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A WAKA TIWAI FROM THE WAIKATO RIVER

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Introduction

The discovery of a canoe submerged in the Waikato River was recently brought to the attention of staff at the Waikato Museum. It was first discovered by commercial divers (Diver Services Limited) in February 2002 while surveying pipelines across the Waikato River in the vicinity of the Hamilton City Council water treatment facility at Waiora Road (Figure 1). With one end protruding about a metre from a soft sediment bank the divers were uncertain as to what it might represent at the time, but recognised the shaped end as being a boat of some description. The site was left undisturbed but revisited again approximately a year later while checking the storm-water discharges. It was noted that the object had been further exposed and now protruded approximately 1.5 m from the bank. A subsequent visit in 2004 revealed further scouring with approximately 2 m exposed. Earlier this year when checking the intake for the pipelines for the Hamilton Gardens the original site was revisited again, but the canoe was no longer in its original location. The missing section was eventually relocated further down stream, having been washed out of its original matrix and come to rest on the river bed

An attempt was made to temporarily secure the remains by shifting them away from the main current to the side of the river, in a slight eddy, under the low hanging and fallen branches and roots of trees growing on the banks of the river. The timbers were anchored by placing stones approximately 300 mm in diameter along the length of the timber to evenly disperse the weight. The canoe was at this point temporarily removed from the water and photographed before being replaced. A second, shorter section was found in the same vicinity shortly after this, and like the longer section was weighted with rocks near the side of the river to prevent its drifting away.

The Waikato Museum was contacted around this time, and arrangements were made to have an archaeological assessment undertaken to determine whether

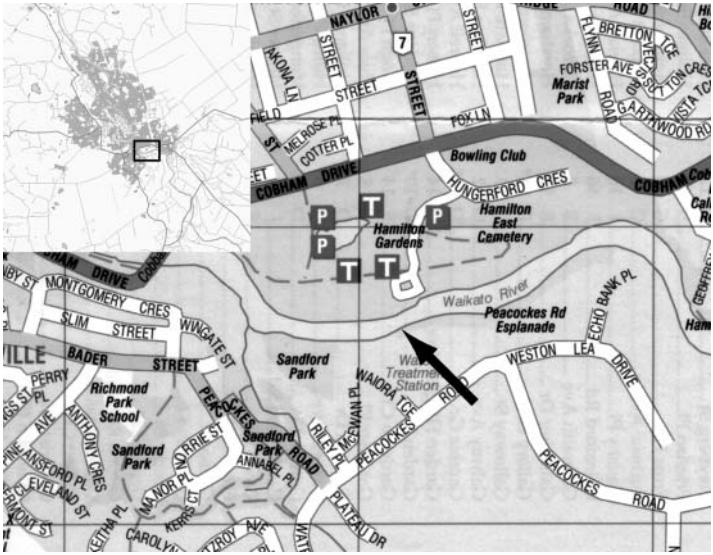

Figure 1. Site location, Hamilton.

it was in fact a Maori canoe. The site visit for this assessment was carried out on 20 April 2005.

Environment

At the time of the site visit water visibility was between 1 and 2 m. The sediment in the river considerably reduces visibility at any distance but during the day the shallow water depth allows sufficient light through to see clearly at close distance and work without serious impediment.

Like any river, the water volume and current in the Waikato fluctuates at different times of year depending on rainfall. At the time of the site visit water flow was estimated to be approximately 140 CuMSecs (cubic metres per second) resulting in a fairly swift current in the centre of the river but only a slight current towards the banks on either side (Tony Thew pers. comm.). The strength of the current at this point in the river depends on the output from the Karapiro power station located upstream. The power station routinely runs a single generator, resulting in a flow similar to that encountered. However, at times of peak generation this can be increased to 350–360 CuMSecs. During these periods work in the river becomes impossible and the increased water volume and current increases sediment erosion and scouring. Unsecured objects in the river are likely to be washed away.

Methods of recording

Recording of the remains was constrained by the underwater environment and methods of recording were selected that reflected the conditions. The two pieces were at shallow depth (0.5–2.0 m), but access to the fabric in some places was hindered both by the rocks used to temporarily anchor the timbers and by the branches and roots of trees in the river. Consequently, the accuracy of measurements may be slightly impaired, and subsequently improved upon by more detailed recording in a laboratory or open air environment.

