

**BEFORE THE ENVIRONMENTAL PROTECTION AUTHORITY  
AT WELLINGTON**

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

**AND**

**IN THE MATTER** of a decision-making committee  
appointed to hear a marine consent  
application by Trans Tasman Resources  
to undertake iron ore extraction and  
processing operations offshore in the  
South Taranaki Bight

---

**EXPERT REBUTTAL EVIDENCE OF ALISON MACDIARMID ON BEHALF OF  
TRANS TASMAN RESOURCES LIMITED**

**9 FEBRUARY 2017**

---



**ATKINS | HOLM | MAJUREY**

Mike Holm/Vicki Morrison-Shaw  
PO Box 1585  
Shortland Street  
AUCKLAND 1140

---

Solicitor on the record  
**Contact solicitor**

Mike Holm  
Vicki Morrison-Shaw

Mike.Holm@ahmlaw.nz  
Vicki.Morrison-Shaw@ahmlaw.nz

(09) 304 0428  
(09) 304 0422

## **INTRODUCTION**

1. My name is Alison Bronwyn MacDiarmid.
2. I prepared Expert Evidence dated 15 December 2016 (First Statement) with respect to these proceedings on behalf of Trans-Tasman Resources Limited.
3. My qualifications and experience as a marine ecologist are set out in paragraphs 1 and 2 of my First Statement.
4. I repeat the confirmation given at paragraph 4 of my First Statement that I have read the Code of Conduct for Expert Witnesses and agree to comply with it.
5. The purpose of this Rebuttal Evidence is to respond to matters raised in submitter evidence.
6. In preparing this evidence I have reviewed all the statements of evidence provided by the submitters and have provided the following rebuttal statement to address a number of matters raised.

## **MARINE MAMMAL MODELLING**

7. A number of submitters expressed concerns about the validity of the marine mammal habitat suitability modelling.
8. I consider the approach taken is valid and I make the following comments.
  - (a) I do not agree that the marine mammal modelling is spatially biased.
  - (b) To ensure no bias occurred a "bias grid" was specifically used to ensure that well observed locations carried no more weight in the analysis than infrequently observed locations.
9. I do not agree with Mr van Heldon that habitat suitability modelling is incorrect because observational data was undertaken on two species that have undergone historical declines in abundance. The use of environmental parameters to model habitat suitability overcomes the problem of a population presently occupying a smaller range than historically, as it helps to identify suitable habitat where individuals may no longer occur.
10. Mr van Heldon asks why the distribution of eagle rays was not used to model the distribution of killer whales. NIWA's approach incorporated a wider range of issues such as feeding, resting, mating, calving, and passage among areas. Concentrating just on one issue would be misleading.
11. I do not agree with Karen Pratt that the cetacean habitat modelling did not use all available evidence and I have no

reason to amend what I said in paragraphs 104-106 of my First statement of Evidence.

#### **BLUE WHALE DISTRIBUTION AND OVERLAP WITH MINING**

12. Some submitters suggest that because the distribution (spatially or seasonally) of krill, *Nyctiphanes australis*, within the STB is not known then the assessment of the percentage of blue whale foraging area in the STB impacted by proposed mining activities by MacDiarmid et al. (2015a) should be dismissed.
13. I do not agree. Krill have been found throughout the STB, but its distribution is likely to be highly variable within seasons and among years. For this reason I reasonably assumed krill to occur everywhere in the STB including the mining site.

#### **SUFFICIENCY OF INFORMATION TO DETERMINE INDIRECT EFFECTS**

14. Several submitters were concerned that insufficient information is available on the ecological linkages between benthic communities, fish communities and marine mammals to be able to determine the indirect, ecological effects of the proposed mining operation.
15. I have addressed this issue in paragraphs 69-74 in my First Statement and am confident that I have accurately assessed the effect of this proposal on the STB ecosystem.

#### **REEF AND DEMERSAL FISH MODELLING**

16. Several submitters have raised concerns that the information on fish communities in the area relies heavily on modelling, using data from around New Zealand rather than intensive sampling in the Taranaki area. I respond as follows.
17. The modelling approach was used for both reef and demersal fish communities because they provided regional and national contexts and were considered to provide a more reliable indicator of long-term patterns of distribution and abundance. One-off snapshot surveys suffer from seasonal and annual bias.
18. The modelling undertaken of demersal and pelagic fishes by Leathwick et al. (2006)<sup>1</sup> is based on extensive (20,000+) research trawls from around New Zealand to 1997, including at least 100 from the STB. To obtain an estimate of the error associated with their predictions Leathwick et al. (2006)

---

<sup>1</sup> Leathwick, J.R.; Elith, J.; Francis, M.O.; Hastie, T.; Taylor, P. (2006a). Variation in demersal fish species richness in the oceans surrounding New Zealand: an analysis using boosted regression trees. *Marine Ecology Progress Series* 321: 267-281.

undertook repeated bootstrap samples, to which they fitted a Boosted Regression Tree model and used this to make a separate prediction for the spatial data. I am satisfied that the information provided and assessed in this regard is both sufficient and appropriate.

