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An Early Artefact Assemblage from the Northern Waikato Coast, New Zealand

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ABSTRACT

This paper presents the first detailed published analysis of a significant artefact assemblage from the Waikato coast (Port Waikato to Awakino). It centres on the study of surface collections made in the late 1980s from eroding middens near the mouth of the Waikorea Stream, south of Port Waikato. Five trolling lures are a feature. They are notable because of similarities in style to those from Wanganui-Taranaki, and the fact that few lures have previously been described or illustrated from the Waikato coastal area. The study also provides insights into connections with other areas as reflected in the presence or absence of various lithic materials.

Keywords: WAIKATO COAST, ARCHAEOLOGY, WAIKOREA, LITHIC SOURCES, CHERT, OBSIDIAN, TROLLING LURES.

INTRODUCTION

There are over 250 recorded archaeological sites along the relatively remote west coast beaches and immediate hinterland between Port Waikato and Raglan Harbour mouth. Many are of high archaeological significance; collectively they make up an extensive and important archaeological landscape. But in contrast to other coastal areas, including those immediately south of Raglan and north of Port Waikato, no archaeological research investigations have been published on this area except for a report on a small pā excavation on the north shore of Raglan harbour (Wilkes 2000). Furthermore, many of the known sites have been recorded only on the basis of aerial photographs, without further field assessment. For these reasons, the analysis of the small surface-collected assemblage from Waikorea has elevated significance in that it provides new information about early pre-European activity along this stretch of coast.

Owen Wilkes (1994) recorded 24 'early' sites (i.e., probably pre AD 1500) between Kawhia and Awakino, although the early status of six of these was considered questionable. These sites were recently reviewed and their location shown on a map by McFadgen (2007: 156–159). A distinctive feature of many of the coastal dune sites in this sector is large expanses of scattered pebbles, often associated with human occupation, which is often

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'early' (Wilkes 1995). McFadgen attributed the origin of these pebble scatters to tsunami activity (McFadgen 2007: 159). Even if they have escaped tsunami damage, the 'early' sites, in particular, are under threat from wind erosion and fossicking. There is also a cluster of 'early' sites on the north side of Raglan Harbour centred round Te Kaha Point (Appendix 1) and evidence of early settlement has been found further north at Waimai Stream, Kaawa Stream, and Port Waikato (Turner 2000: 381–382). However, apart from unpublished small-scale excavations on R14/56, a purported 'early' fish hook manufacturing camp in Raglan Harbour mouth (Bonica n.d.), at Taharoa (Bulmer 1978), and Te Horea (Wilkes 2000), none of the 50 recorded 'early' sites have been investigated or radiocarbon dated. This tally, a total of about 50 sites along the Waikato Coast between Awakino and Port Waikato, has been confirmed by Louise Furey's current research projects on 'early' sites. Typically, the sites in question contain a lot of stone flakes (not usually seen in later sites) and oven stones (used and unused) and have greasy black charcoal lenses incorporating bone material (L. Furey pers. comm. 8 September 2008).

Some important artefact collections have been made from eroding middens and working floors along the coast. Wilkes collected some artefacts during his arduous King Country coastline survey (Wilkes 1994) but the most extensive assemblage is the Bird Collection from the Te Horea dunes. It contains considerable evidence of fish hook manufacture and lithic working (Turner 2000). Although aspects of these collections have been documented, no detailed analyses have been published.

This paper presents an analysis of significant surface collections made by John Ogden between 1987 and 1989 from eroding middens (R14/256 and R14/330) in sand dunes about 700 m inland from the mouth of the Waikorea Stream. In the intervening years the remaining *in situ* deposits at Waikorea have been largely obliterated by natural erosion of the sand dunes. Another small assemblage obtained from a deflated midden site (R14/284) near the mouth of the Waimai Stream to the south is also described. The latter deposit is notable in that it contains small iron and copper artefacts, possibly derived from an old sailing ship wreck nearby (R14/301).

PREVIOUS WORK

Archaeological work in the Waikato, particularly after the establishment of the Waikato Museum Archaeological Society in 1960, was reviewed by Wilkes (1997). Initially the focus was on inland pā and swamp sites, but the prospect of blacksand mining at Taharoa helped direct attention to the coast. In 1970, Jim McKinlay (New Zealand Historic Places Trust) led an excavation and recording project at Taharoa (McKinlay n.d.). A little later, John Coster and Gabrielle Johnson carried out an intensive site survey at Te Maika on the south side of Kawhia Harbour, followed by survey of a larger area between Kawhia and Aotea (Coster and Johnson 1975, 1978).

In the early 1970s, University of Auckland Anthropology Department archaeologists began to wrest the initiative away from the Waikato Museum. Despite the changes in the wind, Ken Gorbey (Waikato Museum) excavated a coastal headland pā at Raglan in 1972–1973 (see Wilkes 2000), while Dante Bonica, then a technician at the museum, excavated an 'early'/moahunter site in the sand-hills nearby (Bonica n.d.; Wilkes 1997).

Richard Cassels used students to record sites over large dune areas at Aotea (1973–1975) and Raglan (1976) and later excavated at Aotea (Fox and Cassels 1983). A large number

of middens were sampled and analysed. Tony Walton looked at kūmara soils and borrow pits in the area (Walton 1983).

In 1977–1978 Steve Edson, then the Waikato Museum archaeologist, undertook an innovative project, which involved identifying archaeological sites on aerial photographs (flown at 10,000 ft), then chartering light planes and photographing the sites with low level oblique angle photography. Three hundred and fifty sites were recorded in this manner but the survey had a more inland focus and did not include the coastline between Raglan and Port Waikato.

The Waikato Conservancy of the Department of Conservation undertook a major survey of the coastlines within the Conservancy in 1989–1990 (Ritchie 1990). This included the coastal strip between Port Waikato and the Mokau River mouth. Although much of the work was a desk top exercise, it included aerial photography of the coastline and obvious archaeological sites were individually photographed during the course of the survey flights. The photographs were later used to create site records.

Other than the areas mentioned above, the remainder of the coast from Port Waikato to the Taranaki boundary near Awakino remained largely an archaeological ‘terra incognita’, with neither systematic archaeological surveys nor investigations until 1994, when Owen Wilkes embarked on two major overland site recording expeditions between Kawhia and Awakino. He documented hundreds of previously unrecorded sites in this area and added them to the site recording scheme (Wilkes 1994, 1995).

