

Proposed Natural Resources Plan for the Wellington Region

Supplementary Right of Reply: Activities in the CMA

For Hearing Stream 6

18 July 2018

Topic: Defining Mean High Water Springs

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This supplementary Right of Reply responds to Panel requests made at Hearing Stream 6 on 28 May 2018. The Panel asked for a written response to questions:

Mean High Water Springs Q&A for right of reply

[1] *Is the Mean High Water Springs on the maps and GIS a hard mapped line or is it indicative only? If the latter, is this clear on the maps and GIS?*

1. GWRC has not defined a mean high water springs (MHWS) line defined for the Wellington region coastline, except at selected river mouth locations and Titahi Bay. There is a generalised administrative boundary in the online mapping service, but we do not say this is the MHWS springs. The disclaimer on the printed PNRP maps is silent on the matter. The decision version could clarify the accuracy of any landward boundaries by stating whether it is approximate or surveyed.

[2] *What is the definition of MHWS?*

2. Defining the MHWS is complicated as its location at any one point is the result of a complex interaction of a number of natural components and there are multiple definitions and methods by which to classify it.
3. A definition of MHWS was included in the operative coastal plan and reads: “the average of each pair of successive high waters during that period of about 24 hours in each semi-lunation (approximately every 14 days), when the range of the tide is greatest.”
4. This is a general description that applies to areas that experience a fortnightly spring and neap tide cycle, such as Porirua and Kapiti. During this cycle the height of the high tides gradually rises and falls in sync with the phases of the moon from full to half to new and so on. But, this definition cannot be applied to rest of the Wellington Coast because it does not experience this fortnightly spring-neap oscillation. Rather, the high tides peak on a monthly cycle every 27.5 days in what is known as a lunar perigean tide. Furthermore, MHWS elevations need to be calculated from measurements spanning at least the period of a year, and technically a tide record of 18.6 years is needed in order to capture the full range of interacting variables. Consequently, a decision was made to not include a MHWS definition or line in the PNRP as it is not a definition that can be usefully applied by a lay person to identify the MHWS on a beach.

[3] *How is MHWS surveyed?*

5. A MHWS survey needs to be undertaken by a qualified surveyor. In Wellington the MHWS is pegged to a survey benchmark known as Wellington Vertical Datum 1953 or WVD53. The MHWS elevation is published by Land Information New Zealand (LINZ) which makes its calculations from long term tidal records. A survey is undertaken of the location in question in order to derive the elevation contours and the MHWS elevation is plotted onto this map.

[4] *Is MHWS a fixed stable line?*

6. The MHWS is not a fixed stable line and fluctuates from month to month and year to year. There are three main factors at play in this equation. The first is that tides vary in height on a range of cycles from fortnightly to monthly, annually and on timescales of decades.

Secondly, the point a tide reaches on a beach will be determined by the physical characteristics of the foreshore, in particular, the elevation and slope. Sediment movements along and across a shoreline result in fluctuations in the volume of sediment in the foreshore on a weekly, monthly and annual basis. These may be broadly thought of as part of an erosion and accretion cycle and are often driven by weather conditions. The difference between the lowest or most depleted state of the foreshore and the highest point, is known as the 'beach envelope' and it can lead to height variations of 1.0 m or more in a beach at any one point. This height and volume variations alters the horizontal or landward extent to which the MHWS can reach leading to changes in its position throughout the year. Thirdly, sea level rise is causing an on-going annual increase in the height of the MHWS elevation. Long term records from the region dating back to 1890 show that over the past 125 years sea level has been rising at an annual rate of 2.1 mm/yr. In addition, recent measurements of vertical land movements by GNS Science show that the region subsiding tectonically at rates of 1-3 mm/yr, which is effectively leading to an additional rate of relative sea level rise and an annual increase in the elevation of the MHWS.

[5] *Have other councils mapped MHWS? And if so how have they determined it?*

7. Auckland Council and Environment Bay of Plenty have had MHWS mapped for their regions. The work was undertaken by NIWA and was done by calculating the MHWS from long term tidal datasets and plotting this onto a high resolution coastal contour map.

[6] *Are we planning to map MHWS? If so, how will this be done and for what purpose and will this mapping sit outside the regional plan?*

8. We currently have a contact with NIWA to plot the MHWS for the Kāpiti Coast. The aim is to use high resolution LiDAR elevation data and surveyed beach profiles to map a MHWS zone that will encompass the MHWS envelope, taking into account inter-annual tidal cycles and beach volume fluctuations. This is being done with KCDC because there are a large number of consent applications that are received for seawall construction along the Kāpiti Coast and each one requires an individual assessment of the MHWS. Mapping the zone will cut down on the amount of the time that staff and applicants have to spend assessing and agreeing on where the boundary sits. At this stage, it is not thought this information will be incorporated in the PNRP. This is because it will require updating as sea level rises. Updating information in a plan requires a plan change and this is an unnecessarily onerous process. Under the RMA and LGA, local authorities are legally entitled to agree on their administrative boundaries without it needing to be included in their respective plans.
9. We have also defined the MHWS for Titahi Bay. The method used here was to commission a surveyor to profile the beach elevation and then plot the published LINZ MHWS elevation onto the contour map. The MHWS was mapped here for beach management purposes. Both councils agreed to the line and it currently sits outside the PNRP.

[7] *What method was used for determining the CMA boundary for river mouths?*

10. The operative regional coastal plan has defined the CMA and river mouth boundaries for 25 locations around the region. These were defined for management reasons as they are all watercourses in which local authorities regularly undertake activities for flood protection or other reasons. The RMA definition was used as a starting point for these river mouths, but it was not strictly adhered to for a range of river management reasons and in some places the river mouth or CMA boundary has been set along more geographic and management lines. Under the RMA and LGA, local authorities are legally entitled to agree on their

administrative boundaries. For the operative plan this was agreed to by GWRC and the relevant TA in conjunction with DoC.

[8] *How do we define MHWS in those situations when it is required?*

11. The most common reason we are required to define the MHWS is to delineate the administrative boundary for consenting purposes. Common examples are for construction or maintenance of seawall/coastal defence structures, road culvert installation/replacement, boat ramp or jetty maintenance, coastal subdivision and development, residential house construction and river/stream mouth activities such as debris clearance or gravel extraction. The method employed to define the MHWS will depend on the scale of the development and complexity of the consenting requirements. In many instances, a desktop assessment is sufficient, using the published LINZ MHWS heights and plotting that on the LiDAR derived coastal elevation contours. In some cases, this may extend to include ground truthing. In more complex situations or situations where a number of activities are regularly undertaken that require the boundary to be defined, a survey is undertaken of the beach and an exact line is plotted. It is usually accepted that the line is temporal and valid for the purposes of obtaining the consent, but that future consents in the same area will require a resurvey of the mark.