NEW ZEALAND
ARCHAEOLOGICAL
ASSOCIATION

ARCHAEOLOGY IN NEW ZEALAND

DAMAGE ASSESSMENT OF WAIHOU RIVER SITES

CAROLINE PHILLIPS AND HARRY ALLEN
DEPARTMENT OF ANTHROPOLOGY,
UNIVERSITY OF AUCKLAND

The low-lying Hauraki Plain through which the Waihou River runs is an uncommon type of environment in New Zealand (Figure 1). It required a particular set of strategies by pre-European Maori in order to settle it. Its very nature has also resulted in particular adjustments by European occupants, especially in this century. These adjustments have had a very significant, and serious, impact on the earlier settlements.

The majority of the archaeological sites along the lower Waihou River between Paeroa and its mouth, just south of Thames, as well as those along the banks of its tributaries, have been damaged or destroyed by the combined effects of flood protection, farming practices and building.

Archaeological site surveys and information from the Maori Land Court records indicate that there were more than 238 Maori settlements on the flat lands bordering the Waihou River and the eastern tributaries downstream of the Ohinemuri junction. It is highly likely that there were many more sites, unrecorded by archaeology or historical documents, some of which would have been damaged or destroyed and some of which, hidden under silt, are yet to be rediscovered.

This paper discusses these various impacts on the Waihou settlements and suggests strongly that some effort be made to prevent the destruction of the remaining sites. In particular, where there are cumulative effects from development projects, such as flood control works, conservation strategies and archaeological heritage management should address the entire area affected rather than decision making on a piecemeal, site-by-site basis.

Authors' note: this paper was first written in 1993, during the *Taskforce Green/University of Auckland Archaeological Project* (Allen et al. 1993). For various reasons it was not published at the time, but the methodology used is still very relevant. Moreover it provides a baseline for a reassessment of the Waihou sites.

Flood Protection

Flood protection works began in 1912 after the devastating floods of 1908, and especially those of 1910. The first scheme involved the construction of a stopbank bordering the Waihou River and the straightening of certain bends. Two of the cuts were in the vicinity of Paeroa, in an endeavour to move the junction of the Waihou and Ohinemuri further downstream and hasten the flow of the waters towards the coast (see arrows in Figure 1).

Further work throughout the middle of the twentieth century has elaborated on the earlier constructions. Three of the smaller eastern tributaries were straightened (Matatoki, Omahu and Kurere), joining existing drainage systems (note the difference between their present courses shown in Figure 1 and the former courses in Figures 2 and 3). A major cut was also put in at the mouth of the Hikutaia Stream. Stopbanks were also erected along the other six tributaries. The method of construction of these earlier stopbanks was found to be faulty and failed over time, with the result that there was continuing flooding of farmland and the townships in the region.

The Waihou Valley Scheme was devised in 1965 by the Hauraki Catchment Board (subsequently amalgamated into the Waikato Regional Council, now Environment Waikato) and commenced work in 1972.[1] The devastating floods of 1981 hastened the work. These flood protection practices are far more extensive and, therefore, far more destructive than the preceding ones. Natural variations in the local environment have not only affected the nature and location of Maori settlements, but also the methods of stopbank and drainage work undertaken by Environment Waikato.

The environmental sections include the northern, middle and southern reaches of the Waihou River and, finally, the major eastern tributaries (Figure 1). Each of these is discussed separately below. It should be noted that the southern reach, which lies between Te Aroha and Paeroa, has not been investigated archaeologically.[2]

The Northern Reach

This 20 km long segment of the Waihou River is located downstream of the Hikutaia junction (Figure 2). In this lower reach the river has meandered over time creating a channel between 500–1000 m wide. The adjacent land is extremely flat, the majority being less than 2 m above sea level (Figure 1), and prior to protection was prone to flooding during the monthly spring tides and after prolonged rains.

[1] The Waihou Valley Scheme flood protection works were completed in 1995 (Watton 1995).

[2] Flood protection works had not begun here when this paper was written in 1993.

