

**BEFORE THE ENVIRONMENTAL PROTECTION AUTHORITY
AT WELLINGTON**

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

AND

IN THE MATTER of an application for marine consent under section 38 of the EEZ Act by Trans-Tasman Resources Limited to undertake iron ore and processing operations offshore in the South Taranaki Bight

BETWEEN **Trans-Tasman Resources Limited**
Applicant

AND **Environmental Protection Authority**
EPA

AND **Fisheries Inshore New Zealand Limited, New Zealand Federation of Commercial Fishermen Inc, Talley's Group Limited, Southern Inshore Fisheries Management Company Limited and Cloudy Bay Clams Limited**
Fisheries Submitters

**PRIMARY EXPERT EVIDENCE OF DEREK JOHN TODD
ON COASTAL PROCESSES FOR FISHERIES SUBMITTERS**

Dated: 23rd January 2017

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SUMMARY OF EVIDENCE

1. My name is Derek John Todd and I am a coastal geomorphologist. I summarise my evidence, according to the key headings in this statement, as follows:

Coastal Stability

- (a) I question why updated data and modelling has not been included or used in the reporting on coastal stability and potential effects. This is of relevance as it raises uncertainty about the ability of this data set to act as a baseline against which to assess potential changes in stability as a result of the mining operation.

Discharge of de-ored sediment

- (b) Trans-Tasman Resources Limited (**Applicant**) needs to clarify the elevation of the discharge of de-ored sediment, the heights of the mounds formed as part of the discharge process, and access to bathymetric monitoring information.

Conclusion

- (c) Updated data and modelling should have been used in the presentation of coastal stability information and in the assessment of effects on coastal processes.
- (d) The proposed condition on discharge of the de-ored sediment should be clarified to ensure that the discharge is 4m above the excavation lane seabed.
- (e) The inconsistency between the de-ored sediment discharge elevation and the height of the deposition mounds should be explained by the Applicant.
- (f) Annual bathymetric surveys should be made available to commercial fishing interests so that fishing vessels are aware of the location of mounds. However, I understand from the fisheries management experts that knowledge of the location of the mounds, while being of navigational assistance in terms of avoidance, does not resolve concerns as to potential impacts of the mounds on fishing effort.

INTRODUCTION

Qualifications and Experience

2. My name is Derek John Todd.
3. I am a Principal Coastal and Natural Hazards Scientist with Jacobs New Zealand. I hold the qualifications of B.Sc (Geography, Mathematics) and M.Sc (Hons) (Geography) degrees from the University of Canterbury.
4. I am a coastal geomorphologist with over thirty years' experience in monitoring and investigating coastal processes & hazards, and assessing the potential future changes in coastline & river mouth stability. My experience includes time working in government, regional councils, environmental consultancies and Universities in New Zealand and Australia. For twelve years I was director and principal consultant for my own consultancy, DTec Consulting, specialising in coastal resource management and science projects for a large range of clients throughout New Zealand.

Code of Conduct

5. I have read the Environment Court Code of Conduct for expert witnesses and agree to comply with it.
6. I confirm that the topics and opinions addressed in this statement are within my area of expertise except where I state that I have relied on the evidence of other persons. I have not omitted to consider materials or facts known to me that might alter or detract from the opinions I have expressed.

Background to Evidence Preparation

7. I have been retained by Fisheries Inshore New Zealand Limited, The New Zealand Federation of Commercial Fishermen Inc, Talley's Group Limited, Southern Inshore Fisheries Management Company Limited, and Cloudy Bay Clams Limited (**Fisheries Submitters**) to prepare a statement of evidence on coastal processes.

8. I have some familiarity with the site of the application and surrounding environment, having visited the South Taranaki Bight coastal area in association with work projects in early and mid-2000.
9. In preparing this evidence I have read the following documents:
 - (a) TTR Impact Assessment;¹
 - (b) Report 5 – NIWA – Coastal Stability in the South Taranaki Bight – Phase 1. Updated November 2015;²
 - (c) Report 6 - NIWA – Coastal Stability in the South Taranaki Bight – Phase 2. Updated November 2015;³
 - (d) Report 39 – ECoast – Potential Effects of TTR Mining Operation on surfing Breaks in Southern Taranaki;⁴
 - (e) Evidence of Shawn Thompson (Operational Description, Project Description) for TTR dated 16 December 2016;
 - (f) Evidence of Terry Hume (Coastal Stability) for TTR dated 15 December 2016; and
 - (g) Primary expert fisheries management evidence of Andrew Smith for the Fisheries Submitters, dated 24 January 2017.