Beginning about 1990, Marianne Turner started site recording on the north side of Raglan harbour, while Owen Wilkes and Kenneth Blair independently recorded sites in the same area as far north as Te Hara Point between 1996 and 2001. From then until 2004, Wilkes embarked on a ‘one man survey project’ of the coastal margin north of Te Hara Point working towards Port Waikato, during which he recorded well over 100 sites. Some of Wilkes’ interest in this area was spurred by seeing the small collection of ‘early material’ from Waikorea Beach deposited with the Department of Conservation in 1990 — the focus of this paper. Wilkes did not produce survey reports for his latter work; he just recorded the sites in his field note books and slipped the completed or upgraded site records into the file. He also linked many of the site photographs taken during the 1989–1990 DOC aerial survey (until then languishing in the Waikato DOC office) to specific sites on the ground, then produced new site records or upgraded existing records.

In September 2004, Hugh Clifford, an ornithologist who regularly walks the full length of Waikorea Beach counting and identifying dead seabirds, reported that he had come across what he believed to be wreckage of an old ship just north of the small unnamed headland at the southern end of the beach. The wreckage appeared because the sea had suddenly eroded the dunes in this area. The debris proved to be a sailing ship’s windlass, a rust-encrusted mass which, following treatment, proved to be a pump of English manufacture, and several iron knees. These items were recovered (NZHPT Authority 2005/66) during the following month, then conserved, and will shortly go on display in the new Raglan Museum. Despite extensive research, the wreckage has not been positively linked to any known shipwreck (Wilkes *et al.* 2004). The possibility that some iron and copper spikes and other European items found by John Ogden in a Maori midden (R14/284) near the mouth of the Waimai stream (1 km north of the shipwreck site) are derived from the shipwreck is discussed below.

In 2005 Moore and Wilkes reported on a significant chert source at Raglan. So far, Raglan chert has been positively identified from at least 18 sites along the west coast between Manukau South Head and Awakino, a distance of about 185 km. Raglan chert is also

present at Waikorea, in R14/256, which is the subject of this paper (Moore and Wilkes 2005: 347).

The most recent archaeological work in the area has been in response to a massive wind farm proposal, the Waikato Wind Farm, to be established along the north Waikato coast and seaward ridges. One hundred and twenty sites were recorded in the project areas; 65 of these had not previously been recorded. The majority are pre-European Maori occupation sites, including over 60 pit and terrace sites, over 20 pā and 7 urupā (burial sites). Only three of the sites are middens, which frequently constitute up to 70 percent of recorded sites in coastal areas (Baquie and Clough 2007; Clough *et al.* 2007).

SETTING AND ENVIRONMENT

The west coast between Raglan Harbour and Port Waikato is characterised by long open sand beaches often backed by high dune systems, interspersed with rocky headlands and steep eroding coastal cliffs. Drifting black sand (Mitawai Sands) overlies calcareous siltstone (Te Akatea Formation) in the vicinity of the Waikorea Stream mouth; further south siltstones form an intermittent shore platform along the coast (Kear 1966). At approximately 2 km intervals, streams have cut through the coastal ridges and dunes and flow into the Tasman Sea.

The advancing sand often accumulated in the low-lying areas where streams debouched on to the coast, forming sand dunes in the process. The area around the Waikorea Stream mouth is a case in point, but the dunes here are relatively low or deflated compared with others along the west coast. The advance of dunes sometimes buried coastal settlements and gardens, a process possibly exacerbated by the impact of people on the landscape (McFadgen 2003).

POLLEN ANALYSIS

In about 1980 Ogden, using a screw auger, collected a pollen sample on the landowner's farm on terrain described as 'pasture on an old lake bed on late Pleistocene dune system'. The stratigraphy consisted of 45 cm of peaty top-soil overlying about 1 m of sandy peat. The sample was taken from the tip of the auger when it contacted a hard surface. Rewi Newnham, then of the Department of Geology, University of Auckland (now of University of Plymouth), studied the sample and interpreted the environment as follows: "swampy ground with *Syzygium* (Eugenia) (swamp maire) *Leptospermum* (manuka) and Restiads (rushes). Nearby was podocarp forest (temperate lowland) with licenous *Metrosideros* (climbing ratas) and *Cyathea* (tree ferns)". *Nothofagus* (beech) forest was present in the region, but its proximity was uncertain.

DESCRIPTION OF SITES

WAIKOREA

The four locations where Ogden collected eroding material have been collectively recorded as site R14/256A, B and C and R14/330 and described as 'occupation residues' on the site records compiled by Wilkes in 1997. They are approximately 700 m inland from the sea.

