greater WELLINGTON
REGIONAL COUNCIL
Te Pane Matua Taiao

# MEMO

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| TO | Kirsty van Reenen |
| COPIED TO | Lucy Harper |
| FROM | Dr Iain Dawe |
| DATE | 20 April 2018 |

**FOR YOUR ACTION**

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## Western rivers applications - assessment of effects on coastal processes

I have reviewed the report prepared for Greater Wellington Regional Council by Tonkin & Taylor entitled "River Management Activities: Western Rivers Coastal Processes Input".

As part of the renewal of the resource consents to undertake flood protection activities in the rivers on the western half of the region, a desktop review was undertaken to assess the degree to which these activities are having an effect on the beaches adjacent the river mouths. The two main rivers in the western half the region are the Waikanae and Ōtaki Rivers on the Kāpiti coast. Both these rivers have flood plain management plans. There are smaller streams in this area that flood protection undertake work on including the Waimeha and the Waitohu Streams. The Waimeha is mentioned in the report but for some reason the Waitohu is overlooked. The main activity that occurs in these streams that could affect the coast is mouth cutting, which is permitted for these two watercourses under the regional plans.

The coastal processes assessment looked at the degree to which the flow of sediments supplying the beaches may be interrupted or altered by river management activities and whether any associated effects on the morphology of the river mouths may be impacting on coastal processes. This is important because rivers supply the majority of the beach forming sediments to the Kāpiti coastline.

The four main activities undertaken in the rivers that could have an effect are: Gravel extraction, bank stabilisation, mouth cutting and channel shaping and realignment. The report deals with each of these activities in turn and provides an assessment of the potential impacts they may be having on the coast. As the assessment was a desktop exercise, no field research or primary analysis was undertaken and it relied on previous studies mainly in the form of consultancy reports. There are some datasets available to support the analysis, but they are limited:

1. Historic and recent gravel extraction rates
2. Bed cross sections
3. Fluvial sediment transport load estimates
4. Coastal longshore sediment transport estimates

Of these, only the first two can be considered empirical. The sediment transport numbers are estimates based on educated research opinion and the limited information available from river monitoring. Despite these limitations, the report concluded that flood protection activities are unlikely to be having a measurable impact on the coast. On the whole I agree with this assessment, but have some additional comments.

With regards to the Waikanae River it was concluded that gravel extraction will be having a minimal effect because the gravels drop out before they reach the mouth and do not supply the beaches around the mouth, which are historically sandy. There was no evidence that channel shaping, bank stabilisation or mouth cutting was having any appreciable impacts. An obvious omission from the analysis of the Waikanae was a report prepared by GWRC flood protection in 2003 titled "Evaluation of Coastal Monitoring Surveys around the Waikanae River Mouth". This report was undertaken in line with the consenting requirements following a mouth cut on the Waikanae. It provided an assessment of any effects the cut may have had on the beaches and included an analysis of beach cross-section surveys. The report concluded that river mouth cut appeared to have only local effects on the Waikanae Beach coastline, but effects nonetheless. It would have been a useful report to include in the assessment.

A similar conclusion was reached with regards to the Ōtaki River except that the shoreline around the mouth and in particular to the south, are mixed sand and gravel beaches, supplied with gravels from the Ōtaki River. It was concluded that, based on historical surveys during a long period of historical extraction, the gravel extraction was not having a major impact because the shoreline is stable here and slowly prograding. The report states that it is plausible that extraction of gravel from the Ōtaki River may be slowing the current rate of accretion on the mixed sand gravel beaches and that the extraction strategy *could be adapted in response to measured shoreline retreat if required in the future*. This is an important comment because under sea level rise, the historical progradation trend may reverse and require a reassessment of the gravel extraction activities. To this end, we need to know what the local rates of shoreline change are and this should be built into the consent conditions. KCDC possibly have some shoreline surveys around the mouth that could be used to this end, but I recommend that the beach cross-section survey locations are looked at to see whether they are fit for purpose to make an assessment of local shoreline changes on the mixed sand and gravel beaches in the area and whether additional cross-section surveys need to be put in place.

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