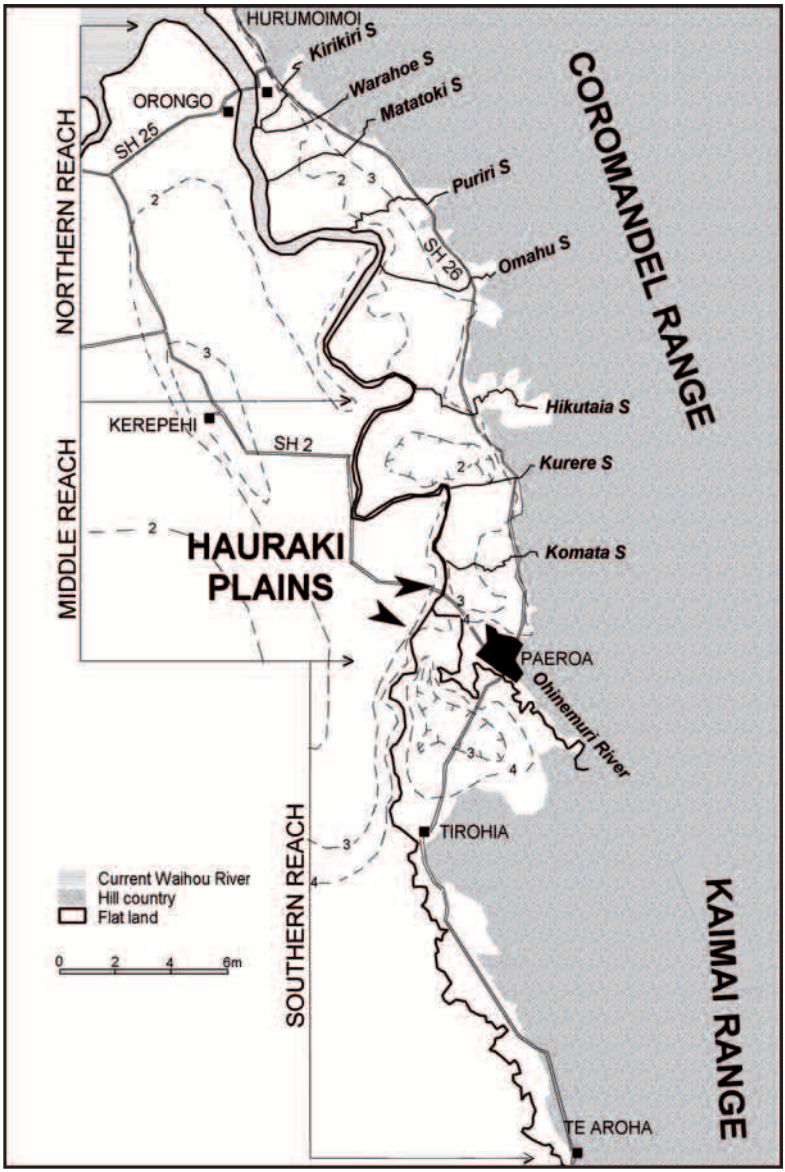


Figure 1. Location lower Waihou River, showing sections of the river, contours on the plains, main roads and placenames mentioned in the text. Arrows indicate the straightened sections of the river near Paeroa.