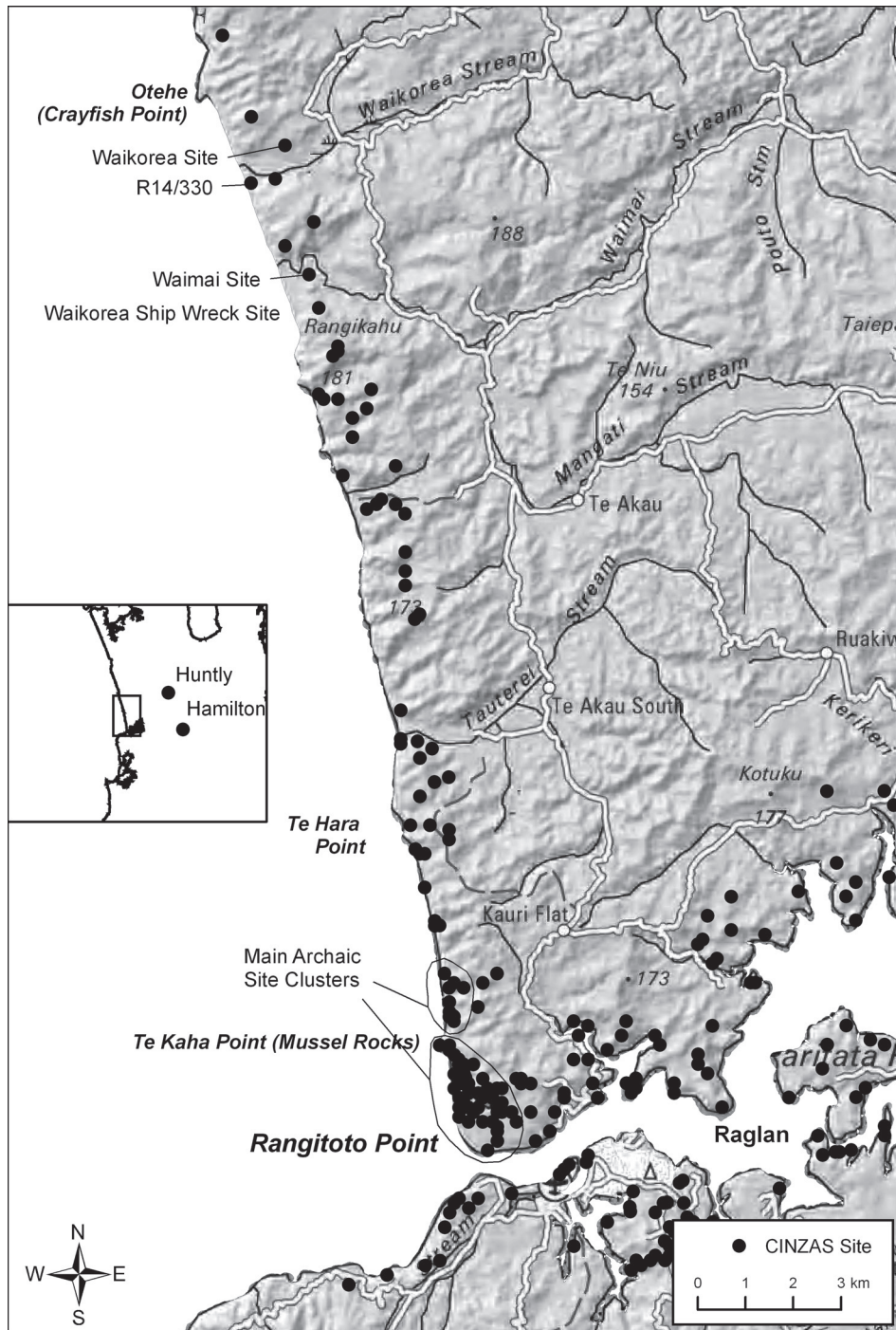


Figure 1: Part of the northern Waikato coast showing distribution of coastal sites, the main 'early' site clusters, and the Waikorea and Waimai sites.

R14/256 is 50–100 m north of the Waikorea Stream, while R14/330, now buried under moving sand, is on the south side of the stream (Fig. 1). The nature of the dune topography and vegetation now is clearly apparent in Figure 2.



Figure 2: The last *in situ* remains of R14/256, Waikorea Stream, July 2008.

The majority of the material came from the highest part, the ‘central dune area’ (R14/256A), more specifically from ‘an old grey hardened surface’ (i.e., a buried palaeosol). The artefactual material had eroded out off this layer and was redeposited in the adjacent black sand. The indurated layer contained clear evidence of fires, in the form of scattered charcoal and abundant oven stones. Areas of iron accretion, which in places had formed pipes around large tree roots, suggested a former forest cover.

Two charcoal samples were collected in 1987 from a concentration about 3 m in diameter (a scattered camp fire) in the palaeosol layer. The first sample was largely composed of matai (*Prumnopitys taxifolia*) and was set aside. The second sample comprised *Olearia* and *Pennantia corymbosa* (ducksfoot). This sample was submitted for dating to the University of Waikato radiocarbon laboratory. It produced an uncalibrated age of 560 ± 40 (WK-1899; $\delta^{13}\text{C} -25.7\%$) and a calibrated date of AD 1400 to 1440 at 1 sigma (McCormac *et al.* 2004; Bronk Ramsay 2005). Ogden noted that there were numerous obsidian flakes and angular stone fragments around the area where the sample was collected. In 1988, Ritchie found a piece of weathered moa bone (identified by R. McGovern-Wilson) about 50 m south of the sample site.

In what Ogden dubbed ‘the rear dune’ (R14/256B), the wind has cut a broad hollow between two eroding dunes. The artefacts scattered here were noticeably more sandblasted than those in the central dune, suggesting a longer period of exposure.

Seaward of the central dune there is a small remnant *in situ* (R14/256C), which appears to be part of the same occupation surface as the central dune. This remnant sits above a deflated hollow in which Ogden observed some human bone. In 2004, amateur archaeologist Kenneth Blair visited the site and reported he had seen the remains of two burials in this area and the larger of two patches of cropstones (email to Wilkes 8 March 2004).

Blair also found two minnow lures, which he showed to Owen Wilkes, who drew them (these have been redrawn and are reproduced in Fig. 5). Blair also reported he had seen “another big patch of cropstones, a lot of obsidian and chert flakes, flaked mudstone, more adze type stone, and a probable sandstone file” (email to Wilkes 8 March 2004).

Minnow lures, obsidian and argillite flakes found in West Coast sites are generally interpreted as evidence of ‘early’ occupation. Typically ‘early sites’ here contain a lot of flakes and oven stone debris, and charcoal lenses incorporating bone material.

The nearest parallel to the nature and antiquity of the sites described in this paper is provided by Coster (1989) in his Aupouri dunes study in Northland. However, in his study the emphasis is on dating the sequence rather than detailed description of the assemblages.

WAIMAI (R14/284)

John Ogden also collected a rather eclectic mix of material from a site (R14/284) near the mouth of the Waimai Stream, 2 km to the south of Waikorea (Fig. 3). This midden appears to have largely eroded away, although a site recorded by Kenneth Blair in 2003 at grid reference 688 948 is possibly a remnant of it. Owen Wilkes was unable to find any trace of it a year later.



Figure 3: The Waimai Stream estuary, July 2008. The Waimai site (R14/284) was in the exposed dunes beside the estuary in the centre of the photograph.

The material from the Waimai Stream site was found in a deflated sand dune on the south side of the stream at a point about 400 m upstream from the sea beach. The most visible evidence was fire-cracked rocks. Ogden collected several items of pre-European origin (see Table 1) and the remains of a dog skull from this area.

A noteworthy aspect of the Waimai assemblage is the European material it contains and the possibility that this is derived from a nearby shipwreck (R14/301). This wreck is of unknown origin but almost certainly the remains of a nineteenth century sailing ship. The European objects from the midden include the following iron items: six spikes of various lengths, one lightweight hatchet head, part of a wrought iron tool consisting of a sharpened blade 105 mm long, 27 mm wide and 3 mm thick at its centre line, two light chain links, a bent wire staple, some pieces of hoop iron, a crude chisel or scraper, and a small triangular file, possibly for sharpening the teeth of a saw. Non-ferrous metal items include two copper spikes, the head of a lead-head nail, and three small slightly conical copper washers. In addition, Ogden collected 16 fragments of glass, including 8 pieces of black beer bottle glass (1860s), a fragment of a Dutch schnapps square bottle (1880–1920) and two bases of green ring seal bottles (1880–1930) at this site.