¹ Trans-Tasman Resources (2016) South Taranaki Bight Offshore Iron Sand Extraction and Processing Project, Impact Assessment. August 2016.

² Hume T. (2015a) Coastal Stability in the South Taranaki Bight – Phase 1: Historical and present day shoreline change. Prepared for Trans-Tasman Resources Ltd. Updated November 2015. *NIWA Client Report* No: Ham2012-083.

³ Hume T. (2015b) Coastal Stability in the South Taranaki Bight – Phase 2: Potential effects of offshore sand extraction on physical drivers and coastal stability. Prepared for Trans-Tasman Resources Ltd. Updated November 2015. *NIWA Client Report* No: Ham2013-083.

⁴ eCoast Ltd (2013) Potential effects of Trans-Tasman Resource4s mining operation on surfing breaks in the Southern Taranaki Bight.

COASTAL STABILITY

Report 5 – NIWA – Coastal Stability in the South Taranaki Bight – Phase 1.

10. This background report on the baseline coastal stability conditions presents information and data on the coastal geomorphology, beach sediments and historical shoreline changes of the South Taranaki Bight. I concur with the general conclusion of the report that there is high temporal variability in the wave climate, and longshore sediment transport, and in the spatial shoreline responses within the South Taranaki Bight.
11. However, I note that although the report is marked as “*updated November 2015*” there appears to have been no update of the information or data collection since the original application reports from 2013. This includes no additional surveyed beach profile data, which remains limited to an 11 month record from June 2011 to April 2012. This is an extremely limited survey record on which to interpret the variability of short term changes in shoreline position.
12. I question why there has been no effort to update the beach profile data since 2012 to provide a longer record of short term shoreline change? This is of relevance as it raises uncertainty about the representativeness of the record of short-term shoreline stability and the ability of this data set to act as a baseline against which to assess potential changes in stability as a result of the mining operation.

Report 6 – NIWA – Coastal Stability in the South Taranaki Bight – Phase 2

13. This report presents results of various modelling undertaken to assess the effects of the mining operation on wave climate, sediment transport and coastal erosion. The general conclusion of the report is that the impacts of the extraction on the coastal processes that drive shoreline changes (currents, waves, sediment supply and transport) will be small and largely limited to the extraction area, and the effects on coastal erosion and accretion patterns are well into the range of natural variability and will not be significant. From my review, I found that the type of modelling carried out is

appropriate to determine potential effects on coastal processes, and I concur with report's conclusions based on that modelling.

14. However, I again note that the interpretation in the report relies on the modelling carried out for the original TTR 2013 application. Therefore, the application relies on the original modelling reported in Hadfield (2012⁵ and 2013⁶) where the sediment plume modelling is used to assess sediment transport effects in the vicinity of the extraction area, rather than the updated modelling (Hadfield & McDonald 2015⁷) using the sediment properties established by the HRW Laboratory testing (HRW 2014⁸, 2015⁹).
15. I question why the results of the updated sediment plume modelling (Hadfield & McDonald, 2015) have not been used in the assessment of effects of the extraction on sediment transport? This is of relevance as the plume modelling results differ between those reported in 2013 and those reported in 2015. These differences are likely to have implications for the sediment transport results, and this raises uncertainty as to the accuracy of the results reported in the Coastal Stability Phase 2 Report.

DISCHARGE OF DE-ORED SEDIMENT

Discharge Elevation

16. I note from the TTR Impact Assessment, Reports and evidence that the discharge of the de-ored sediment will be to an elevation of 4m above the seabed. This is also set out as a requirement in proposed condition 55. However, it is unclear whether this elevation is from the original un-excavated seabed or the bottom of the excavation lane. This could make a large difference to the height of the water column below the discharge,

⁵ Hadfield, M. (2012) Sediment Plume Modelling for South Taranaki Bight Iron sand Mining. Phase 3 interim report prepared for Trans-Tasman Resources Ltd, October 2012. *NIWA Client Report* No: WLG2012-51: 52.

⁶ Hadfield, M. (2013) South Taranaki Bight iron sand extraction sediment plume modelling. Phase 3 studies. Report prepared for Trans-Tasman Resources Ltd, July 2013. *NIWA Client Report* No: WLG2013-56: 59.

