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THE MIDDENS OF PEGASUS TOWN, CANTERBURY, STAGES 1–5

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Introduction

Pegasus Town will be located about 25 km north of Christchurch near Woodend. It is a planned town for 5000 people in a 3 by 4 km area. It includes a business district by a large artificial lake as well as residential districts, a school and a golf course.

The eastern third of Pegasus Town is a wetland-sand plain which has been used for live-stock grazing. An inner sand dune system makes up the middle third, and to the west is an alluvial fan plain. The dunes had been planted in pines and the alluvial plain was cultivated. All of this is being cleared for development except for an extensive eastern wetland reserve and a cultural heritage reserve on the western dune ridge of the inner dune system (Western Management Conservation Area – WMCA).

The new town is located immediately south of Kaiapoi Pa (site M35/7), the Ngai Tahu stronghold sacked by Te Rauparaha in 1832 (Stack 1893; Slater 1912). Part of the battleground area is within the WMCA. Kaiapoi Pa was a greenstone exchange centre and foremost political base for Ngai Tahu (Evison 1997: 20; Taylor 1950: 40). Traditional sources indicate the pa was built in the early 1700s (Anderson 1998; Evison 1997).

The WMCA contains the Hohoupounamu site (M35/12), of outstanding significance as a major greenstone-tool manufacturing site (Burrage 1975; Trotter 1998, 2001). Hohoupounamu was partly excavated between 1966 and 1974 by the Canterbury Museum; the dates are shown in Table 1 (one date has been discarded due to laboratory error, Michael Trotter pers. comm. 2006).

The excavated material from Hohoupounamu includes 2060 greenstone flakes and over 100 worked pieces, with the greatest abundance in the upper levels (Challis 1995: 38). Other materials included 1730 pieces of flint,

Table 1. Hohouponamu M35/12 dates (Challis 1995: 80).

Lab no.	CRA	calibrated at 95% confi- dence interval	provenance	material
NZ 1158	604±43	1578–1812	middle layer	estuarine cockle shell
NZ 1160	346±43	1479–1665	middle layer	freshwater mussel shell
NZ 1161	343±86	1435–1818	middle layer	freshwater mussel periostracum
NZ 1375	837±44	1408–1535	lowest layer	estuarine cockle shell

331 of quartzite and 259 of obsidian. There were two argillite adzes, many greenstone adzes and chisels (mostly small), barbed bird spears, harpoons, fish lures, fish hooks, a tattooing chisel, bone patu, bone toggles, stone drill point, perforated human and dog teeth, greenstone and bone pendants, bone pins, needles awls and threaders and a bone comb (Challis 1995: 59–61, 114–116). The excavations revealed a row of postholes like a palisade, and the butt of one of the posts was recovered.

In the late 1990s assessment surveys and sub-surface testing was undertaken in the Pegasus Town area by Chris Jacomb (1997, 1998). About 50 sites were documented, and the Hohouponamu site was identified as being about 350 m long and 200 m at the widest part. Most of the sites recorded were shell middens located in the inner dune system, which had been planted in pines.

An Authority application to the Historic Places Trust was prepared in 2005 (Witter 2005). The basic concept behind the research strategy for the application was that archaeological investigations and salvage would be concurrent with the development. This is because the ground cover of trees and other vegetation prevents the detection of archaeological sites and restricts access to them, even for previously recorded sites. Thus, as a block of land is cleared the process is monitored and all previously known and any new sites are marked. These are then test-excavated to determine research potential and those with the greatest potential were salvage excavated. The excavations proceed as the development progressed elsewhere in the area.

The objective of this paper is to summarise the fieldwork for the first phase of development (“Pegasus Stages 1–5”) and to review some of the issues which have emerged.

Landscape Context

There are two sets of sand dunes which border Pegasus Bay. The dunes which belong to foreshore are the Kairaki dune system and date to about 500 years ago, while the inner late Holocene dunes behind them are the Waikuku

system (McFadgen and Goff 2005, Boffa Miskell n.d.). These dunes have been cut by the Ashley River to the north and the Waimakariri River to the south (Figure 1). The Kairaki dunes were formed after a major tectonic event in the Southern Alps which caused extensive landslides and slips and resulted in a massive bedload of sand being carried by the rivers into Pegasus Bay. This provided the sediment for an off-shore barrier bar to be built up and form the present coastal dunes.

The swale between the Waikuku and Kairaki dunes was an extensive freshwater swamp before draining for European agriculture and much of it remains a wetland. In May 2006, while monitoring the digging of a sewerline through this area shell beds of predominantly cockle (*Austrovenus stutchburyi*) were encountered at 1–1.5 m below the surface. These appear to have been a natural population living in a tidal lagoon that had formed after the Kairaki dune building event. This lagoon then filled with sediment and became the freshwater swamp.

A large number of midden sites with estuarine shells have been recorded in the inner (Waikuku) sand belt between the Ashley and Waimakariri Rivers (Challis 1995). Two dates have been recorded from middens in these dunes at about 500 and 300 years old (Trotter and McCullough 2005: 9–10).