Despite the poor provenance of this material, the pre-European and European era artefacts were found in close proximity, suggesting the Waimai site was occupied during the contact period and probably earlier. The copper items in particular are suggestive of a European maritime connection. Possibly they and the other items were derived from the shipwreck, but the ship may not have been manned when it was wrecked. There are records of ships (or parts of ships) being abandoned or lost off the eastern coast of Australia, drifting across the Tasman Sea and ‘wrecking’ on the west coast of New Zealand. Such ‘treasure trove’ is likely to have been investigated and exploited by Maori groups, considering the wealth of useful items they might contain.

PRE-EUROPEAN ARTEFACTS

WAIKOREA

The artefacts recovered from the sites at Waikorea are mainly obsidian and chert, with some metasomatised argillite and, significantly, five trolling lure shanks. Details are provided in Table 1.

Obsidian

Approximately 550 flakes, cores and pieces of obsidian were collected from the Waikorea sites, with a total weight of 1240 g. This assemblage is dominated by Mayor Island obsidian, which forms 92 percent of the total by weight (95 percent by number of pieces). Obsidian that is grey in transmitted light forms about 7 percent by weight, and red only 1 percent. The proportion of Mayor Island to grey obsidian at each site or area is shown in Figure 4.

TABLE 1
Artefacts and other items from Waikorea and Waimai (Ogden Collection)
(weights in g)

SITE	R14/256A	R14/256B	R14/256C	R14/330	TOTAL	R14/284
OBSIDIAN						
<i>Mayor Island</i>						
Quantity	454	43	2	30	529	15
Weight	925	145	5	60	1135	55
<i>Grey</i>						
Quantity	17	2	-	4	23	2
Weight	80	3	-	10	93	9
<i>Red</i>						
Quantity	4	-	-	-	4	-
weight	11	-	-	-	11	-
Total no.	475	45	2	34	556	17
CHERT						
Quantity	84	16	3	22	125	1
Weight	296	72	10	67	445	
ARGILLITE						
Flakes	1	2	-	10	13	-
Chips	3	-	-	-	3	-
Piece (butt)	1	-	-	-	1	-
OTHER						
Sandstone flakes	5	-	-	1	6	-
Trolling lure	†1	*1	-	-	2	-
Chisel?	-	-	-	2	2	-
Hammerstone	1	-	-	-	1	6
Hoanga?	1	-	-	-	1	-
File	1	-	-	-	1	-
Basalt	-	-	-	-	-	1
Quartzite flakes	1	-	-	-	1	2
Kōkōwai	5	-	-	-	5	-
Moa crop stones	15	-	-	-	15	-

* from R14/256B or R14/330

† 3 additional shanks held by others

Mayor Island: Mayor Island obsidian was identified on the basis of its olive green colour in transmitted light (Moore 1988). Most of the flakes and pieces from R14/256A are <30 mm in size and many are <20 mm. Many of the cores are also small. The majority of the flakes show no obvious sign of use, but at least 8 percent, all of which are >20 mm in size, have definite edge wear. One of the cores also has some edge wear. Only one drill point was identified. Two flakes have remnants of rough cortex, indicating that they were struck from a core or block obtained from the surface of a rhyolite flow (pahoehoe type). None appear to have been derived from water-worn cobbles or boulders.

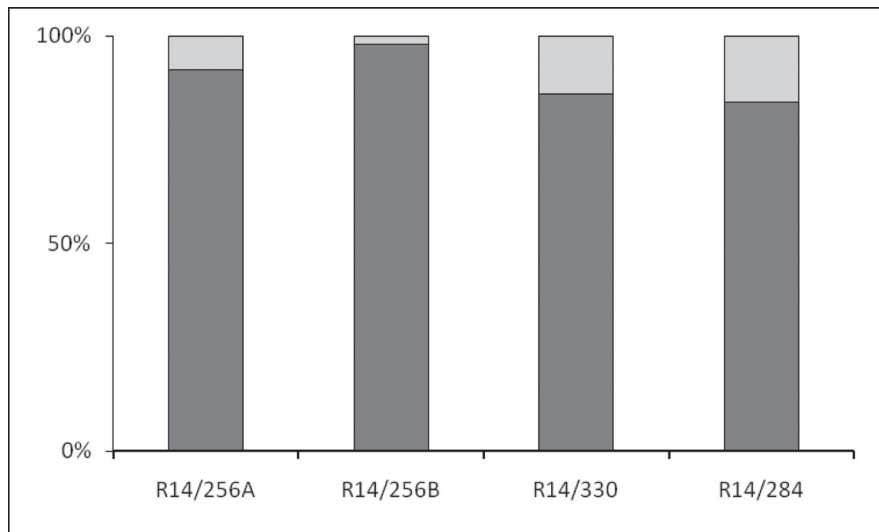


Figure 4: Relative proportions of Mayor Island (darker) and 'grey' obsidian (lighter) by weight in the Waikorea and Waimai sites.

Most of the flakes and cores from R14/256B are badly sand-blasted, and only one flake with obvious edge wear was identified. Of those from R14/330, just one flake shows possible use wear. One flake also has a portion of water-worn cortex, indicating that it was derived from a beach cobble or boulder.

'Grey' obsidian: A range of physical characteristics is apparent among the assemblage of 'grey' flakes and pieces and one core from Waikorea. Three main groups were defined (note that 'grey' refers to the colour in transmitted, not reflected, light).

One group is characterised by moderate to good translucency (often with a smoky tinge), weak or no flow banding, and presence of rare spherulites, crystal inclusions (phenocrysts) and vesicles. Several pieces in this group also have remnants of rough to slightly water-worn cortex, and one flake has a smooth cortex.

The second group consists of flakes characterised by moderate to poor translucency and moderate to strong flow banding, with spherulites and crystal inclusions but no vesicles. At least one of the flakes has a portion of rough cortex.

A third group is represented by a single core (weight 37 g) from R14/256A. This was clearly derived from a cobble with rough, pitted, and slightly water-worn cortex, and is characterised by very poor translucency, weak flow banding, and common spherulites. No flakes of this type of obsidian were recognised.