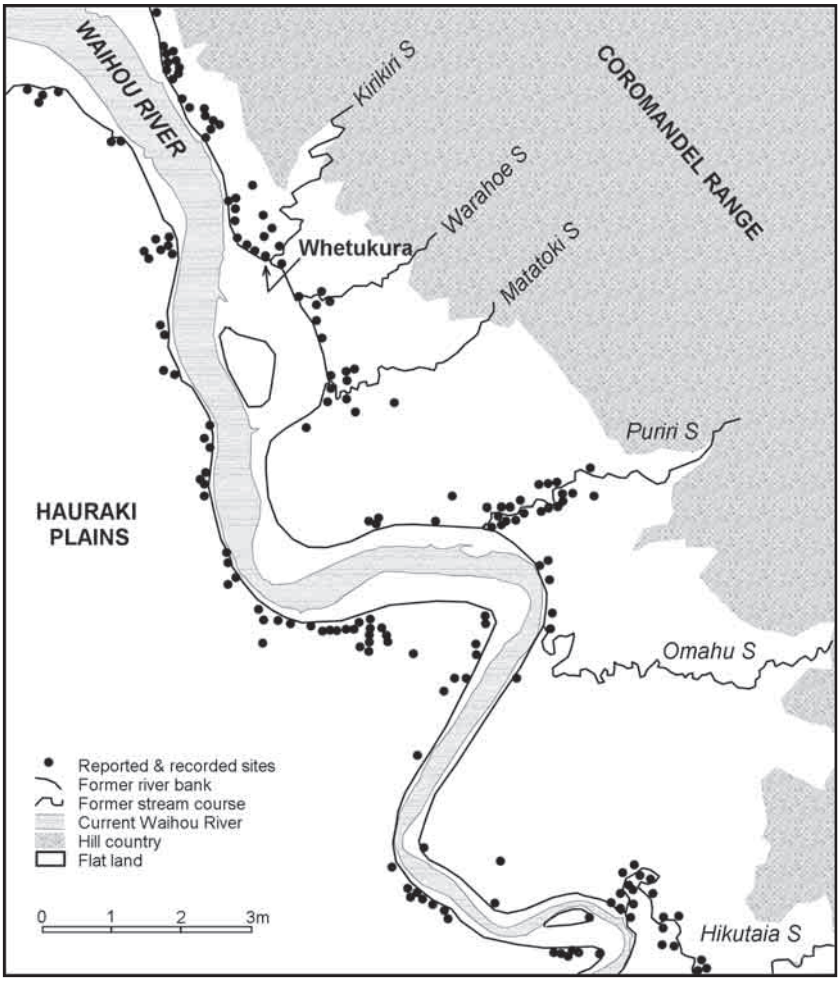


Figure 2. Northern reach of Waihou River and eastern tributaries, showing the reported and recorded archaeological sites, with the former river bank and current course of the river.

The Maori settlements in this area were concentrated on old beach ridges and along small streams near their junction with the Waihou. The majority of these sites were artificially built up by the use of sub-fossil shell (found locally at Hurumoimoi and Orongo) and midden material (also composed largely of shell). The extensive use of shell has meant that the settle-

ments are very visible archaeologically, showing up readily in drain sections and as crop marks, and easily located by a hand-held metal probe. One example is the shell-rich site of Whetukura Pa, which has a drain and stopbank cut through it (Figure 4, see location Figure 2).

Although the river was very wide at the time of settlement it has silted up during the last 150 years, therefore the stopbanks have largely been constructed on reclaimed land rather than the original riverbank. In fact, the earlier stopbanks were put along the river edge in order to allow the development of pasture on the reclaimed mudflats behind, whereas the current stopbank is constructed over 50 m back from the river bank (Figure 5a). As the silts along the banks were not of good enough quality for stopbank construction most of the soil has been brought in from elsewhere or dredged from the adjacent stream beds. Thus, of the 129 sites reported in this reach, only 25 have been affected by flood protection works (Table 1).

The Middle Reach

This 18 km long central stretch extends between the Ohinemuri and Hikutaia junctions (Figure 3). The Waihou River flows though a narrower channel, varying between 70 and 150 m wide. It is bordered by natural levees averaging 100 m wide which are slightly elevated above the surrounding swampland.

The Maori settlements are generally located on these sandy levees. Considerably less shell was used in the construction of the sites in this reach, making them much harder to locate archaeologically. The previous flood protection work utilised much of the silt from the levees to construct the stopbank and in doing so destroyed, or severely damaged many of these river bank sites. Therefore, the main source of information for settlements in this area has had to come from the Maori Land Court records.

The current flood protection scheme in this reach has involved creating a graded berm or floodway between the river and the stopbanks, new higher stopbanks, and toe drains (Figure 5b). These developments have effectively removed a 150 m wide strip to a depth of 2 m along the river bank (compared to the previous 50 m, or narrower, strip) thereby destroying most of the sites located along the natural levees. Thus, of the 45 known settlements in this reach, more than 26 have been destroyed and a further 10 have been severely damaged (Table 1).

The Southern Reach

The 34 km stretch between the junction with the Ohinemuri River and the township of Te Aroha is similar to the middle reach, however, the Waihou

