

29 March 2017

Background:

1. Due to an unexpected software issue experienced late on the 29th March, I have not been able to provide 'commentary boxes' alongside the dots e.g. ***"this reef 3m in height, at 26m depth, 10m x 15m wide, with snapper, terakihi to be found, with gurnard close by in the sand"*** or ***"reef pinnacle, 4m height and 30m round, go for crayfish"***. I am hoping a small extension could be offered so that I could provide this.
2. It was only six days ago that the minute from the DMC, 24 confirmed that dots *were* acceptable. Time constraints have meant that since the 24 March, I have not had the ability to interview more fisherman/divers. However **I have provided more reefs**, as in the process of updating the GIS map, we realised one diver's data had been missed – this has now been included to you in the map.
3. As you know I am spending considerable hours responding on other matters before the DMC – such as 'the worst case plume modelling'. I am also spending considerable time reviewing the updated conditions. This has limited my time available to provide the comprehensive, narrated reef map that I would have liked.
4. I think the whole process **would be much more informative** if the DMC had asked of the local divers the following three points. Locals will not have read all the NIWA reports, and so don't appreciate that the reefs that have been described by NIWA – do not match the description of reefs they dive. For example, see page 15 of the PowerPoint I presented at the Hearing which had the Patea Shoals NIWA survey describe **100% of the sub-tidal reefs sampled as 'low-relief outcrop, low relief bedrock, partially covered in sand'**. The pictures & data in my submission of reef biodiversity is in stark contrast to this. All the reefs described to me by divers are 2m-8m.
 - a. Reef height and diameter
 - b. Substrate type – and unusual features e.g. slabs/pinnacle

- c. Coverage – what does the diver note? E.g. seaweed
5. Unfortunately the in the Hearing the DMC did not ask the locals who presented to **describe the various reefs** they dive and that their friends dive. I think this was a missed opportunity.
6. The Memorandum of Counsel on unmapped reefs stated “6. NIWA video surveys located and identified reef communities on some further **small rocky outcrops** (the closest of which was about 5 km from the mining area) as shown in Figure 3 below from page 10 of my evidence. But note that the complete region between the PPA and the coast was not sampled or multibeam mapped.” **It is interesting that no mention was made that 100% of these were ‘low relief outcrop/bedrock, partially covered’.** **Nor was there mention** that the closest of 5km was described as “rocky outcrop/rippled sands: low relief outcrop, partially buried by rippled sands, shell debris and gravel/pebbles in troughs, mudstone cobble, opal fish x 5, small fish x 1”. In other words – no mention of algae cover, sponges etc. – a reef that seems incredibly lacking in biodiversity.
7. **Please find attached some GIS maps**, run for me with the support of ‘Main Trust’ to whom I supplied the confidential details of reefs, and fishing spots supplied to me from **only a few recreational fisherman/divers (less than ten)**. I have also included the trawl maps showing foul ground, from a commercial fisherman, as well as information presented to you from Captain Smith on commercial fishermen’s’ foul ground. Of particular importance in Captain Smith’s transcript is his comments on the foul ground to be found in the Project Area. On the basis of its shallow depth, and the diversity of benthos found at similar depths on the ‘Project Reef’ and ‘The Crack’, I would support the need for this area to be dive surveyed.

30 MR SHAW: I'm trying not to be confused.

MR SMITH:

The activity to the north: there's a lot of plots there that are marking humps and hollows. Then if you look at the southeast corner of the mining area, you've got some red stars. That's rough ground we try and steer away from. Where those red little stars are on the southeast corner, the fishing trawlers will keep away from there because it's areas of foul ground.