The physical characteristics of the first group are typical of obsidian from sources such as Taupo and Great Barrier, but also match those of some material from Whangamata (Moore 1988, 2004). X-ray fluorescence analysis of one flake from this group (sample 256/1, Table 2) indicates that it originated from the Taupo source. The second group has characteristics which are typical of obsidian from a number of sources, including Whangamata, Cooks Beach-Hahei, and are also similar to some Taupo material. One flake, showing strong flow banding and containing very small spherulites and rare crystal inclusions, was analysed (sample 256/2), indicating that it came from the Hahei source.

TABLE 2
Chemical (XRF) analyses of obsidian artefacts¶

Major Elements	SAMPLES			LOD† ppm
	256/1 wgt%	256/2 wgt%	256/3 wgt%	
SiO ₂	76.37	75.50	75.64	177
TiO ₂	0.18	0.09	0.09	26
Al ₂ O ₃	12.30	12.99	13.01	116
Fe ₂ O ₃	1.42	1.68	1.66	14
MnO	0.04	0.06	0.06	8
MgO	0.15	0.04	0.04	61
CaO	1.12	1.07	1.04	42
Na ₂ O	4.03	4.08	4.06	73
K ₂ O	3.43	3.81	3.83	14
P ₂ O ₅	0.03	0.02	0.02	16
Total	99.18	99.46	99.57	
Trace Elements	ppm	ppm	ppm	ppm
Zn	30	43	42	4
Ga	13	14	16	4
Rb	120	130	134	3
Sr	91	94	90	2
Y	24	34	33	2
Zr	157	149	143	2
Nb	8	9	8	2
Ba	529	646	631	16
Pb	14	18	17	6

¶ Analyses by J. Wilmshurst, University of Auckland

† Limit of determination

Initial indications were that the core could have come from a different source, possibly Whangamata, and a small piece was therefore analysed (sample 256/3). This clearly shows that it originated from the Hahei area, not Whangamata.

Probable source allocations for the entire assemblage of 'grey' obsidian from the Waikorea sites, based on physical characteristics and the three XRF analyses (Table 2), suggest that roughly equal amounts (by weight, excluding the core) were derived from the Taupo and Hahei sources. Including the core, the ratio of Hahei to Taupo obsidian, by weight, is about 2:1. Considering the variation in physical characteristics, all of the Taupo (or probable Taupo) obsidian artefacts could have been produced from only two or three cobbles. One of these had a rough but slightly water-worn cortex and another had a smooth water-worn cortex, indicating they were obtained from a stream or beach environment. At least two of the pieces from R14/256A have such similar features that they almost certainly came from the same core. All of the flakes considered to be from the Hahei source could be derived from just one core and, interestingly, one of the flakes from R14/330 has almost identical features to the analysed piece (sample 256/2) from R14/256A. Obviously the core from R14/256A was produced from a different cobble, with rough cortex. Altogether, then, all of the 'grey' obsidian could have been derived from only four or five cobbles.

Red obsidian: There are only four small flakes of red-brown obsidian in the Ogden collection, all of which came from R14/256A. They have the same colour (reddish brown with black flecks), and therefore could have come from the same core. None have any cortex, but three show some edge wear.

Only a few sources of flake quality red-brown obsidian are known, the main ones being Taupo, Waihi, and Great Barrier. The colour is not too different from that of Waihi red obsidian, but considering the lack of other material from this source it seems unlikely that it came from there. Great Barrier cannot be excluded but is also unlikely. The red obsidian, therefore, is probably all from Taupo.

Chert

Chert was the second most common lithic material found at Waikorea; altogether 125 pieces were collected, with a total weight of 445 g. This includes cores, flakes, and drill points. Most of the chert is a yellowish brown colour, but some is slightly reddish or grey. A high proportion of it has remnants of rough cortex and contains remains of bryozoa. All of this material is considered to be derived from the Raglan source (Moore and Wilkes 2005).

At least five cores were identified, three having remnants of rough cortex. Many of the flakes also have portions of rough cortex — about 40 percent of those from R14/256A and 60 percent of those from R14/256B and R14/330. One of the flakes and several unworked pieces have remnants of smooth, water-worn cortex. About 30 percent of the flakes from R14/256A and 20 percent of those from R14/330 show some edge wear, although the proportion of flakes that were actually utilised is likely to be considerably higher. There are at least 12 definite drill points in the collection, most (9) from R14/256A; a further 12 items were classified as possible drill points. The drill points range from about 50 mm to only 16 mm in length. Some might have been used in the manufacture of trolling lures.

Trolling lures

Five trolling lure shanks, all broken, have been collected from Waikorea. Two are in the Ogden collection (here numbered TL1, TL2) and a further three are held by others. All except one of these (TL2) was found at R14/256A. The shanks are illustrated in Figure 5 and details are provided in Table 3. Terminology largely follows that of Crosby (1966), who classified shanks according to six different modes (A to F). The term 'lug' is taken from Duff's (1956) use of this word in relation to adzes.

TL1 comprises the distal (or tail) half only. It is completely polished, with an egg shaped cross-section and rounded sides terminating in a prominent dorsal ridge. It has a flat seating platform (for attachment of the point), and a well-defined lashing grip (slot) with slightly raised ridge on the ventral side. There are two small notches cut into this ridge, which is here referred to as the terminal ridge. The shank is made of very fine sandstone, greenish with a dark surface staining.

The second shank (TL2) was collected from either R14/256B or R14/330. It is made from olive grey, very fine sandstone, similar to that of TL1. It has split longitudinally, along the dorsal ridge, and the distal end is missing. At the proximal end there are two lateral 'eyes' drilled from either side. This head lashing design is classified by Crosby (1966) as Bilateral or B Series.