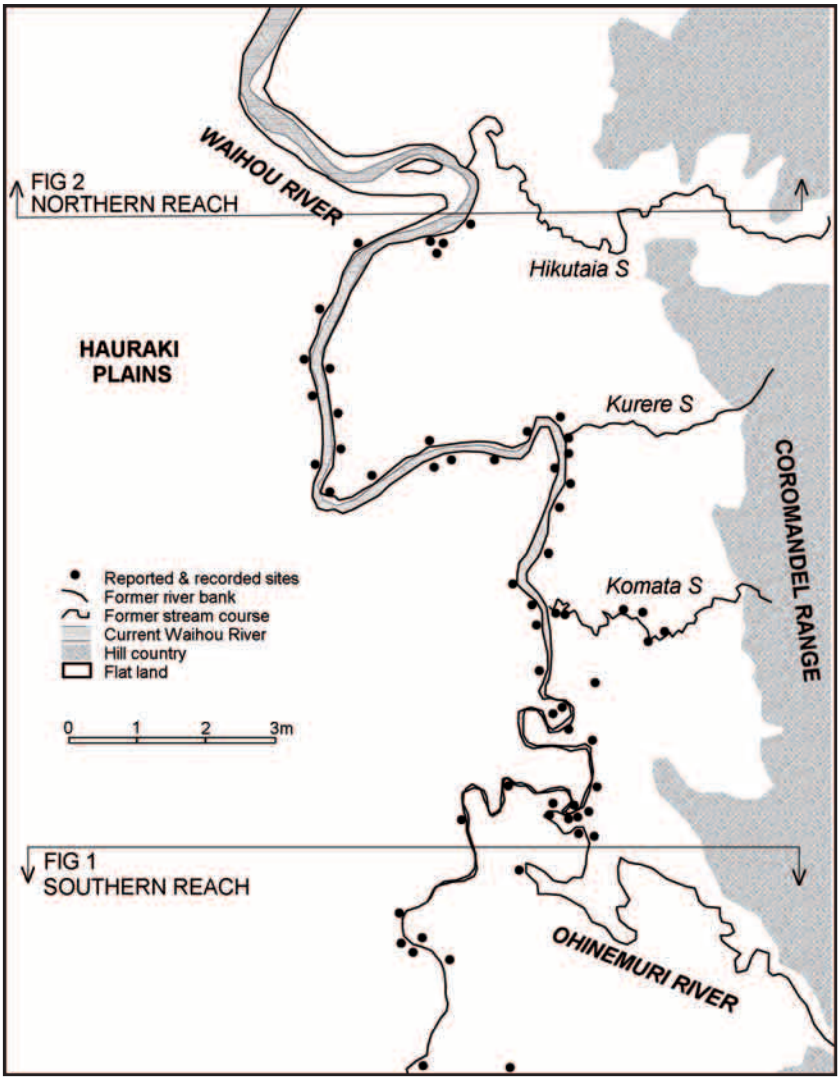


Figure 3. Middle reach of Waihou River and eastern tributaries, showing the reported and recorded archaeological sites, with the former river bank and current course of the river.