Likewise, photography of the fabric was limited by the underwater environment. Water clarity meant that the camera lens had to be held no more than 0.5 m from the subject, limiting the amount that could be included in each frame. The recording was also undertaken in a mild river current that made it difficult for the diver to remain steady while taking the photograph. The exception is, of course, Figure 2 which was taken at an earlier date, when the canoe was first moved to its present location at the side of the river.

Figure 2. Longer section of hull temporarily removed from the river (photo Diver Services Ltd.).

Dimensions of timbers were firstly taken using a baseline and offset method at 0.5 m intervals along the centreline of each hull section. Detail between these measurements was sketched in and cross sections estimated by measuring from the lowest part of the depression along the centreline to the relative height of the gunwales (Figure 3). A split in the timber near the end of the longer section allowed the thickness of the keel to be determined at this point.

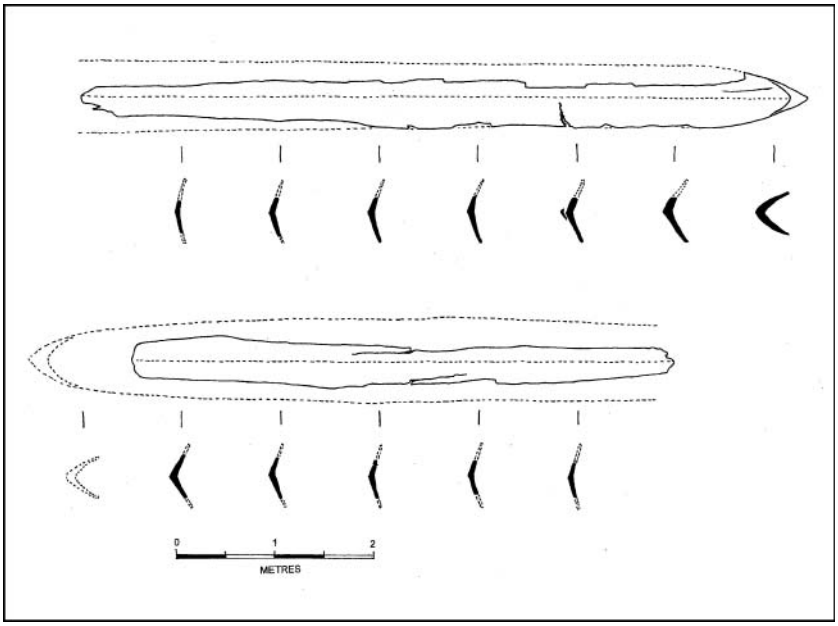

Figure 3. Measured drawing of canoe remnants with suggested reconstruction.

Artefact Description and Ethnographic Comparisons

The find appears to be a waka tiwai or river canoe as described by Elsdon Best (1925: 183–185). Best (1925: 240) describes the waka tiwai as:

> Plain dugout hulls, usually in one piece, and lacking top-strakes, thwarts, floor-grating, and adornment. Small vessels used for many purposes. The smaller forms were known as *koki*, *kopapa*, *korea*, &c.

This is in contrast to the more elaborately ornamented waka taua (war canoe) or the waka tete (fishing canoe), usually fitted with top-strakes, thwarts and floor grating:

> The *tiwai* (*waka tiwai*) was a smaller canoe than the *tete*, and was not fitted with topsides. Usually a *tiwai* was made in one piece. They were river canoes, but might occasionally be used for sea fishing near the land, though not for deep sea fishing. Such a craft might contain from five to ten persons: thus they were of different sizes. These vessels were not provided with thwarts, and were not ornamented in any way… The

> name *tiwai* in itself denotes the lack of accessories, and implies a plain dugout hull. (Best 1925:183)

Best goes on to describe a 31 ft (9.5 m) waka tiwai from Wellington:

> This small vessel is remarkable for its sheer, or curvature to prow and stern, which amounts to 11½ in. – that is to say, a line drawn taut from prow to stern is 11½ in. above the sides of the canoe in the middle. The widest part is not in the middle, but nearer the stern, where it is 31 in. wide, at 20 ft from the prow. The lower parts of this shallow hull are 1½ in. thick; the gunwales are 1 in. in thickness. The keel is sharp at both ends, but flattens towards the middle. (Best 1925: 185)

Waka tiwai are also described by Haddon and Hornell (1936: 215):

> A few river canoes (waka tiwai) survive to the present day. They are two-ended dugout hulls, the bottom round, the ends pointed, and with little sheer. There are no added pieces of any kind; even thwarts are wanting.