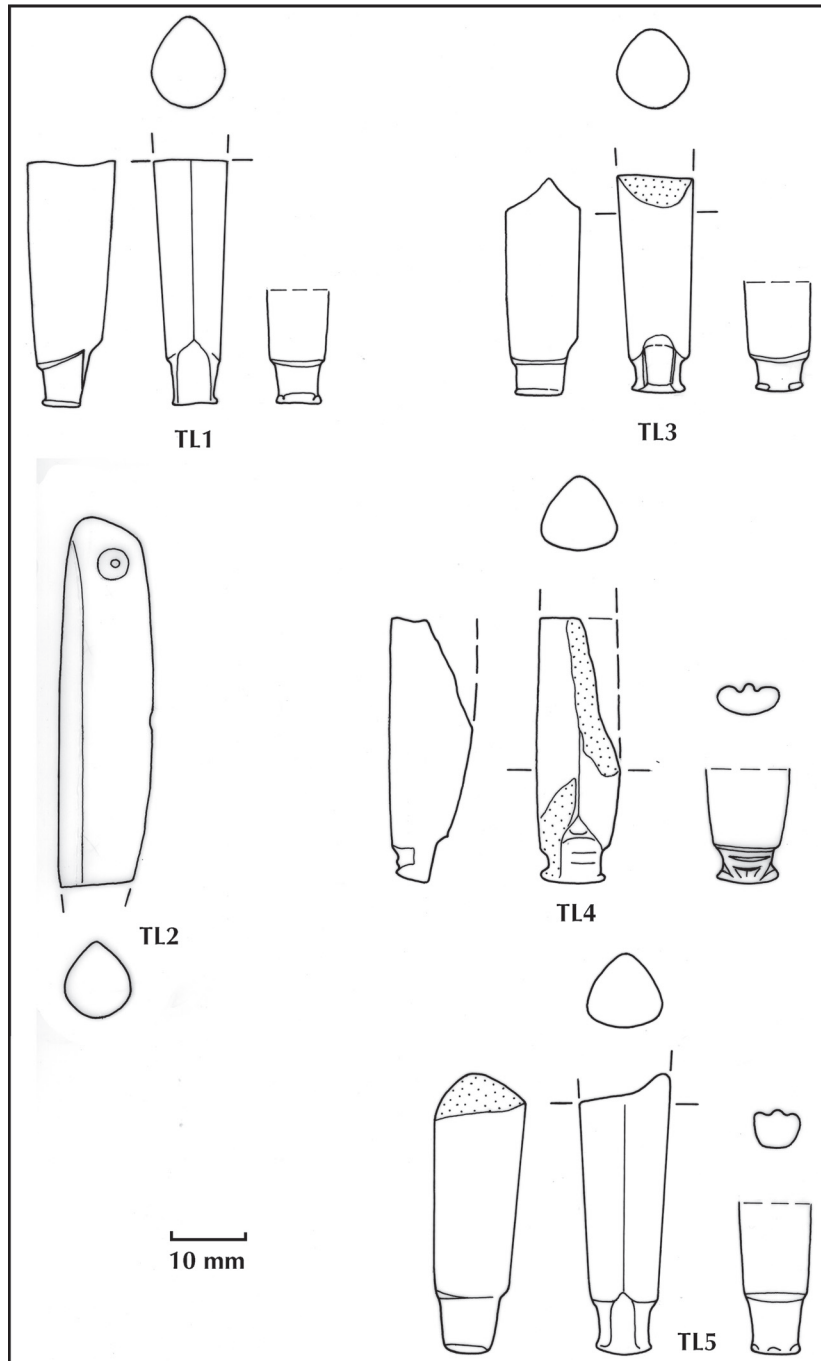


Figure 5: Stone trolling lure shanks from Waikorea.

TABLE 3
Details of trolling lure shanks from Waikorea*

SHANK no.	TL1	TL2	TL3	TL4	TL5
Min. length	32	49	28.5	35	37
Width	10	c.12	10	11.4	11
Height	12	12	min 10	-	-
Head form	-	pointed	-	-	-
Head lashing	-	bilateral hole steep nose	-	-	-
Section	egg-shaped	egg-shaped	egg-shaped	round triangular	round triangular
Tail lashing	side+ventral slot	-	side+ventral slot	side+ventral slot; 2 ventral notches	both sides + ventral stepped
Length	3.7	-	3	3	5
Width	5.5	-	6	6.5	7
Tail form	squared	-	squared	rounded	rounded
Point seating	all-over platform	-	furrow	all-over platform	narrow platform
Length	8.3	-	7	7	7.6
Width	4.2	-	4	4.5	3.5
Other features	2 notches on terminal ridge	-	terminal lugs	terminal lugs + notches	terminal lugs

* All measurements in mm

The other three shanks are represented by the distal portion only. One (TL3) is similar to TL1 and appears to be made from the same material, but has a more rounded cross-section and less well defined dorsal ridge. The point seating platform is also slightly concave (longitudinally), and the terminal ridge at the end of the lashing slot has been reduced to form two narrow lugs on the ventral side.

Shank TL4 is made of coarser, olive grey, fine grained greywacke, and has a rounded triangular section and well defined dorsal ridge. It has a different lashing slot with two transverse grooves on the ventral side and two notches cut across the terminal ridge (on the ventral side), similar to those present on TL1 but more pronounced.

Shank TL5 is also made of fine grained greywacke, and has been slightly sand blasted. It is quite similar to TL1 in style, but has a less well defined terminal ridge and more triangular cross-section, similar to that of TL4.

The five shanks show a general consistency in style, with only slight differences in cross-section and features at the distal end. One of the more obvious differences is in the degree of notching on the terminal ridge, on the ventral side, to form lugs. Conceivably this might represent a progressive change in design, from TL1 to TL3 and TL5 to TL 4, aimed at producing more prominent lugs for lashing the point by increasing the degree of notching, but it could just as easily reflect minor variation within an accepted style.

Metasomatised argillite

A total of 24 flakes and chips of metasomatised argillite (hereafter referred to as 'argillite') were collected from sites R14/256A, R14/256B and R14/330, along with three larger pieces off argillite adzes.

Eleven argillite flakes and chips were recovered from R14/256A, most of which were clearly derived from polished adzes. Colours include black, dark grey, medium grey and olive grey, indicating that the flakes were derived from at least four or five different adzes. One large flake, of olive grey argillite, shows some edge wear. There are also two larger pieces from R14/256A. One consists of part of a polished blade, of medium grey argillite, the other a part of a polished adze of black argillite, which has been subsequently worked.

Only two argillite flakes were found at R14/256B. One is dark grey in colour, the other olive black, indicating they were derived from different adzes.

A larger number of argillite flakes and chips (10) was collected at R14/330. Of these, six consist of slightly greenish, dark grey argillite. Four are of slightly coarser grained material, and could have come from the same adze. Another two, one of which was from a polished adze, consist of more greenish, dark grey argillite. The remaining two flakes are greyish-black with slightly darker veins, but are not identical. One came from a hammer-dressed adze (or butt), the other from a polished adze. The ten flakes and chips, therefore, were probably derived from at least four different adzes.

Other items

Sandstone flakes: Five flakes of olive grey, very fine sandstone were collected from R14/256A and one from R14/330. One of those from R14/256A has been partly ground on both sides, and another partly ground on one edge (one side only). These may have been derived from partly polished adzes.

