

**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

**EVIDENCE IN REPLY OF DR GREG BARBARA TO THE EXPERT
EVIDENCE OF DR DONALD ROBERTSON**

Dated: 3 March 2017

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BARRISTER

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INTRODUCTION

1. I prepared primary expert evidence, dated 23 January 2017, in relation to the application by Trans-Tasman Resources Limited (TTR).
2. Dr Donald Robertson, in response to a request by the Decision-Making Committee , reviewed the fisheries evidence of TTR and submitters and prepared a report dated 21 February 2017.
3. The purpose of this evidence is to reply to comments made by Don Robertson in relation to my evidence.

DR ROBERTSON'S COMMENT ON GREG BARBARA'S EXPERT EVIDENCE DATED 23 JANUARY 2017

4. At paragraph [37], Dr Robertson states that paragraphs [66], [68] and [69] of my primary expert evidence are inconsequential statements. I disagree with this assessment. These are not inconsequential, as they highlight gaps in the NIWA investigations and the TTR application. It was accepted and stated in the Effects on Benthic Ecology Joint Statement of Experts that *“the benthic surveys were not temporally optimal and were not intended or designed to document seasonal variability of communities”*¹. Furthermore it was agreed in the Effects on Fish Ecology Joint Statement of Experts that:²

The lack of information on the noise signatures (frequency and intensity) of individual operational components and the resultant operational noise profiles at various stages of operations cannot be adequately described at this time as there is no comparable data on which to make an assumption

5. Noise impacts on fish cannot be determined at this stage due the inadequacies of the TTR underwater noise model. It was assumed by Dr MacDiarmid in the Effects on Fish Ecology Joint Statement of Experts that there would be masking of some fish vocalisations but that not all fish would be deterred by sounds, and because the intensity and frequency of noise generation is not known it is not possible to know which fish or to would be affected, or the degree such fish would be affected..

¹ Page 9, Joint Statement of Experts in the Field of Effects on Benthic Ecology, 20 February 2017.

² Page 5-6, Joint Statement of Experts in the Field of Effects on Fish, 17 February 2017

6. Additionally, the issues mentioned in my paragraphs ([66], [68] and [69]) have implications for fish distribution and therefore fisheries. If fish alter their distribution in relation to the mining operation by either attraction or avoidance behaviour into areas where fishers cannot follow the catch, this is an impact on the fishing industry. While Dr Robertson is of the opinion that effects on fish are the same as effects on fisheries, this is not correct. This point was discussed and agreed by all experts, including Dr Robertson, in the Joint Statement of Experts in the Field of Effects on Fisheries, which states: *“that a fishery is combination of a biological resource to exploit, economic investment, fishing technology and knowledge, and rules and regulations to administer the fishery.”*³ This means that fisheries are more than just fish stocks, and that fisheries are governed by social, economic and legislative regulations as well as abundance and distribution of fish).
7. Dr Robertson implies, in his paragraph [52], that changes in fish distribution caused by the proposed mining operation would be similar to natural variations that fishers deal with on a regular basis. While I agree that the distribution of fish species is seasonally and annually variable, natural variation is not the same as ongoing (chronic) anthropogenic impacts over several decades. If the mining operation changes the relative abundance or distribution of fish, due to noise or changes in water quality, these are in addition to the natural variation. The extent of these effects are not yet known.
8. It was stated during the Effects on Fish Ecology and Effects on Benthic Ecology Expert Conferencing sessions that TTR has not commissioned any field surveys of the fish stocks or benthic ecology (that supports fish stocks in the STB) since the last application in 2013. It was also stated during the Effects on Fisheries Expert Conferencing that *“NIWA was commissioned by TTR to explore only the biological effects on fished species. Identifying those people or groups with an interest in fisheries or potential effects on them was not asked for by TTR and not produced by NIWA.”*⁴
9. Dr Robertson considers that if the effects on fish were minor then the economic effects would also be minor. I question how an assessment of the fishery can be undertaken without assessing the industry, especially when

³ Page 7, Joint Statement of Experts in the Field of Effects on Fishing, 15 February 2017

⁴ Page 7, Joint Statement of Experts in the Field of Effects on Fishing, 15 February 2017.

data used is over six years old. I also question how a conclusion of only minor impacts can be reached when neither recent surveys of fish nor detailed surveys of the benthic ecology have been undertaken. As I state in paragraph [68] of my primary expert evidence, MacDiarmid et al. (2015 TTR Report 1) note there is disconnect between the high pelagic and demersal fishery productivity and the apparent lack of benthic productivity. Demersal fish live at or near the seabed and are generally highly dependent on what food they can find at the seabed. This includes the organisms that live on or in the sediments. It is likely, therefore, that the demersal fishery is supported by a benthic infauna community within the STB that is more complex or abundant than reported by NIWA. It is also likely that the complexity and total abundance of benthic infauna was overlooked due to the inadequacies of the benthic surveys, as I pointed out in paragraph [71] of my primary expert evidence (i.e. organisms smaller than 4mm would not have been collected in the dredge trawls). Without identifying what is supporting the high productivity of the demersal fishery, it is premature to conclude that the mining operation will have only minor impacts on the demersal fish populations or the fishery. These gaps in knowledge are not inconsequential when attempting to determine degrees of impact on the benthic communities that support fisheries.