The remnant fragments of the Waikato waka closely match these descriptions. The remains discovered so far comprise two lengths of dugout hull. The longer piece comprises a 7.37 m section of one end of the canoe[1] extending towards the mid section (see Figures 2, 4–7). The V shaped cross section on the longer section is considerably more pronounced towards the end where it tapers to a point, and flatter towards the mid-section. On the basis of its shallower draft, the smaller 5.4 m section appears to comprise another piece of mid-section (see Figures 8–9), although the curvature of the timber and slightly more pronounced keel at one end suggest this section was also nearing towards one end of the canoe.

The shallow curvature towards the middle of the waka tiwai, and its inherent precariousness and instability was noted by Best (1925: 183), who quotes Wakefield's description of such a canoe in Wellington:

> Several canoes came off… One of them, a low skimming-dish thing without top-planks, filled and turned over, ducking six or seven natives, including a woman, who were passengers. They seemed to be perfectly used to such accidents, and some hung on to the bottom of the canoe while the others swam with one hand and gathered the paddles which had gone adrift.

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[1] This section may be either the prow or the stern of the canoe, but on the basis of what remains of this section it is difficult to tell (see explanation below).

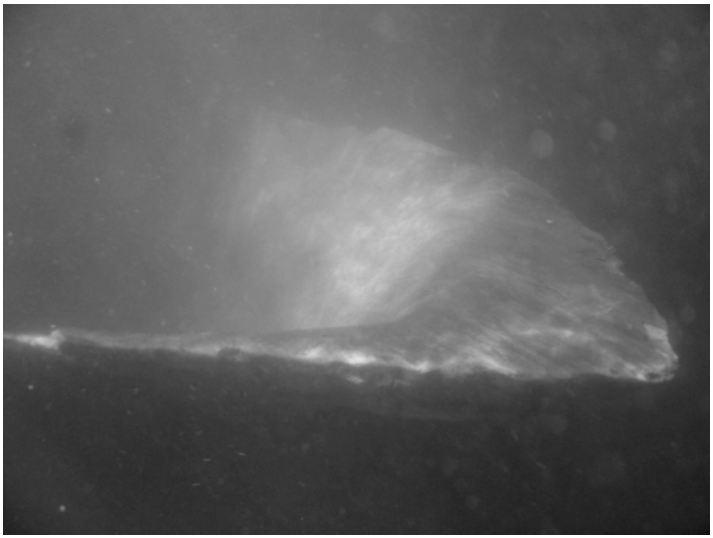

Figure 4. Canoe 'prow' as viewed from 'starboard' side.

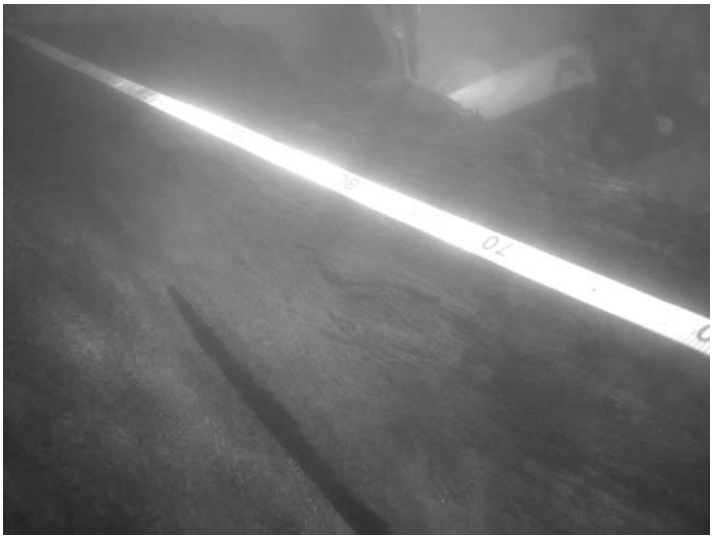

Figure 5. Hull section near 'prow' showing split near keel (photo Diver Services Ltd.).

