

Addendum to NIWA Client Report 2018316WN “Technical review of Coastal Research Limited’s marine dumping consent application”

Review of evidence provided by Clinton Duffy on 31 October on behalf of the Director-General of Conservation

Ecological values present at mid-outer shelf depths east of Great Barrier Island

I agree with Mr Duffy’s statement that “although dumping of dredge spoil at the Northern Disposal Area will adversely affect the benthic ecology of a small part of the northeast North Island continental shelf, the application understates the ecological values likely to have been present at and surrounding the disposal area”. Mr Duffy provides detailed information, which was not included in the consent application, on the biodiversity present or likely to be present within the Northern Disposal Area including sessile and mobile epifauna and fish based on published studies and databases. It is also stated that the invertebrate and fish assemblages are probably typical of large areas of the continental shelf around North and upper South islands, although somewhat modified by bottom trawling. I find this assessment to be reasonable.

Effects on the ecology of the Northern Disposal Area

Mr Duffy notes that sediment disposal has affected benthic invertebrates within the Northern Disposal Area as shown by the monitoring undertaken to date, and he notes the lack of information on the mobility of benthic invertebrates and their ability to survive burial. He notes that benthic invertebrates in the area are unlikely to be resilient to deposited sediments given the naturally low levels of disturbance in the Northern Disposal Area. Mr Duffy remarks that disposal may have short-term positive effects on some invertebrates and fish due to the presence of invertebrate prey in the spoils, and that effects on pelagic fish will likely to be short-lived. Overall, I agree with this assessment.

Monitoring

Mr Duffy states that the benthic monitoring undertaken to date is biased towards the small fauna and disregards larger fauna such as bivalves, burrowing urchins and holothurians, which are longer-lived and respond differently to disturbance. The smaller fauna is referred to as “meiofauna” by Mr Duffy, which is technically incorrect. The relatively coarse mesh (0.5mm) used for extracting fauna from cores during monitoring retains organisms referred to as “macrofauna”. Meiofauna are normally sampled using a 0.063mm mesh and are typically dominated by nematodes and small crustaceans. Nevertheless, it is correct that the relatively small size of the cores will not provide an accurate assessment of the distribution and abundance of the larger mega-epifauna. I note that the numerical dominance of foraminiferans in the samples is largely the result of the mesh size used for extracting the fauna from the sediments, not the surface area of the sampling device. Mr Duffy notes that underwater camera systems are needed to quantify the abundance of epifaunal organisms and that in situ sampling using epibenthic sleds or beam trawls are required to provide species-level identifications (i.e., combining these methods is best practice). Overall, I agree with Mr Duffy’s assessment that the proposed monitoring sampling strategy using relatively

small cores and a 0.5 mm mesh is biased towards a particular component of the benthic fauna (i.e., macrofauna) and disregards other components such as the smaller meiofauna and larger mega-epifauna, which will be composed of different species and will likely respond differently to sediment disposal.

Conclusions

Mr Duffy notes that deep reef habitats with diverse filter-feeding assemblages are known to occur southwest of the Northern Disposal Area, and that they are likely to be highly sensitive to sedimentation.

Mr Duffy states that the adverse effects of sediment disposal on benthic biological assemblages within the disposal area will increase with increased volume and frequency of dumping, and that increased dumping volume should not impact benthic and pelagic habitats beyond the existing boundary of the Northern Disposal Area.

He recommends that at least two control sites should be used for monitoring of benthic communities, and that monitoring should be conducted at the same time each year to ensure comparability. He also recommends continued use of core sampling in future monitoring surveys to provide continuity, as well as the use of high resolution imaging of the sea floor to characterise epibenthic invertebrates. I have made similar recommendations in the NIWA Client Report.

Mr Duffy recommends the use of a box corer or grab for sampling the larger mega-epifauna. This would be a useful addition to the sampling methodology, which would also provide specimens to verify species identifications from image/video. Baited underwater video or short duration trawls would provide valuable information on demersal fish assemblages.

I agree that provision of appropriately preserved and labelled voucher specimens to relevant national collections would represent best practice.

I agree that there should be a requirement to immediately report the presence of non-indigenous species from the disposal area to MPI and the EPA.



Dr Daniel Leduc
Benthic Ecologist
8 November 2018