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Disturbance in the North Island of New Zealand: A case study using floodplain cores from the Coromandel to determine anthropogenic disturbance

A thesis presented in partial fulfilment of the requirements for the degree of

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in Geography

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Kuaotunu Stream with the surrounding Kuaotunu floodplain.

Photographer E.Fox, 25-03-2014.

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Abstract

It is well documented that following human occupation of a region, the surrounding environment may undergo drastic changes through vegetation pattern alterations, displacement of fauna, alteration of sedimentation and fluvial regimes, and changes to the composition of the underlying material. Many case studies of anthropogenic disturbance have been conducted in New Zealand. One of the main outcomes of this research is to collate, contrast and compare this wealth of case studies to look for any underlying trends in timing, distribution and magnitude of disturbance nationwide. This thesis focusses on late Holocene records from the North Island, and compared the history of disturbance with that from the South Island (as per McWethy et al. 2010). Based on the combination of palynology, sedimentology and geochemistry, this review demonstrates the pace of disturbance observed in the North Island was very rapid following occupation, a trend also established in the South Island.

The other main outcome of this research is to add to the knowledge base of North Island disturbance history, through development of a landscape disturbance history in the Coromandel, using floodplain cores from the Paeroa and Kuaotunu areas. Sediment logging and subsequent XRF-geochemical analysis performed on these cores revealed a 'mining layer' that was used as a baseline for mining disturbance in this environment. This layer is interpreted as when European activities began disturbing the environment. Cores extracted from the Paeroa area indicated that the sedimentation rates in the floodplain had increased more than 15-fold since human occupation. Significant rises in the amount of Arsenic and Lead contained within the sediment were also detected. Cores from the Kuaotunu floodplain also showed changes in geochemistry that coincided with historic mining in the area, but reverted back to near pre-mining levels following the initial disturbance. These results suggest that factors such as catchment characteristics and degree of disturbance in an area affect the extent of impact on a site, which may have implications for future management of post mining sites. XRF analysis is a relatively underutilized proxy in New Zealand. It, in conjunction with Particle Size Analysis, has proved valuable in this study and

are recommended for application in future New Zealand environmental reconstruction-focused research.

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