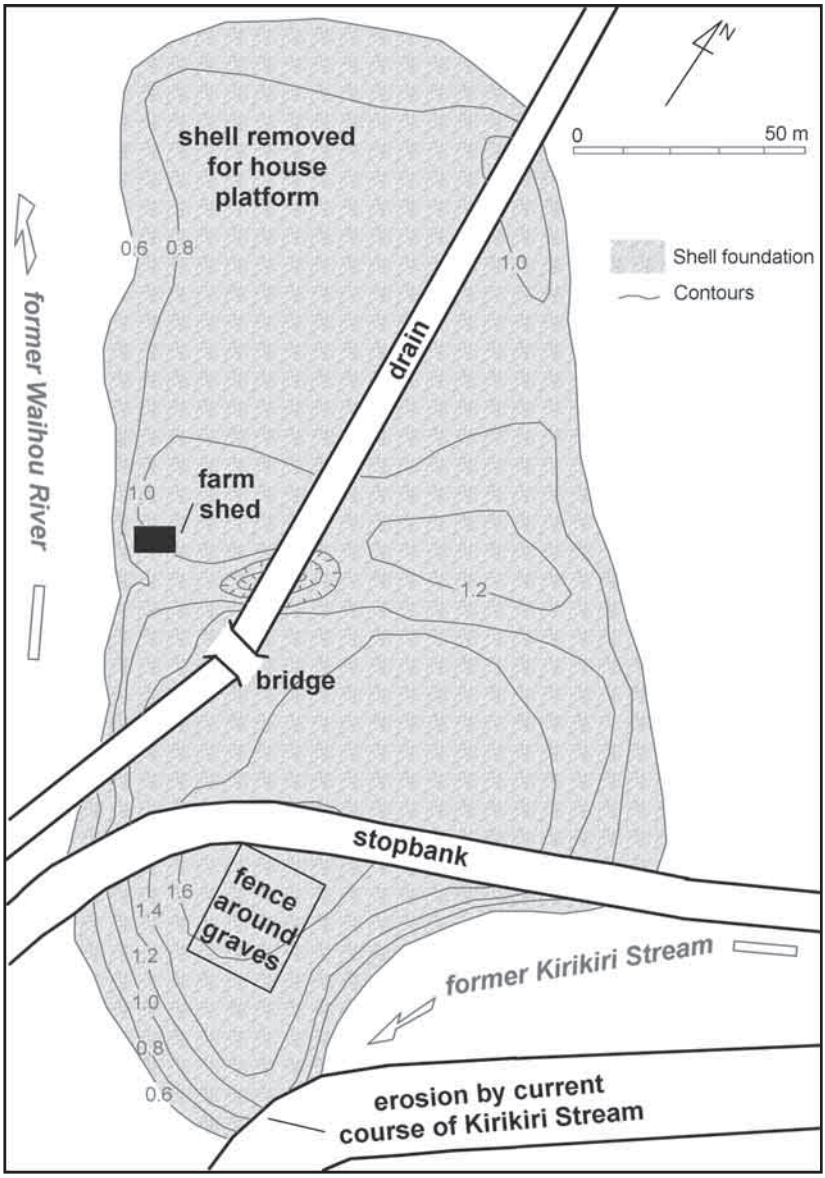


Figure 4. Contour map of Whetukura pa, Kirikiri Stream, showing damage from stopbank, drain, farm shed and shell quarrying (from Allen et al. 1994).

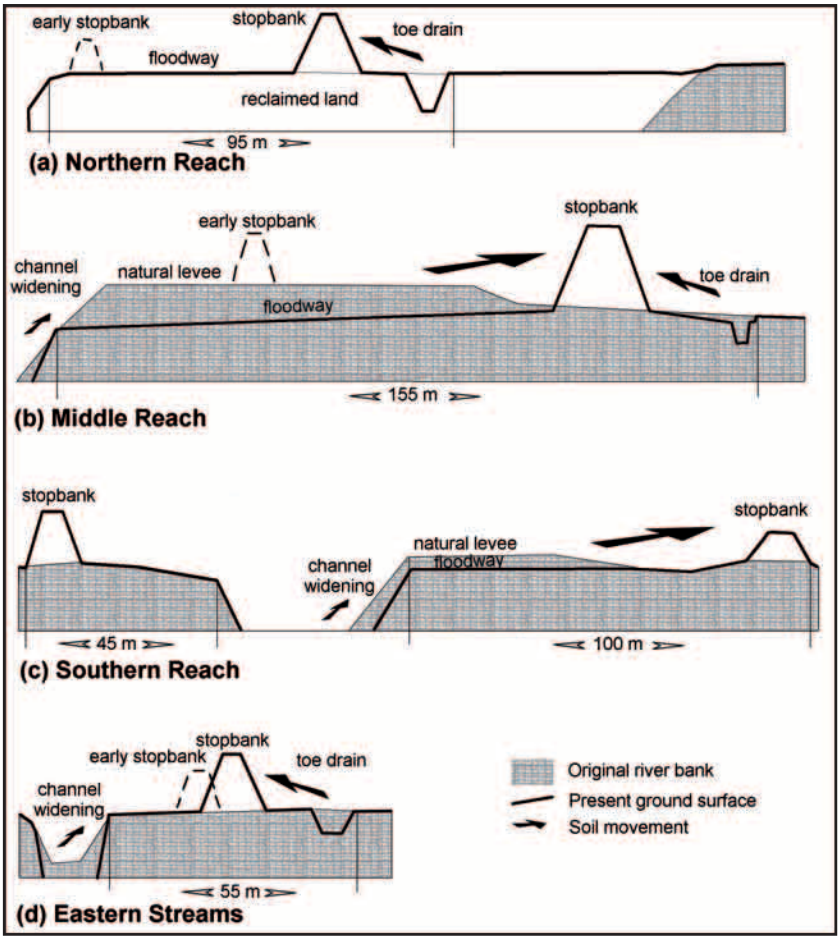


Figure 5. Profiles showing flood protection techniques in various parts of the Waihou River and eastern tributaries.

is narrower, being only 30–40 m wide (Figure 1). The river banks are more elevated, being 4 m above sea level at Paeroa, 5 m at Tirohia and rising to 10 m at Te Aroha.

