JDB: 8 May 2018

Expert evidence concerning

NORTHLAND REGIONAL COUNCIL HEARING OF RESOURCE CONSENT APPLICATIONS FOR ACTIVITIES ASSOCIATED WITH DOUG'S OPUA BOATYARD, WALLS BAY, OPUA (APP.039650.01.01)

1. This is the expert evidence of **John Duncan Booth**.
2. I am a marine scientist; I reside at 488 Rawhiti Rd, Russell; I hold the degrees of BSc, BSc Hons (1), and PhD; and I have 50 years of experience in NZ-coastal biological and physical marine science.
3. Although retired from full-time employment, I continue to research and publish on aspects of the marine ecology of the Bay of Islands (e.g., Booth 2016, Booth 2017).
4. My expert evidence presented here solely concerns the appropriateness of the ecological survey and ecological impact information provided by the applicant (*Ecological survey: Doug's Opua Boatyard*, an April 2018 ecological report prepared for Doug Schmuck by 4SIGHT Consulting) – with one exception.
5. (That exception concerns the late submission by the applicant, the plan 'Shellfish bed erosion barrier 02-05-18'. I deal with this here and now by declaring how remarkable it seems that at this late stage the 'Boundary of Occupational Area' is extended by some unquantified distance into the shellfish bed by way of a Sub-Surface Erosion Barrier.)
6. My understanding is that the April 2018 report is the only ecological report produced in support of the application.

***Ecological survey: Doug's Opua Boatyard* by 4SIGHT Consulting**

7. The report is a somewhat lightweight descriptive overview of the biology and chemistry of the shallow part of the site; if you were looking for an ecological impact statement, this is not it.
8. The report essentially deals only with some inner-shore point sampling locations, and does not address at all the issues of proposed new capital and maintenance dredging.
9. There was a survey of the edible shellfish population, and of the sediment chemistry.

Shellfish population survey

10. Section 2.2 of the report states '*A survey was conducted to characterise the populations of edible shellfish on the beach area adjacent to the boatyard operation in terms of population density and size frequency, and to establish whether there was a harvestable shellfish bed at the site*.'
11. Only the intertidal 'on the beach where the boatyard is situated' was sampled – an area of 250 m^2 - *after being shown where shellfish were known to be present by the applicant*. No indication is given as to how widespread the ten samples were, or how they were chosen (random, systematic etc).
12. Ten quadrats were sampled, all containing pipi and seven containing cockles. The usefulness and validity of this survey would have been much enhanced if some sort of variability (error structure) had been provided – afterall, this is labelled a 'Shellfish population survey'.

13. Mean density of harvestable pipi (*Paphies australis*) was 51/m^2, and therefore definable as a small harvestable bed. Cockles (*Austrovenus stutchburyi*) densities were not sufficient to form a harvestable shellfish population.
14. The result concerning pipi being present in harvestable densities should have been put into a wider context. Pipi are, in their own right and separately from cockles, particularly sought; the areas of Bay of Islands foreshore where pipi survive is reducing as sedimentation continues and mangroves expand their footprint; and Walls Bay is one of a shrinking number of places with easy public access to a harvestable pipi population.
15. This section of the report would have been more informative if it had done the following:
    - Shown the actual extent of the pipi bed, and the variability in the sampling results. This information is essential if we want to know how 'stable' things are.
    - Acknowledged how pipi-dominated beds are a far less extensive and frequent biome in the Bay of Islands than cockle beds, and are under greater threat from sedimentation than cockle beds.

Sediment quality (chemistry)