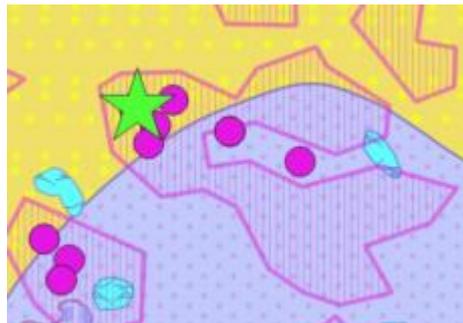
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- i. http://www.epa.govt.nz/EEZ/EEZ000011/Transcript_02-03-17.pdf

8. Alison MacDiarmid's evidence, point 5 in the Memorandum of Counsel stated there **is a complete lack of rocky reef within the PPA**. This appears at odds with information presented by Commercial fishermen to myself, and presented to the DMC by Captain Smith:
 5. A full multibeam swath mapping survey of the PPA carried out by NIWA indicated a complete lack of rocky reef within this PPA. The multibeam survey data were used as inputs to the bathymetry maps shown in TTRL documents.
9. I am concerned that the objective evidence supplied by Captain Smith on foul ground occurring on the seaward boundary of the Project site, as well as the fact that Map 45 describes the area within the Project site as being RS (rock and sand) seems in direct contrast to the statement made by Alison MacDiarmid at the Hearing on 3 March 2017 *"Yes. So, that's the process by which the original DOC database was actually sort of ground truth, at least for the sites where there were drilling log or bathymetric information, and then **NIWA undertook a swath mapping multibeam survey of the proposed project area which indicated a complete lack of rocky reefs within that area** and those, as I've said to you earlier, those data were then used as inputs to the bathymetry maps shown in various TTR documents. 30 Our own NIWA video surveys located and identified reef communities on some further small rocky outcrops, **the closest of which was about 5 kilometres from the mining area** and those are shown in figure 3 below"*.
http://www.epa.govt.nz/EEZ/EEZ000011/Transcript_03-03-17.pdf pg. 1085
10. I am also concerned that the Memorandum of Counsel on 'unmapped reefs' point 8 which stated: *Additional surveys undertaken by NIWA for TTRL were **focussed upon nearshore habitats, including reefs**, as this is where concerns were raised with respect to sedimentation and light attenuation effects. It would seem rather obvious that those sub-tidal reefs in greatest proximity to the mining, would be those most at risk of sedimentation and light attenuation effect.* http://www.epa.govt.nz/EEZ/EEZ000011/Memorandum_of_Counsel_responding_to_matter_of_unmapped_reefs.pdf

11. A GIS system is an incredibly powerful tool. Already viewing the mapped data, I can see where different data sources combine to show a picture. For example the Project Reef lies in an area that recreational fishermen state is a 'network of reefs' – and this is validated when you look at the 'foul ground' the commercial fishermen has surrounded the Project Reef with.



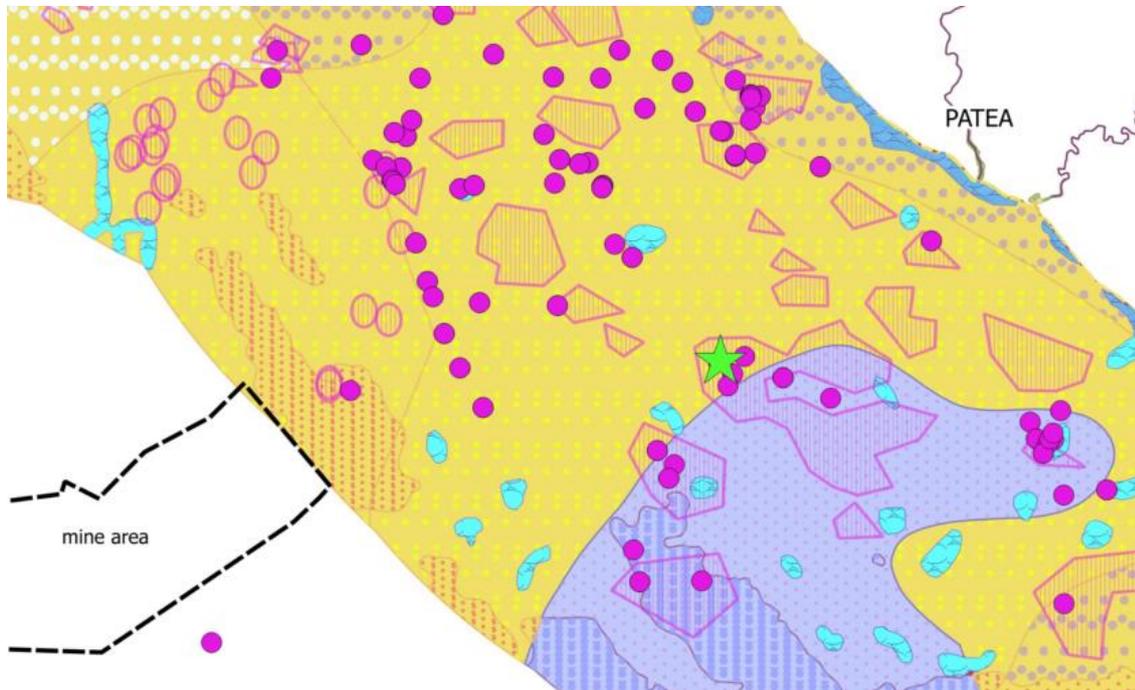
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12. I have sent PDF's of the information on reefs with this word document. A small snippet of the data is shown below:

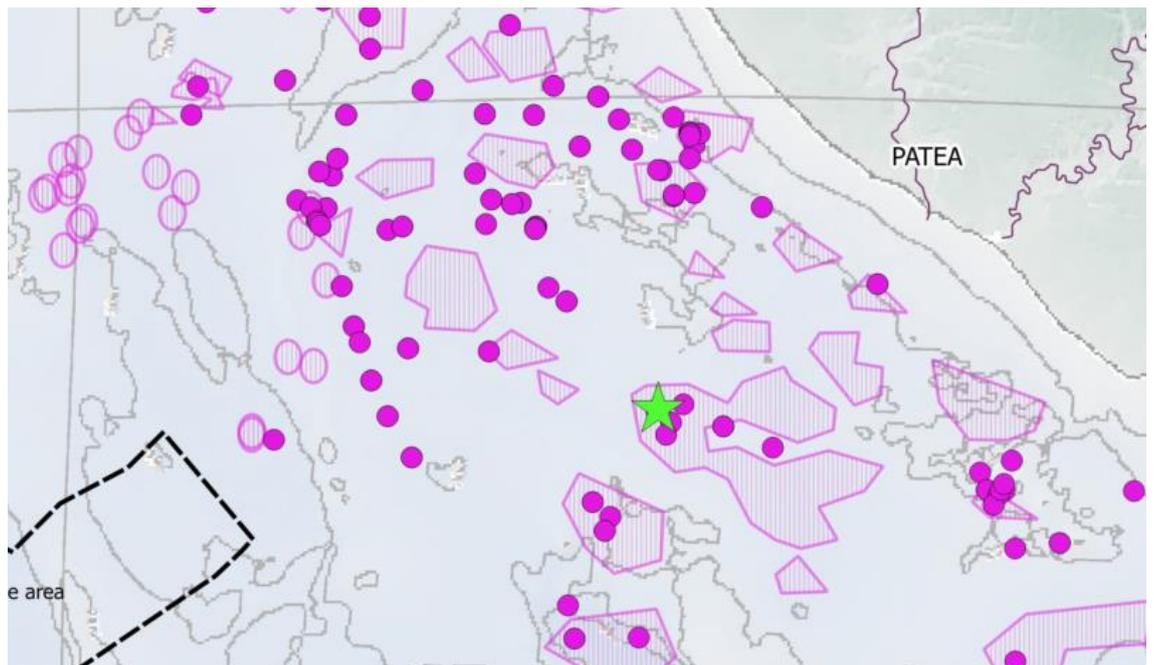
Captain Smith showing foul ground at the Project site (some mismatch in data area between our GIS and Captain Smith)



Our GIS system, showing DOC reefs (light blue), star (Project Reef), odd shapes (foul ground commercial), purple dots & circles (fishing & dive spots). Also included is the DOC substrate – which provides a very powerful insight into the different habitats running through the Patea Shoals.



This snippet is without the DOC reefs, just showing commercial foul ground and dive and fishing spots.



This map combines trawl marks and known dive and fishing spots, as well as the Project Reef. **Again the GIS system proves its worth when you look at the combination of data –** the dive spots appear either in untrawled areas, or in the polygons showing foul ground.