10. At paragraph [39], Dr Robertson states I should have shown data to support the statement that higher catch (returns) occur around the PPA. Dr Robertson went on ask whether I was referring to total catch or catch rate. To clarify, I based my assessment on the NIWA reports and interpreting the data they presented on total catch. I was referring to Figure 5-2 of the NIWA Report 10 (see reproduced as Figure 1 below). An example of actual catches of jack mackerel⁵ is provided in NIWA Report 18 at page 17. Figure 3.4 in that Report shows midwater trawl catch (93% of which is jack mackerel). This is reproduced below as Figure 2 which shows the jack mackerel total catch in relation to some predicted extents of the sediment plume. If catch data is lacking it is lacking from the NIWA reports.

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Note that the NIWA Reports 10 and 18 do not define which species of *Trachurus* are classed as jack mackerel.

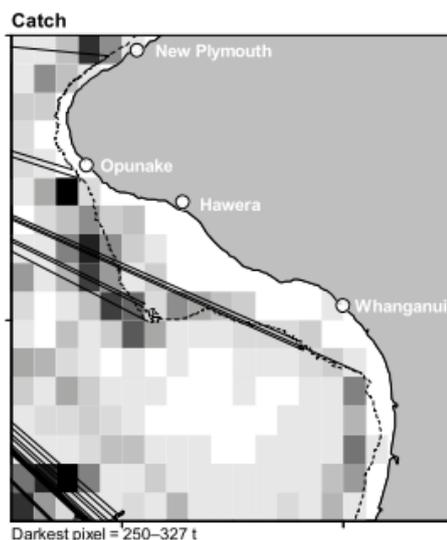


Figure 1 Bottom trawling catch. Density plots showing the spread of total catch within the study area between 1 October 2004 and July 2010. Pixels are $0.1^\circ \times 0.1^\circ$ rectangles. The dashed line represents the 50 m contour.

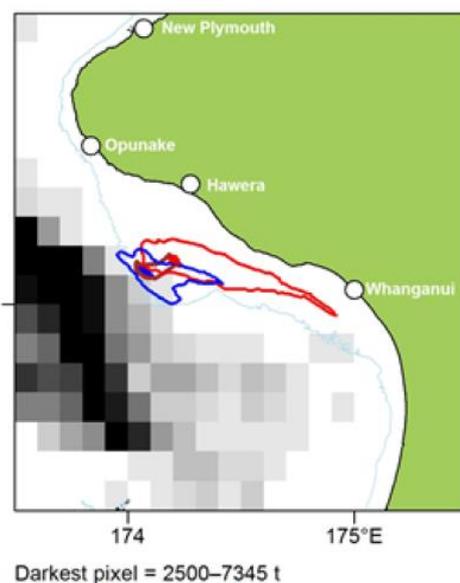


Figure 2 Catch by midwater trawl (93% jack mackerel) between 1 October 2006 and 30 September 2015.

11. As shown in Figure 1, higher catch for bottom trawling occurs in a number of areas including along the 50m contour in areas to the west and north of the PPA. Figure 2 shows that for jack mackerel, higher catch occurs in waters to the north and west of the PPA. This would indicate that these areas are at risk of underwater noise and vibration impacts from the mining operation and

that the underwater noise assessment should consider these commercial fish species in its sensitivity assessment.

12. Dr Robertson states, at paragraph [40], that my paragraph [73] undermines or negates my statements at paragraph [74]. I disagree with this comment. As I discuss in paragraphs [9], [10] and [11] of this statement, the trawler catch is higher for all species combined, and in particular the jack mackerel, in areas to the west of the PPA. The plume overlay provided in NIWA Report 10 (shown in Figure 2 above) does not show the full extent or variation of extent for the plume (the sediment plume will not travel in a constant direction as shown in the animations provided by TTR⁶). Nor does it show the noise extent expected to be generated by the mining operation. Without showing the full potential extent of the plume or noise contours, it is difficult to determine which fisheries areas will be impacted and to what extent. It is therefore not appropriate to assume impacts will be negligible.
13. Dr Robertson states, at paragraph [43], that catch rates “*are well covered in the submissions by Dr MacDiarmid*”. This is incorrect and was discussed at length during the Effects on Fishing Expert Conferencing that Dr Robertson attended. At this conferencing, the catch data used by NIWA was shown to be dated and drew in data from QMA 7 and QMA 8, which was not appropriate from a fisheries management perspective. The modelling of predicted fish presence in Report 17 is also disputed in Dr Helson’s evidence due to it not having been “*ground truthed*” (i.e. by checking the model against field data or catch records). Therefore, I maintain my opinion that without a better understanding of the extent of overlap with the PPA, plume (or noise) impacts and high return fishing areas, it is not possible to state that the spatial displacement of fisheries by the PPA would be minor or not.
14. I have already presented some of my replies to Dr Robertson’s statement in paragraph [44] above, including Dr MacDiarmid’s own admissions of gaps in the NIWA studies. NIWA did not conduct a full impact assessment on the

