environment would be safeguarded or that the adverse effects of the proposal could be avoided, remedied or mitigated, nor do we consider that the proposed conditions (including the adaptive management approach) are sufficiently certain or robust for this application to be approved, given the uncertainty and inadequacy of the information presented to us about the potential adverse effects.

15. Overall, we think this application was premature. More time to have better understood the proposed operation and the receiving environment and engage more constructively with existing interests and other parties may have overcome many of the concerns we have set out in this decision. It is conceivable that at least some of these matters could have been addressed contemporaneously with the other investigative work the applicant undertook prior to lodging the application for consents.

98. In our submission, the CRP DMC finds itself in a very similar situation.

Stepping back, we submit that this is for a good underlying reason: the science and engineering challenges of seabed mining are very challenging indeed. It is

¹³⁹ Slooten transcript pg 1471.

a nascent industry. In this case, in many ways, the challenges are even greater than TTR, as is will be carried out at 450 metres. The destruction will be immediate: deepwater corals and other benthic life will undoubtedly be destroyed. The DMC must deal with this application as it is, and apply the principles of the Act. In doing so, in our submission, they should come to the conclusion that the consent should be refused.

99. The application is premature, as is shown by the many requests for information and scientific debate we have seen. The EIA was far from adequate. The information we know is inadequate, but what we do know is enough to justify refusing the consent. The mining will destroy virtually all life on hundreds of square kilometres of the seabed, including rare, vulnerable and endemic species. No reliable scientific information exists on recovery or restoration. A toxic plume, including high levels of uranium, will be released which will smother everything for hundreds of square kilometers. There is insufficient information on benthic effects, and the effects we do know about, on destruction of deep sea corals and benthic life and habitat are severe. The most basic baseline on toxicity is missing. The information on marine mammals is woefully deficient, the evidence on noise is partial and incomplete but even so shows capacity for lasting injury to marine mammals, the effects of the uranium and its derivatives on the marine life and food chain are unknown and effects on wider ecosystem, including fish and fisheries, is unknown.
100. At Hamilton we left with the Committee the 2014 International Seabed Authority Secretary-General's report for 2014. This shows the status of seabed

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mining internationally. It shows, in our submission, that seabed mining is only in its infancy. That this is a new and in fact unprecedented activity, underlines that our submission, this application is premature.

101. 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 (see Opening Submissions at para. 18 for a legal discussion of s 10): a) sustaining the potential of natural resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; b) safeguarding the life-supporting capacity of the environment; and c) avoiding, remedying, or mitigating any adverse effects of activities on the environment.
102. For all these reasons, we submit that the DMC should refuse the requested consent.

Respectfully submitted

Duncan Currie

Ruby Haazen

17 November 2014