Method

Fieldwork began in October 2005 to monitor the timber harvest and land clearing in the Pegasus Stages 1–5 area. This is a 1 x 0.6 km area in the inner dune system. Part of this had been planted in pines in the 1930s and had been partially logged, leaving patches of old growth trees and an impenetrable cover of broom, gorse, blackberry and pine saplings. A root rake mounted on a digger was used to windrow this vegetation and clear around the trees to be harvested. This proved to be an effective way to locate sites which had been inaccessible to the previous survey work. The rest was a younger pine plantation which was harvested manually and by a feller-buncher. The slash from this covered the ground, and it was not until windrowing and stump pulling that sites could be found.

The sites were indicated by shell or fire-cracked rock or both, with artefacts being rare. All sites were marked with a hand-held GPS and the waypoint was used as the site designation. Sites with the potential for in situ deposits were barricaded with tomato stakes and danger tape to prevent any further disturbance by heavy machinery.

Test excavations followed using 1 x 1 m squares. Usually the top layer of loose or disturbed sand was excavated as “Surface” and sieved with a 10 mm sieve. The underlying deposit was then passed through a 5 mm sieve. The

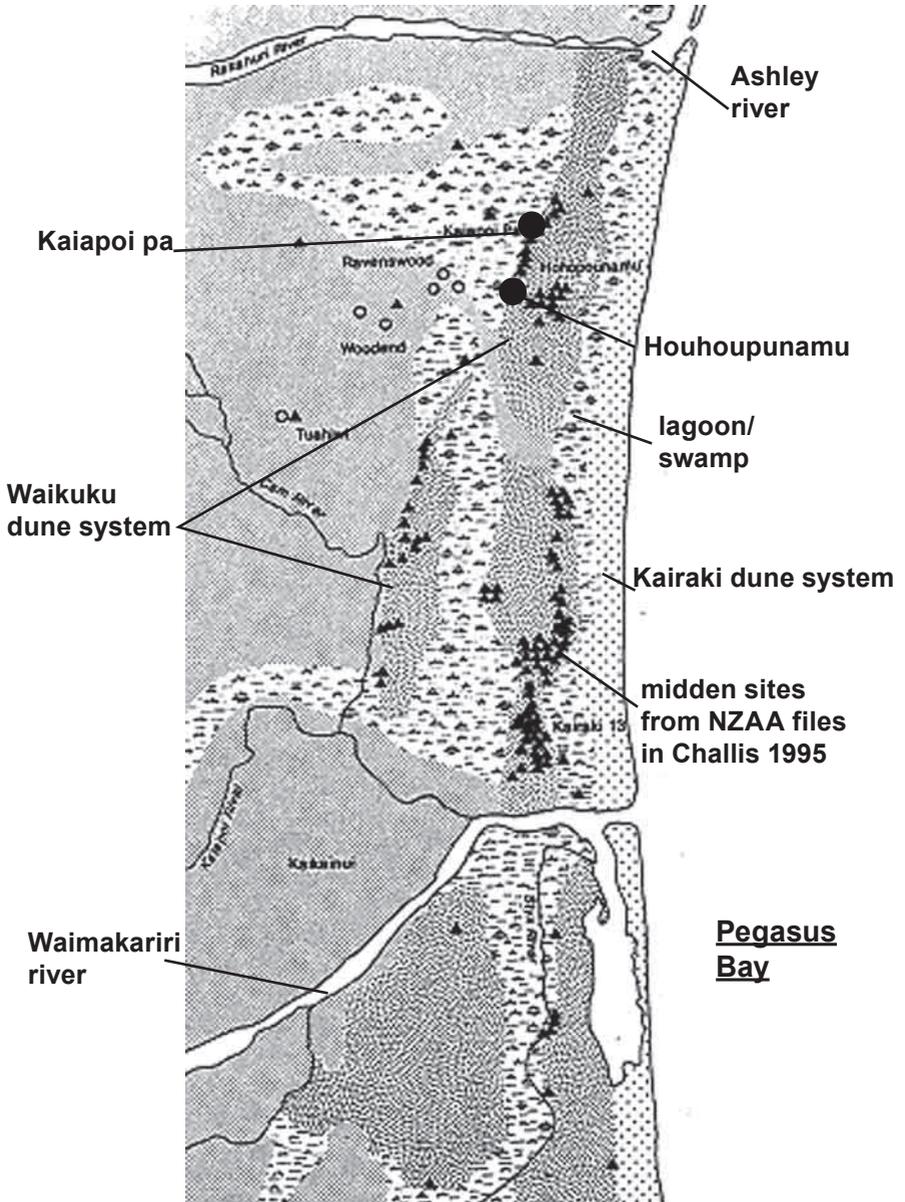


Figure 1. Dune Systems and middens on the Pegasus Bay coast. The map is from Challis 1995.

excavations were dug by stratigraphic layer. Samples of the contents of all the sites excavated were retained.