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TTR Sediment plume animations:

ftp://ftp.niwa.co.nz/incoming/hadfield/TTR/SSC_mining-derived_May2015_run23_mine-a-v8.avi

ftp://ftp.niwa.co.nz/incoming/hadfield/TTR/SSC_mining-derived_May2015_run23_mine-a-v8.avi

STB fisheries, but instead was only commissioned by TTR to undertake an assessment on the impacts on fish. There have been no further benthic surveys or fish surveys since the last TTR application, so there has been no advancement in the understanding of the fishery presented by TTR in this application.

15. Dr Robertson, at paragraph [46], considers that my paragraph [82] on Tuna is not relevant. I disagree. The commercial importance of the Tuna fishery is relevant as the species are sensitive to prey distribution, noise and temperature changes. While Tuna will predominantly be driven by access to their prey, the TTR operations have the potential to alter prey distribution (by attracting some species and repelling others) as well as directly impacting on Tuna distribution by noise impacts. There has been no assessment undertaken by TTR on the potential for Tuna to be disturbed by the noise generated by their operation. As discussed and agreed by all attendees at the Effects on Fish Ecology and Effects on Marine Mammals Expert Conferencing sessions, low frequency sound generated by the mining operation will travel tens of kilometres and possibly further. If Tuna are shown to be sensitive to these sound frequencies and levels of noise, this could alter their distribution in the STB to areas outside of where fishers can catch them. The effects on Tuna including noise need to be included in the TTR impact assessment.
16. At paragraph [47] Dr Robertson states that he does not understand "*how the mining operations might impact the jack mackerel*". This indicates that Dr Robertson has not read my evidence as a whole, specifically the potential for the discharge plume from the mining operation to act as an attractant for some scavenging or opportunistic species, which was agreed on as being likely at both the Effects on Fish and Effects on Benthic Ecology expert conferencing sessions. If jack mackerel are attracted to the PPA due to the ready availability of machined benthic organisms returned in the sediment plume, this is an impact. Likewise if fish are repelled from an area by the noise generated by the mining operation, this is also an impact.
17. I agree with Dr Robertson that there are multiple species of Trachurus that come under the common name of jack mackerel and point out this is an issue with NIWA Reports 10, 17 and 18 of the TTR application (in particular, on p.45 of Report 10 where NIWA only identify that "*the Jack Mackerel*

fishery is large offshore and mid water trawl fishery (*Trachurus spp.*).”) It needs to also be noted that in Report 10, NIWA refer to *Trachurus. novaezealandiae* as golden mackerel and not jack mackerel. *T. declivis* is referred to as horse mackerel in the appendices of the same report. Given these vagaries, it was not possible for me determine from Report 10 whether either *T. novaezealandiae* or *T. declivis* is also classed as jack mackerel by the NIWA investigators. By not specifying which species of *Trachurus spp.* NIWA were assessing for the fishery they have not, in my opinion, conducted an adequate level of assessment on the potential impacts on this fishery.

18. In summary, while Dr Robertson’s review of my evidence attempted to highlight gaps in the logic of my evidence, they were in fact gaps in the NIWA reports that my evidence was attempting to highlight. If Dr Robertson feels that it is not clear where fishing hotspots occur, this is an issue that needs to be addressed in the TTR application in order to determine whether the mining operation will be clear of important fishing areas or not. Furthermore, the vagaries of the NIWA reports in regards to which species they are referring to when using common names (such as jack mackerel) have implications when attempting to determine levels of impact on a species and the fisheries that rely on it.
19. The points made in my primary evidence (i.e. that the mining operation could act as an attractant for some fish species and that the extent of the noise impacts is unknown), which Dr Robertson calls inconsequential, were, in fact, all agreed as important points during the Effects on Fish Ecology and Effects on Benthic Ecology Expert Conferencing sessions. This indicates that Dr Robertson has not considered the cumulative effects of the mining operation on the fisheries, but merely whether each impact on its own would be significant. This is not an appropriate approach when assessing a long-term operation where chronic impacts will be of greater influence on the fishery than acute (short lived) impacts.
20. Similarly, Dr Robertson’s view that assessing impacts on fish sufficiently assesses impacts on fisheries is incorrect. He agreed during the Effects on Fishing Expert Conferencing, that a fishery is a combination of a biological resource to exploit, economic investment, fishing technology and knowledge, and rules and regulations to administer the fishery. Accordingly,

assessing impacts on fish alone is not an adequate proxy for determining the level of impact on a fishery. At the very least, the impacts on the economics and influence of where a fisher can fish under the legislation governing a fishery must also be considered.

Dated this 3rd day of March 2017

A handwritten signature in black ink, appearing to read "G. Barbara", written in a cursive style.

Greg Barbara