The river is again bordered by narrow levees, which probably were used for Maori settlement. However, this stretch has not been thoroughly investigated archaeologically, or researched historically, so the numbers of past settlements are unknown. In this reach the sites are even harder to locate by

archaeological survey, as they contain very little shell. It is thought that research of the Maori Land Court Records and other historic maps is probably the only effective means of locating settlements without excavation. In fact, one historic map (McKay 1981) does indicate the presence of more than 20 settlements in this reach (those sites that are known within the southern area shown in Figure 3 are indicated).

Flood protection between Tirohia and Ohinemuri had involved work very similar to that in the middle section. South of Tirohia the work involves channel widening at slow bends, raising and extending the primary stopbank on the west bank, creating stopbank sections to join areas of higher land on the east bank, and lowering of the levees by as much as 1 m in some places to create a floodway and provide soil for the stopbanks (Figure 5c). It is this last work which may severely affect settlements located on the levees.

The Eastern Tributaries

The major tributaries that flow from the Coromandel and Kaimai Ranges to the east have also been affected by the flood protection works. The main streams affected, from north to south, are the Kirkiri, Warahoe, Puriri, Hikutaia, Komata and Ohinemuri (Figures 2 and 3).

The settlements along the four northern streams are easier to locate, owing to the use of shell fill. The sites tend to be located on the stream banks and are more frequent near the junction with the Waihou River.

The flood protection works have involved the straightening out of several bends, especially at the junction with the Waihou, and the construction of stopbanks. Current work includes the widening of the stream channels (sometimes the spoil is deposited on the stopbank), moving of the stopbanks further inland, and the creation of floodways and toe drains (Figure 5d). The current work affects some 50 m either side of the original stream bank, whereas the earlier work affected a 25–30 m wide strip.

Approximately 64 settlements are known to have been located along these six streams, of these two thirds have been damaged or destroyed (Table 1) and further work is planned in the next year which may affect others.

As stated above, the other major streams (Matatoki, Omahu and Kurere) were fed into canals and extensive drainage systems early on and some damage must have occurred. Many of these streams have not been thoroughly investigated archaeologically or researched historically, so the numbers of past settlements is probably much greater than those that are currently known.

Farming Practices

The wet conditions on the heavy silty-clay, low-lying soils have resulted in the development of extensive drainage systems and particular farming techniques. The result is that several sites have been cut by the many drains that cross the land. Hump and hollow drainage, which is very common in the northern reach and adjacent stream areas, is the single most destructive method (Figure 6). In some cases the difference between the top of the hump and the bottom of the hollow is 1 m in depth. Mole drainage has sliced through many settlement deposits and the practice of wintering of stock on the shell-filled sites has destroyed the upper layers. The shell from some sites has also been quarried to make farm tracks.

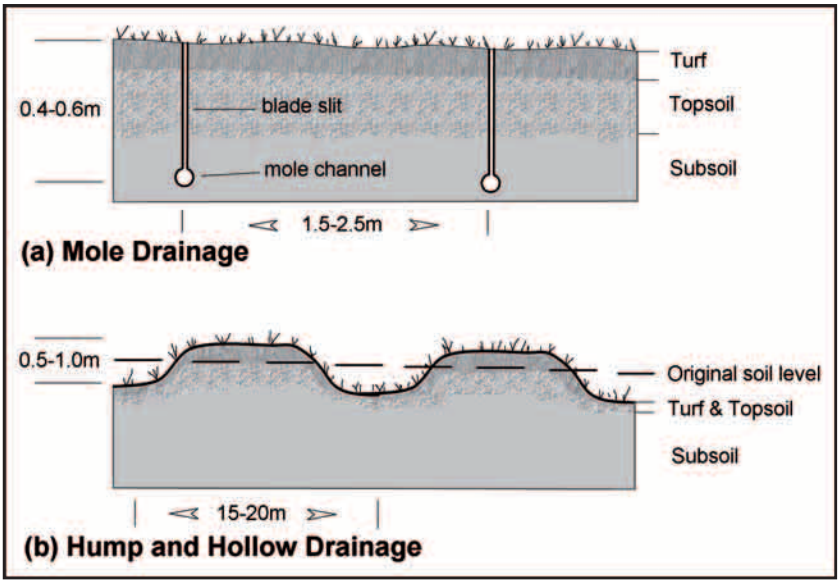
Farming practices have affected 58 sites in the northern reach, two in the middle reach and 17 along the streams (Table 1).