The flakes are all very similar in colour and grain size, although one of the flakes from R14/256A contains abundant dark flecks and the one from R14/330 includes a portion of fine to medium grained sandstone. The material is the same as that used for the two possible chisels from R14/330 (see below) and is very similar to that of two of the trolling lure shanks (TL1, TL2).

Possible chisels: Two artefacts from R14/330 appear to represent unfinished chisels. Both are made from elongate flakes or spalls of greenish very fine sandstone with dark flecks. One (length 88 mm) shows some flaking and polishing on both sides, but no obvious bevel or butt. It is also slightly weathered on one side, and may have been derived from a flat boulder or slab. The other (length 80 mm) has been flaked to form a distinct butt and seems to be partly polished on one side, although it has been extensively sand-blasted. The sandstone is laminated, but otherwise very similar to that of the other specimen.

File/abrader: An elongate schist pebble (83 mm in length) from R14/256A with distinct smoothing on one side was probably used as a file. The schist contains veins of quartz, but no visible biotite mica.

The collection also includes what appears to be the butt end of a broken, partly polished adze, which may have been subsequently used as an abrader. It is composed of brown, weathered, very fine sandstone, a material that does not seem particularly suitable for the manufacture of adzes.

Hammerstone: There is only one hammer stone in the collection, from R14/256A. It is a well rounded pebble (approximately 50 mm in length) of quartz or quartzite, showing extensive bruising on both ends. A single spall off a well rounded quartzite cobble and one piece off a well rounded quartz pebble were also found at this site, and may have been derived from other hammer stones.

Kōkōwai

Several small pieces of kōkōwai were collected from R14/256A. Four of them have a very fine grained (silty) texture and are composed mainly of haematite. Another appears to consist of highly weathered, haematite-rich, siltstone. All five pieces are probably from the same source, perhaps a deeply weathered horizon within the nearby Tertiary sedimentary strata.

WAIMAI

The collection from the Waimai site, R14/284, is much more restricted and consists mainly of obsidian flakes and hammer stones. Only 15 pieces of obsidian were collected, with a total weight of 55 g. This includes 12 flakes and 1 core of Mayor Island obsidian. Two of the flakes show edge wear. The core is composed of poor quality material, very different from that of the flakes. There is only one flake and one core of 'grey' obsidian. Both have good translucency (with a smoky tinge) and remnants of rough but slightly water-worn cortex, and lack spherulites. They could originate from the same cobble which, on the basis of the physical characteristics of the obsidian, probably came from the Taupo source.

The proportion of Mayor Island to 'grey' obsidian at this site is somewhat lower than at Waikorea, with Mayor Island material forming about 86 percent of the assemblage by weight and grey obsidian 14 percent. However, the small size of the collection needs to be taken into account.

Six definite hammer stones were collected. They are all well rounded, flattish quartzite cobbles with maximum diameters ranging from 68 to 102 mm. Two show extensive damage (flaking) at one end only, one has flake damage at one end and bruising at the other, and two have flake damage at both ends. Another has flake damage on one side and bruising all around the edge. There is also one unused quartzite pebble in the collection and two flakes off quartzite pebbles or cobbles.

The collection includes the butt end of a hammer-dressed and partly polished adze made from porphyritic vesicular basalt. The basalt is probably from the Raglan area. Only one small core of Raglan chert was found.

FAUNAL AND MISCELLANEOUS MATERIAL

Bone was limited to a few indeterminate wind-eroded fragments, but both moa bone, in small slithers, and whalebone were present. A flat object about 80 x 65 x 5 mm appears to be a piece of shaped whalebone.

Two small collections of moa crop stones (small polished pebbles) were made by John Ogden from the hard clay surface exposed at two different locations beneath the dune sand at R14/256A. The stones are composed of quartzite, meta-volcanic rock, quartz and chert, mainly Raglan chert. A further collection (N=39) made in 2005 contained stones of the

same rock types, apart from quartz. Altogether, Raglan chert formed 20 percent of the total number of stones recovered.

The presence of Raglan chert places some constraints on where the moa lived. For such stones to be contained in their gizzards, the birds must have passed through the Raglan area or along the coastline to the north. Assuming the stones are sub-fossil, it indicates that moa were living in the Waikorea area before human settlement.

AGES OF WAIKOREA AND WAIMAI

Besides the calibrated radiocarbon date (AD 1400–1440), an early age for site R14/256 is implied by the nature of the artefact assemblage, and particularly the trolling lures. Crosby (1966) considered that bilateral or B Series shanks were an early type, apparently not represented in the historic period (1996: 120). R14/330 may be more-or-less contemporary with R14/256, judging from the presence of the same type of very fine sandstone at both sites and fairly similar proportions of Mayor Island to ‘grey’ obsidian. The assemblage from Waimai is too restricted to make any meaningful comparisons with the Waikorea sites, and little can be said other than that the obsidian proportions are similar to those at site R14/330.

DISCUSSION AND CONCLUSIONS

The ‘early’ dune sites (n=25–30) along the Waikato coast between Raglan Harbour and Port Waikato, such as Waikorea, are rapidly disappearing as a result of natural erosion processes. Although interpretation of highly eroded dune sites is problematical because of the loss of both context and content, nonetheless, as this study has shown, analysis of surface collections can provide important new insights into pre-European activity in some areas. Specifically, the analysis has been able to demonstrate that a considerable range of artefacts was being manufactured and used at Waikorea, and that lithic materials were obtained from both local and distant sources.

The five trolling lure shanks from Waikorea are notable, because few shanks have previously been reported from the Waikato coast. They differ from the one from Kororomaiwaho pā (N64/8) at Aotea north head (Fox and Cassels 1983: Fig. 41) in both cross-section and design of the point attachment area; the example from Kororomaiwaho may be a much later form. They also differ from a complete lure found at an undoubtedly early site (R14/282) just north of Raglan, which has a half-oval cross-section, tapered/notched head, and notches at the distal end. The variation among the lures might indicate that some were imported as finished items, rather than being manufactured locally.

Crosby (1966: 120) considered that bilateral or B Series lure shanks like TL2 were a predominantly western North Island form, found mainly in the Taranaki and Wanganui regions. None were recorded from the Waikato coast. She also noted that the steep-nosed form is very common in Taranaki, and that egg-shaped cross-sections are typical of Wanganui shanks (Crosby 1966: 121, 123). Although it is not possible to classify the other Waikorea examples according to Crosby’s (1966) series, certain features of the shanks such as slotted tail lashings and narrow or all-over (wide) attachment platforms are common among B Series lures. However, only Wanganui shanks apparently have ventral tail notches like those seen on TL4 (Crosby 1966: 123).