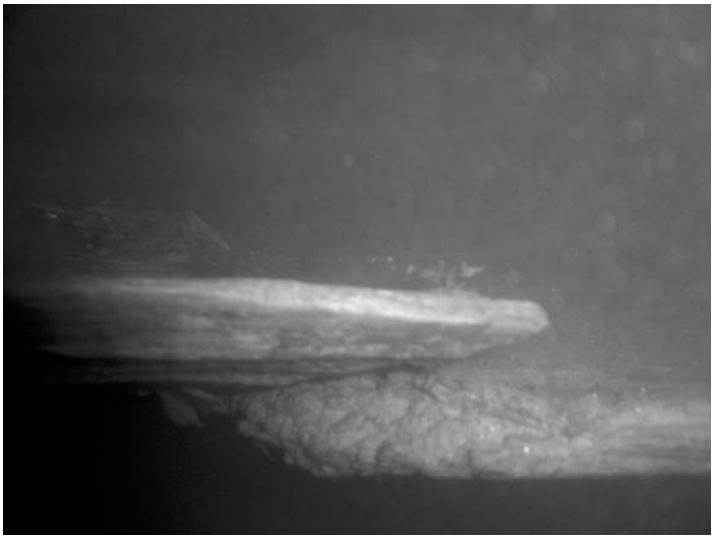

Figure 6. Hull fracture on 'starboard' side of larger fragment.

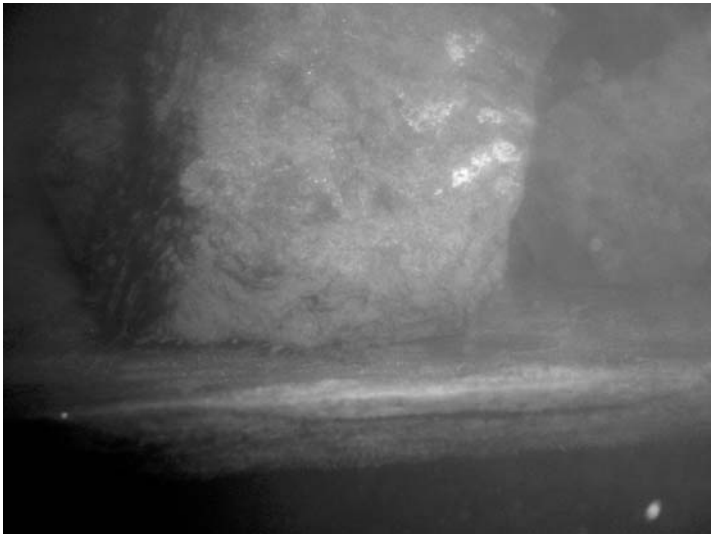

Figure 7. Temporary anchoring of timbers in river.

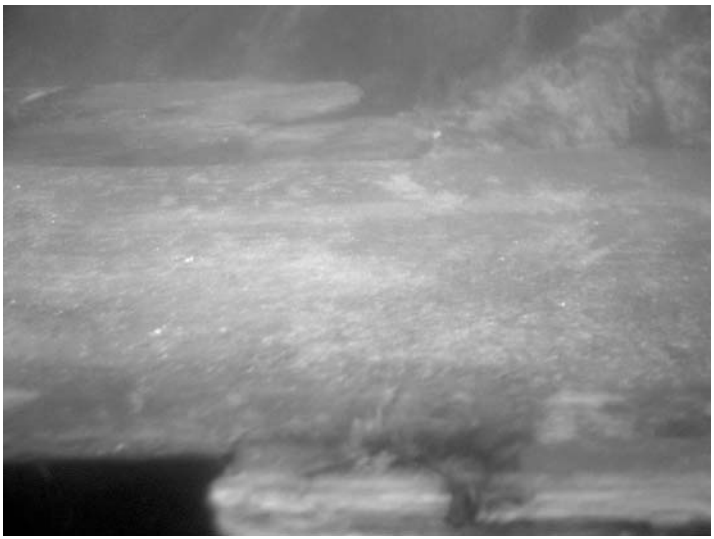

Figure 8. Shorter hull section near centre.