⁷ Hadfield, M. and McDonald H. (2015) Sediment Plume Modelling. Prepared for trans-Tasman Resources Ltd, October 2015. *NIWA Client Report* No: WLG2015-22

⁸ HR Wallingford (2014) Support to Trans-Tasman Resources: Laboratory testing of sediments. October 2014. HR Wallingford report DDM7316-RT002-R01-00.

⁹ HR Wallingford (2015) Support to Trans-Tasman Resources: Source terms and sediment properties for plume dispersion modelling. HR Wallingford report DDM7316-RT004-R01-00.

which in turn would influence the scale of the sediment plume and sediment transport away from the deposition area.

17. Figure 2.8 of the Impact Assessment implies that de-ored sediment will be discharged back into the extracted lanes. However, section 2.3.5 of the Impact Assessment states "*that de-ored sediment will be returned to the seabed in the general vicinity of where it was extracted within the project area*".
18. I accept that the mining operation at the start of each mining block would need to discharge sediment outside of the excavation lane. This is what would cause the development of seabed mounds. However, outside of these circumstances, I understand it is that all other discharge from the mining operation should be able to be re-deposited into an extracted lane. This should be reflected in the wording of condition 55 if consent is granted.
19. Discharging within an existing lane at all times, outside the creation of excavation commencement mounds would have the added benefit of reducing the size and scale of mounds and pits to the minimum required under the operational constraints of the crawler and sediment disposal pipe.

Elevation of Discharge Mounds

20. I note from the TTR Impact Assessment, Reports and evidence that the mounds formed by the discharge of de-ored sediment will have a maximum elevation of 9 m. I further note that proposed condition 58 limits the height of the deposition mounds to this elevation above the pre-mined sea bed level.
21. However, if the discharge elevation is limited to 4 m above the sea bed, it is not clear how a mound up to 9 m will be able to be formed. I would have thought there would be some consistency between these two elevations. This inconsistency needs to be explained by the Applicant.

Access to Bathymetric Surveys

22. I note the evidence of Mr Andrew Smith on fisheries management at paragraphs [47] and [48] raises concerns about the risks to small trawl vessels from the significant seabed pits and mounds created by the mining operation. I understand that these concerns are based on the “soft” unconsolidated nature of the mounds compared to the natural sand ridges and rock outcrops found in the area, and that fishermen will not be aware of the presence of the mounds.
23. Report 6 states that that the deposited mounds will be a similar scale to sand ridges and sand wave features naturally found on the seabed in the general area, which are described at page 33 of that report and page 41 of the Impact Assessment as being 20 km long and 5-10m in elevation offshore from Patea.
24. However, the scale of the mounds given on page 14 of Report 6 are quite different, being much sharper breaks in relief with dimensions of 300m long and 500m wide with heights of 8 m or 9 m. I assume that these mounds would also be more unconsolidated than the natural sand ridges and sand waves. I cannot comment on what effect these differences may have on trawl operations, but I understand the Mr Andrew Smith has concerns as to their potential impact on fishing effort.
25. I note that proposed condition 47 establishes the requirement to undertake an annual bathymetric survey of the pits and mounds created by the mining operation. I understand that access to this regularly updated bathymetric information would be of benefit to commercial fishing interests so that fishing vessels are aware of the location of mounds and can plan to avoid them when trawling in the area once the mining operation has been completed. However there does not appear to be any mechanism for this information to be made available to fishing interests.
26. I would therefore suggest that the consent conditions include that the annual bathymetric surveys are made available to commercial fishing interests.

CONCLUSION

27. In summary, I conclude that:
- (a) Although I concur with the general statement of the scale of short-term coastal stability in Report 5, this could have been better verified by undertaking more beach profile surveys since the 2013 report.
 - (b) I also concur with the general conclusions of assessment of effects of the mining operation on coastal processes, but consider that the assessment should have used the updated sediment plume modelling available since the original 2013 application.
 - (c) The proposed condition on discharge of the de-ored sediment should be clarified to ensure that the discharge is 4 m above the excavation lane seabed outside the commencement of excavation.
 - (d) There is an inconsistency between the discharge elevation and the height of the deposition mounds which needs to be explained by the Applicant.
 - (e) Annual bathymetric surveys should be made available to commercial fishing interests so that fishing vessels are aware of the location of mounds and can plan to avoid them when trawling in the area once the mining operation has been completed.

Dated this 23rd day of January 2017



Derek Todd