16. Section 2.3 of the report states '*The purpose of the sediment quality survey was to establish the levels of contaminants within sediments in three broad zones. These are: a) the immediate vicinity of the slipway facility being the zone most likely to have accumulated contaminants from boatyard activities; b) within the area to be disturbed by the proposed dredging; c) providing 'background' or 'control' sites at positions adjacent to the area intended to be dredged, and at points distant from the boatyard operation. Substances targeted for analysis were Zinc and Copper because those metals (particularly Copper) are the biocides that are currently most commonly associated with vessels and antifouling paint, and that are most likely to accumulate in sediments at boatyards and slipways*.'
17. The concentrations of copper and zinc relative to international (ANZECC) guidelines were provided, based on three shoreline samples and three samples near the end of the jetty (each with three subsamples). Only the site directly alongside the ramp could be defined as polluted/moderately polluted.
18. This section of the report would have been more informative if it had done the following:
    - Explained how relevant one surficial sediment sample comprised of three subsamples, taken on just one day, is in characterising the heavy-metal status of any particular spot.
    - The variability (error structure) had been provided for each sampling site based on the three subsamples. This information is essential if we want to know how 'stable' things are.
    - More sampling had been undertaken along the beach in order to identify the extent of the heavily polluted sediment with distance from the boatyard.
    - The results might have been put into a Bay of Islands-wide context, making use of the extensive NRC database and NIWA results. For example the zinc concentrations at Site SL are almost four times (almost twice, when normalised to 100% mud) greater than the average for innermost Bay of Islands surface sediment sampled in 2009 (Maas & Nodder 2009: 58-62). The equivalent values for copper were 40 times (>5 times).
    - The flesh of the shellfish might have been sampled in order to determine the health threat this level of pollution may be casting on nearby harvestable kai moana. Cockles appear to accumulate lead; and the native rock oyster *Saccostrea glomerata* accumulates zinc, and to a lesser extent copper (Nielsen & Nathan 1975: 470). (Comparative values for copper and zinc, and other heavy metals, for the Bay of Islands found in shellfish flesh in 2009 are given by Maas & Nodder 2010: 23, 62.)
    - The flesh of the harvestable rock oysters (*Crassostrea gigas*) nearby might also have been determined – so that people harvesting them might be informed of any risks.

Ecology of deeper waters

19. The above refers only to inshore areas (shoreline, and just off the end of the jetty) – yet the planned construction and dredging extends a further 150 m or so. As far as I can determine, there has been no attempt to characterise the ecology, or address biological impacts, in these deeper waters. For example, are horse mussels (*Atrina zelandica*) – an important, and threatened, structuring species – present here?
20. In my view it is not enough to simply pronounce '*As for ECOLOGICAL effects, the activities of dredging and structural constructions will have no more than minor impact on the surrounding environment when properly controlled so that the impact on tidal, subtidal and benthic habitats is limited or minor in their effects.*' (Page 4 of Amended/combined amalgamated Resource Consent Application)

Hydrological considerations

21. Capital and maintenance dredging can bring about 1) the physical destruction and/or removal of marine life; 2) changes to the water movement patterns; and 3) stir up sediment. As far as I can tell, the only reference to hydrological impact is captured in '*As for HYDROLOGICAL effects, the proposed dredging cuts and batter angles have been designed to reduce the effects of sediment deposition and erosions in the area. As well as any long shore drift or swash that is naturally occurring. A Mike 3 dredging model was developed to verify this design.*' (Page 4 of Amended/combined amalgamated Resource Consent Application)
22. In my view, this is simply insufficient (and I could find no sign of the *Mike 3 dredging model*). Siltation is currently the greatest single threat to the ecology and mauri of the Bay of Islands, and Veronica Channel is the funnel that empties the Kawakawa/Taumarere (the greatest source of silt) and the Waikare, much of the silt being deposited in Te Rawhiti Channel (https://marinedata.niwa.co.nz/). Silt contributes to the extinguishing of shellfish beds; expansion of mangroves and loss of seagrass and saltmarsh; and to the smothering of deeper reefs and seafloor. It is incumbent on us all to reduce siltation as far as possible.

Summing up

23. The ecological report (*Ecological survey: Doug's Opua Boatyard*) is a minimal, once-over-lightly investigation into inshore, edible shellfish presence; and a minimal, once-over-lightly investigation into inshore levels of copper and zinc. The absence of essential sampling-variability information, and the confined extent and density of the sampling, mean the report is too information-deficient – in my view – to be useful in assessing/supporting the Resource Consent Application.
24. And, more egregiously, it appears no investigation has been made (or has been made available) into the ecological and hydrological effects of the proposed capital and maintenance dredging in a location adjacent to 1) a shoreline that contains a representative example of the ever-shrinking pipi-community biome; and adjacent to 2) a channel where every effort should be made to decrease silt levels.

John Booth
8 May 2018

References

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