As is evident in other early sites along this coast (Appendix 1), significant quantities of imported obsidian were being used at Waikorea. Although the bulk of the obsidian came

from Mayor Island, small amounts were also obtained from Taupo and the Coromandel Peninsula. What this means in terms of connections with these areas is difficult to assess, but the absence of Tahanga basalt flakes (and Tahanga adzes) at the Waikorea sites suggests that contact with the Coromandel area, at least, was probably very limited, and could well have been a 'one-off' event. The Hahei obsidian might, for instance, have been obtained by gift or exchange with a visiting group from that area.

Most of the adzes used (and probably reworked) at Waikorea were of metasomatised argillite from the Nelson/Marlborough region. Together with obsidian they constitute the only items or materials that were undoubtedly imported from outside the region. Other lithic materials utilised at Waikorea were, or could have been, obtained from the Waikato coastal area. Apart from the chert, other materials that were probably collected locally include the fine grained green sandstone used to manufacture trolling lures and chisels, quartzite pebbles (for hammer stones), and kōkōwai. The pebble of schist, apparently used as a file, along with the quartzite pebbles, may originate from Jurassic conglomerates outcropping on the south side of Kawhia Harbour and the adjacent outer coast, which are known to contain clasts of various metamorphic rock types (Macdonald 1954).

Analysis of the artefact assemblage, and the radiocarbon date, suggest that Waikorea was the location of a seasonal camp or short-term settlement in the early fifteenth century. The main occupation area appears to have extended for 200 to 300 m along the northern side of Waikorea Stream, and it is possible that individual sites (R14/256 A, B, C) within this complex represent separate camps, occupied at different times. Although some of the chert and obsidian flakes could have been used for butchering purposes, there is no clear evidence of this activity. There is also surprisingly little indication of the consumption of shellfish, although midden deposits might have been largely destroyed during deflation of the dunes. The evidence that fishing, and in particular trolling, was a major activity is more compelling, based on the five trolling lures and relatively high number of chert drill points. It is assumed that the drill points were used mainly in the manufacture of fish hooks and points, despite the fact that no bone hooks or points were found among the cultural material scattered over the area.

There is a clear indication from the style of the trolling lure shanks, and most of the lithic materials, of a connection between those who occupied the Waikorea sites and areas to the south, possibly as far afield as Taranaki or Wanganui. The style of the lures according to the Crosby classification is strongly 'Taranaki-Wanganui', which possibly extends their range and may reflect some form of cultural connection which will require further archaeological investigations along this coast to elucidate more clearly. With the exception of the obsidian, there is little evidence of significant links with areas to the north or east.

Within a 5 km radius of the Waikorea occupation site (R14/256) there are well over 50 substantial Maori earthwork sites including pā, although the majority are pits and pit/terrace complexes. Two pā (R14/161 and 162) are in the immediate vicinity, a few hundred metres away on the higher ground to the north. The site distribution and types would suggest that there was a significant Maori population living in the immediate hinterland or exploiting the coastal resources in the vicinity of the Waikorea Stream mouth from at least AD 1400 until European contact.

Whether the copper and iron spikes and other European artefacts found amid the pre-European material at the Waimai site (R14/284) are derived from the nearby European shipwreck (R14/301) is unresolved because all the pieces found at the shipwreck are heavy steel items such as a windlass, pump and knees; items which are likely to have been of little use to Maori during the contact era. Although a direct link between the ship wreckage and

the small European items in the midden cannot be made, the possibility that they represent items scavenged from the wreckage cannot be ruled out either.

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APPENDIX 1

Lithics and other finds and features of 'early' sites: Raglan Harbour mouth to Port Waikato

Site No.	General Location	Obsidian	Chert	Sandstone abraders	Adze parts	Flakes	Drill points	Lures	Fish bones	Other
R14/55	Raglan Hbr S shore	x	x	x	basalt	-	-	x	-	reel necklace
R14/56	Raglan Hbr entrance	x	x	x	x	basalt	-	1	x	moa bone
R14/58	Raglan Hbr entrance	x	x	x	-	basalt	-	-	x	-
R15/59	Raglan Hbr N shore	-	-	-	unspec.	-	-	-	-	greasy matrix
R14/23	Tauterei Stm mouth	x	x	-	argillite	basalt	-	-	x	-
R14/302	Tanetaupiri Stm mouth	x	x	-	argillite	basalt	-	-	x	-
R14/365	Te Kaha north	x	x	-	basalt	-	-	-	-	-
R14/366	Te Kaha north	x	x	-	argillite	basalt	x	slate 1	-	limestone pounder
R14/279	Te Kaha south	x	x	x	argillite	basalt	-	-	-	dog, moa
R14/280	Te Kaha south	x	x	-	argillite	basalt	x	-	-	sea mammal
R14/281	Te Kaha S, large	x	-	-	argillite	-	-	-	-	moa bone
R14/108	Rangitoto Pt dunes	x	x	-	-	-	-	-	-	seal
R14/110	Rangitoto Pt dunes	x	x	-	-	basalt	-	-	x	-
R14/111	Rangitoto Pt dunes	x	-	-	-	-	-	-	x	-
R14/112	Rangitoto Pt dunes	x	-	-	-	-	-	-	x	-
R14/113	Te Kaha south	x	x	-	-	basalt	-	-	x	-
R14/114	Te Kaha south	x	x	-	-	basalt	-	-	x	-
R14/115	Lake Waitamoumou	x	-	-	-	bas/arg	-	x	x	-
R14/310	Te Kaha south	-	x	-	bas/arg	-	x	-	-	-
R14/317	Te Kaha south	x	-	x	argillite	-	-	-	-	-
R14/318	Te Kaha south	x	x	-	-	basalt	x	-	-	whalebone
R14/319	Te Kaha south	-	-	-	argillite	-	-	-	-	-
R14/271	just N of Raglan Hbr	x	x	x	argillite	basalt	-	-	-	moa bone
R14/272	just N of Raglan Hbr	x	-	x	-	quartz	-	-	-	-
R14/256	Waikorea	x	x	x	argillite	basalt	x	5	-	moa bone
R14/330	S of Waikorea	x	x	-	argillite	-	-	-	-	-
R14/284	Waimai Stream	x	x	-	-	-	-	-	-	-

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