Figure 9. Shorter hull section towards 'stern.'

However, this unreliability would seem to be a matter of opinion, as demonstrated by James Cowan's 1930 recollection of a waka tiwai voyage on the Mokau River (quoted in Nelson 1991: 28):

> No Pakeha-built craft would have stood that rough usage on the rapids and along the snags and shoals, but our strong and solid and rather heavy waka was just the thing for such an expedition along an uncleared bush waterway.

The tip of the canoe on the larger section is well preserved and intact on both sides for approximately 400 mm on either side. From this point one side of the canoe has been broken off approximately 100–150 mm from the centreline or keel. The timber is thicker towards the centreline of the keel and tapers towards the gunwales on the more intact side. Neither piece exhibits evidence of holes drilled in the sides or gunwales to accommodate lashings for attaching top-strakes, although beyond the intact tip where each tapers toward the outer edge it has become weaker and much of the original edge has broken off. If the canoe did represent either a waka tete or a waka taua one would expect to see lashing holes in better preserved sections, as has been noted on other archaeological canoe finds (e.g., Cassels 1979: 89–106; Gillies and Skerrett 1996: 131–137; Irwin 2004: 96–104).

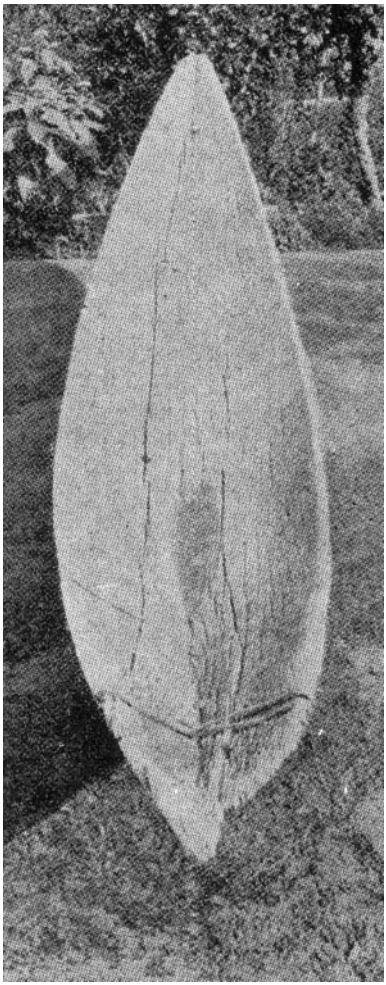

Figure 10. Small canoe from Wellington (Best 1925: 181).

If the two pieces represent a single canoe it would be considerably larger than the Wellington waka tiwai described by Best, perhaps between 15–18 m (45–50 ft) in total length. This is longer than the average reported, but fits with Best's general description of river canoes from the Wanganui River, ranging

from 34–61 ft (10.4–18.6 m) (Best 1925: 180). Some of these, however, were fitted out as waka tete, or fishing canoes, with top-strakes, thwarts and floor grating. Both Buck (1950: 203) and Nelson (1991: 28–29) report that 15m (45 ft) was a common length for the waka tete and that waka tiwai were smaller than this, being on average about 9 m in length. Even if the finds do represent more

Figure 11. Wanganui River canoes (Best 1925: 184).

Figure 12. Small river canoe (Best 1925: 184).

than one canoe, the longer fragment, at nearly 7.4 m, is still likely to represent a hull well in excess of 9 m to allow for a roughly symmetrical shape (refer Figures 10–12) and for its termination at the opposite end. In absence of other pieces to support the notion of multiple canoes deposited at this site it is tentatively proposed that the two pieces comprise a single hull that is significantly larger than previously documented waka tiwai. However, a longer hull may have had implications for the negotiation of river hazards further upstream.

