

Lakeside blues – balancing flood protection and property values

People with properties on the shores of Lake Taupo will have a chance to hear how flood-protection measures will affect them shortly after a major flood hazard assessment is released this month.

Jack McConchie from Opus worked with Taupo District Council and Environment Waikato on the assessment and says quantifying the flood hazard on the lake was a unique proposition.

“It is a fascinating body of water,” Dr McConchie says.

“For a start the shoreline is around 700km long and there are major differences between each part of the lake. There are also issues that you don’t get with smaller lakes or with rivers.”

Water levels within the lake are not solely a result of rainfall and runoff. Rather, the water level fluctuates according to the interaction of a number of factors, including rainfall and runoff; lake level management for hydro-power generation; wind generated waves and tectonic deformation of the lake bed and shoreline.

These factors include physical processes that can be modelled, but also a range of human, economic, and regulatory factors, which operate independently.

The flood assessment involved magnitude – frequency analyses of a number of factors.

Implicit in these analyses is the stationarity of data.

This assumes that the same processes and relationships that existed in the past will continue to apply in the future. This has particular implications when considering the long-term effects of land use and climate change, and ground deformation.

The risk of flooding, and the extent and depth of inundation around Lake Taupo is a multi-factor problem. A number of factors combine to form a particular water level, and the same water level can be reached by the coincidence of different combinations of factors.

It is possible to have the same water level with different frequencies, different water levels with the same frequency, and different water levels with different frequencies. The effect of a change in water level at the shore varies with topography, beach profile and material, and the level of capital investment and development.

One issue around Lake Taupo is that the flood assessment impinges on properties that are worth millions of dollars.

“It’s a high-profile lake with valuable properties on the lakeshore, so there is certainly some interest in terms of zoning,” Dr McConchie says.

“Part of the problem is that people are pushing closer and closer to the lakeshore and then the lake decides to reclaim the land that these properties have been built on. Clearing vegetation also has an effect on the lakeshore.”

The lake also has many small beaches, often with limited sediment supply due to upriver development such as forestry or hydro dams. These pocket beaches have tended to erode over the years, raising concerns among some residents.

Also there have been changes in the wave patterns over the years as El Nino/La Nina weather patterns have impacted the lake. Traditionally, the prevailing westerly winds have meant bigger waves on the eastern shore, but in recent years northeasterlies



have seen waves battering previously calm areas like Kuratau and Pukawa.

The initial stage of the assessment is now before the Taupo District Council planners and the focus has moved on to smaller tributaries in the catchment such as the Tongariro and Tauranga-Taupo rivers.

“Apart from the technical issues involved in the assessment there are also people issues. People don’t want devaluing land-use changes in the catchment and the big issue is how do you manage to strike a balance. Identifying the problem is only the first step.”

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