### **CAWTHRON SENSITIVE HABITATS REPORT AND OCCURRENCE OF SPONGE GARDENS**

19. Several submitters commented that no reference was made in my evidence to the Cawthron 'Sensitive habitats' report<sup>2</sup> or to sponge gardens.
20. No reference was made to the Cawthron report as for the region of interest it draws heavily on the two NIWA reports on benthic communities. Paragraphs 12 – 28 in my First Statement of Evidence are based on this original work rather than Cawthron's summary.

### **LOCATION OF ROCKY REEFS**

21. Several submitters indicated the locations of rocky reefs additional to those illustrated in *MacDiarmid et al. (2015)*<sup>3</sup>.
22. I refer to the evidence of Dr Mark James and agree with his assessment.

### **RECREATIONAL AND CUSTOMARY FISHERIES**

23. Several submitters raised concerns in their evidence that NIWA did not assess recreational or customary fisheries in its reports.
24. NIWA was not retained to undertake these assessments but did assess the potential impact of the iron sand recovery operations on a great number of recreational and customary species. These effects are addressed in paragraphs 65-74 in my First Statement and are not repeated here.

### **COMMERCIAL FISHERIES**

25. In paragraph 50 of his evidence Dr Helson suggests that the NIWA report on STB Commercial Fisheries<sup>4</sup> and my First

---

<sup>2</sup> Johnston O. (2016). Sensitive habitats and threatened species in the Taranaki Coastal Marine Area (TCMA) - database investigation. Prepared for Taranaki Regional Council. Cawthron Report No. 2877. 28 p. plus appendices.

<sup>3</sup> South Taranaki Bight Fish and Fisheries (MacDiarmid, Anderson and Sturman, 2015)

<sup>4</sup> Report 18-NIWA South Taranaki Bight Commercial Fisheries Report FINAL May 2016.pdf

Statement of evidence addressing the effects on fish are incorrectly conflated with the effects on fisheries.

26. Fisheries depend on the availability of fish. NIWA assessed the impact on STB fisheries by considering the overlap between commercial fisheries and the area from which commercial fish species would likely be displaced. I consider this to be an appropriate way of assessing impact on fisheries as the commercial fisheries are dependent on the distribution of fished species. In fact this is what commercial fisheries do every day – they adjust to a changing distribution of fish.
27. In paragraphs 57-60 Dr Helson points out that a small part of the area considered in the analysis of effects of the proposed operations on fishing activities<sup>8</sup> lies within Fisheries Management Area (FMA) 7 and thus underestimates the impact of the mining plume on commercial operations.
28. It is correct that the report was focused on the STB as a whole – indeed Dr Helson was present at a meeting which discussed an earlier extraction of these data from this same area and called for a re-extraction of the data including the most recent years and analysis by a different method. This was done. I note that the assessment did not include catches in FMA8 north of New Plymouth. Inclusion of these catches would have lessened the impact of the proposed activities as a percentage of overall catches.

### **SURFCLAMS**

29. Several submitters express concerns in their evidence for surfclams along the Manawatu coast and aquaculture species in the Marlborough Sounds.
30. There is no evidence to suggest these populations are at risk. Sensitivity of a variety of species to suspended sediments are covered in paragraph 69 in my First Statement of Evidence. The sediment model shows no deposition in shallow areas inhabited by surf clams. In deeper areas offshore of the surf clam area deposition is estimated to be a maximum of 0.1 mm per year.

### **BENTHIC ECOLOGY**

31. Several submitters criticise the benthic sampling design, specifically relating to the time taken to sample the entire survey and that because there is no seasonal sampling there is insufficient information on which to base a decision.
32. The benthic surveys carried out provide substantial spatial information on the types of habitats present, their distributions and the associated benthic infaunal and epifaunal communities. The distribution of identified habitats

will not change although the populations within them will fluctuate over time. I believe the surveys provide adequate information to support evidence based decision making. Further, I understand from Mr Govier's evidence that monitoring will be undertaken quarterly for the BEMP and EMMP and consider this will address temporal changes.

### **CONCLUSIONS**

33. Various witnesses have suggested that there is insufficient information available to reliably assess the effects of the proposal and that there is an unacceptable level of uncertainty that can only be addressed by collecting additional data. I do not agree and insofar as it relates to the matters addressed in my evidence I am satisfied that the existing environment is well defined and in sufficient detail for me to have confidence in the veracity of the assessments undertaken.
34. I confirm that the issues raised by submitters have not altered any of the conclusions in my First Statement.

*AB MacDiarmid*

**Alison MacDiarmid**

**9 February 2017**