On the basis of the remaining portions it is difficult to determine the prow or stern of the canoe. Best's description of the Wellington waka tiwai suggests that some of these canoes may have been slightly wider nearer the stern. If the Waikato waka tiwai did share this hull form then it is likely that the intact end represents the prow of the canoe. The 'starboard'[2] gunwale towards the 'prow' appears to be mostly intact for approximately 4 m and does not appear noticeably wider towards this end. The shorter 5.4 m section of hull appears to be broken at the gunwales on both sides, so it is unknown whether the hull was wider at this point or not. The absence of the 'stern' also hinders interpretation in this respect.

Inspection of the hull revealed damage in some areas. Approximately 2.5 m down the 'starboard' side of the longer section is a tear which extends towards the centreline of the hull almost to the keel (see Figures 2 and 6). The hull appears especially weak at this point and is in danger of separating completely. A large splinter is also separating from the keel at this point further weakening the hull. The nature of the tear suggests that this damage may have occurred subsequent to deposition, possibly as recently as when the canoe was exposed to the forces of the river current as it was being washed out of the bank.

Within a metre of the 'prow' of the longer section is a 0.5 m long split in the timber near the keel (see Figure 5). This is more likely to have occurred prior to deposition since water-logged wood is likely to expand rather than contract and splitting is more likely to occur when the wood is drying out. This split may even have been a possible reason for abandonment (although such splitting would have been easily mended by plugging the hole with raupo down, Best 1925: 185–186). On the shorter section of canoe there are notable splits approximately mid-way along the length on either side of the keel which join with the outer edges where they have broken off.

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[2] Note: use of the terms 'port' and 'starboard' are dependent on determining the prow and stern of the vessel, so for ease of reference it is therefore assumed from this point, that the intact end is the prow of the vessel.

During the recording a piece of wood was unintentionally separated from the longer section of canoe near the prow. This was taken as a sample to the Auckland University wet wood conservator and identified as totara (*Podocarpus totara*) (Dilys Johns pers. comm.).

Historical Context

The Maori waka was in use up until the early 20th century, playing an important role in food resource gathering, warfare and transportation in Maori society. Smaller forms such as the tiwai were particularly useful for river transport, able to be poled upsteam and through rapids and then paddled back downstream. They also effectively served the role of bridges for crossing rivers, allowing cultivation on both sides of large rivers (Buck 1950: 209). Following the arrival of Europeans waka tete and tiwai also proved important in assisting the provisioning of visiting ships.

The decline of the waka during the 19th century has been attributed to a number of factors. Many Maori were quick to adopt the European style boats, although these were not always superior in form and waka still remained the preferred mode of transport on rivers (see above and Nelson 1991: 28). In particular, the introduction of the horse and construction of the road and rail networks provided alternative means of transportation, and in the Waikato many Maori canoes were destroyed during the 1860s land wars to deliberately demobilise the Maori resistance (Nelson 1991: 62). From the 1880s smaller waka were increasingly displaced by scows for coastal trade and paddle steamers for river transport. By the 20th century they were largely limited to major North Island rivers and lakes, including the Waikato and Wanganui Rivers (Nelson 1991: 49).

Further Research

A subsequent course of action is yet to be determined by the Waikato Museum following the outcome of iwi consultation. Subsequent work may involve the removal and stabilisation of the timbers, timber analysis of the two remnant fragments to determine whether they represent one single or two separate canoes, or possibly rescue investigation of the site of original deposition to attempt to locate additional pieces of canoe or any associated artefacts or material suitable for radiocarbon dating. It is not unlikely that a 'stern' section could be found, as the curvature and termination of the stern will have acted similarly to an anchor in the sediment of the river bed. Scouring of the river bed at this point is likely to continue during periods of increased water flow, and there is the potential for any additional material to be washed away before it can be adequately recorded. The remains recovered to date have been left submerged to delay

deterioration but have only been anchored temporarily. They are unlikely to remain in their present location if the river flow is increased to allow for maximum power generation and further scouring and erosion of the site of original deposition is also likely.

Acknowledgements

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