Buildings

In this low-lying landscape there is a greater than usual correlation of buildings (houses, barns and factories) with old Maori settlements. This is especially so in the northern reach and along the adjacent streams where the artificially raised shell-filled pa were especially popular (Figure 4). Quarrying of shell and sandy fill for building foundations elsewhere has also affected all or parts of several sites.

Table 1. Activities which have destroyed and damaged archaeological sites along the lower Waihou River. Italics = sites damaged as a percentage of the total number in the particular area.

		Unaffected		Damaged		Destroyed		Total
Northern		40	*31*	79	*61*	10	*8*	129
Middle		6	*13*	12	*27*	27	*60*	45
Stream		20	*31*	35	*55*	9	*14*	64
Total		66	*28*	126	*53*	46	*19*	238
		Flood protection		Farming & Roading		Building		Total
Northern	damaged	20	*15.5*	53	*41.1*	6	*4.7*	79
	destroyed	5	*3.9*	5	*3.9*	0	*0.0*	10
Middle	damaged	10	*22.2*	2	*4.4*	0	*0.0*	12
	destroyed	26	*57.8*	0	*0.0*	1	*2.2*	27
Stream	damaged	15	*23.4*	*15*	*23.4*	5	*7.8*	35
	destroyed	7	*10.9*	2	*3.1*	0	*0.0*	9
Total		83	*34.9*	77	*32.4*	12	*5.0*	172



A mole plough has a long vertical blade with a torpedo like plug at the bottom; it is drawn through the soil by the plough and forms a circular channel (mole channel/drain) which the water will run down, while the blade cuts through the soil profile above.
Hump and hollow drainage is where major land reshaping is undertaken over the entire paddock using a mechanical excavator. Parallel ridges are formed, with even sides sloping to shallow drains in between.

Figure 6. Diagrams of the effects of mole drainage and hump and hollow drainage.

At present there are at least 11 sites on which buildings are located and one is known to have been destroyed by quarrying (Figure 6). Many other sites may have been the locations for farmhouses in the past, but with more effective drainage and the focus shifting away from the river, houses are now being located closer to the main roads.

Conclusion

It has been shown that nearly three quarters of the pre-European Maori settlements have been severely damaged or destroyed by the combined effects of flood protection, farming and building. An estimate of the number of damaged and destroyed sites has been given. Much of this destruction has occurred despite the existence of the archaeological provisions of the Historic Places Act.

It should be noted that the archaeological survey of the region is not complete, neither is the historical research. Both types of investigation would yield further evidence of past occupation. In several areas increased silting during the last 150 years has buried many sites which would only be revealed by excavation. An example of this is shown along the Puriri Stream where a previous surface survey recorded 10 sites, while toe-drain construction revealed a further nine settlements (Bedford and Allen 1992).

Acknowledgements

Thanks to Environment Waikato, especially Kevin Campbell of Paeroa, Scott Fowlds and Owen Passau of Te Aroha, and Ian Sara and Peter Cullen of Kerepehi. Thanks to members of the Taskforce Green/University of Auckland archaeological group Apanui Skipper, Justin Te Moananui-Waikato, Craig Reidy and Bella Cook.

References

Allen, H., C.A. Phillips, A. Skipper, J. Te Moananui-Waikato, C. Reidy and B. Cook 1994. Taskforce Green/University of Auckland archaeological project, Waihou River (1993). Department of Anthropology, University of Auckland.

Best, S. 1979. Site survey report: Lower Waihou River, Hauraki Plains. Unpubublished report to the New Zealand Historic Places Trust, Wellington.

Bedford, S. and H. Allen 1992. Report on the 1991 and 1992 investigations on the Puriri River. Auckland Uniservices Ltd, University of Auckland.

Crosby, A. and S. Loughlin 1991. Site survey report: west bank of the lower Waihou River. Unpublished report to the New Zealand Historic Places Trust, Wellington.

McKay, J. 1871. Sketch map of the Tauranga, Thames and Waikato districts. Scale 1:200 000. (Refers to NZ Land Court claim no. 2754). Alexander Turnbull Library, Ref. 832.1gbbd. 1871/Acc. 1,741, Wellington

Watton, G. 1995. *Taming the Waihou: The Story of the Waihou Valley Catchment Flood Protection and Erosion Control Scheme.* Waikato Regional Council, Hamilton.