The sites selected for salvage excavation were the best in situ deposits of the different kinds of sites. This included middens with varying proportions of shellfish species and shell sizes. The various types of cooking features (ovens and hearths) were also excavated. Some entire middens were excavated and all of the shell measured by weight and volume. Any artefacts or animal bone was recovered in situ or picked out of the sieve.

Results

A total of 92 sites were recorded within the Pegasus Stages 1–5 area (Figure 2). These included middens, ovens, find spots and habitation areas. Of these, 56 were tested or excavated further (Table 2). There also were 4 concentrations of moa gizzard stones which appear to be non-archaeological since they were not associated with artefacts or ovens.

Table 2. Number of site types found and excavated.

Site Type	Number Found	Number Excavated
middens	66	43
ovens	17	13
find spots	7	n/a
habitations	2	2

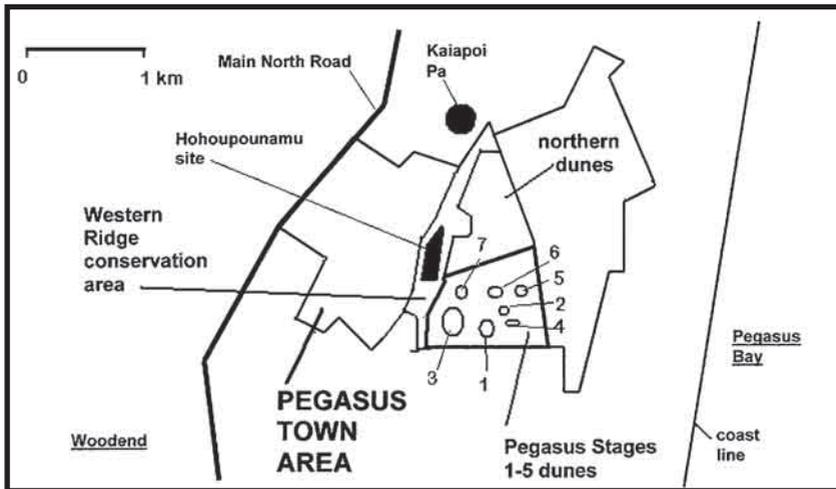


Figure 2. Map showing the Pegasus Town area. Numbered areas within the Stages 1–5 block are midden groups as described in the text.

Middens

There were two multiple deposit middens and three domestic middens. The multiple deposit types had contiguous shell dumps suggesting multiple continuous events. The domestic middens are interpreted as clean-up dumps from a habitation area. All of the remaining tested middens were single layer/single episode deposits. The observations below were made during the excavation work:

- Midden size. The single layer midden deposits ranged from 5–20 cm thick. The largest single layer middens were about 10 m² and the smallest were about 4 m². Two of the middens represented contiguous shell deposits and one 36 m² midden was completely excavated. There were three domestic middens which were up to 50 cm thick; one 12 m² in size was completely excavated.
- Midden structure. Some of the middens were heavily disturbed by erosion, machinery or tree roots but many were complete and intact. The middens were sometimes in isolation from any cooking feature and had little or no charcoal associated. Other middens were closely associated with a shallow charcoal filled basin-like hearth that had a single layer of fire-cracked cooking stones on the surface. These usually had varying amounts of charcoal mixed with the shell. In other cases the associated cooking feature is more pit-like and contained fire-cracked cooking stones mixed in it.
- Deposition. The shells may be jumbled in a deposit, and be tilted and imbricated at various angles. The same effect was observed when the excavated and sieved shells were poured into a pile from a bucket. In other cases the shells were stacked (or several nestled together) and tightly bunched as compact clusters. It was as though they had been placed as hand-fulls in a container. The shells also occurred as a thin discontinuous layer. The domestic deposits contained a great deal of burnt and heavily fragmented shell mixed with charcoal. One was so burnt that some of the shell was turned into lime.
- Shellfish composition. The shellfish were typically dominated by cockle (sometimes exclusively cockle), but pipi and mud snail were sometimes present and in a few cases pipi was dominant. Shell size varied considerably and sometimes there were extremely small juvenile shells. Whelks and top shells occurred but were rare.
- Artefacts. Most middens had no artefacts present. There were however examples where flaked stone was found of silcrete, flint, chert, argillite, basalt, greenstone and greywacke. Some sandstone fragments seem to have been abraded. Most of the flakes appear to be the product

of resharpening larger tools and some had use-wear on the edge of the platform. One midden had a broken basalt adze and a domestic midden had a broken, heavily burnt greenstone adze. No bone tools were found in any single layer type middens but these were present in the domestic and multiple deposit types. A large boulder was found on top one of the multiple deposit middens and another one on top of a domestic midden. These are likely to be cached fernroot pounding anvils.

- Animal bone. Vertebrate remains also were usually lacking. The fish bone has not been systematically identified but most were probably red cod. There were a few large ling jaws and some flounder vertebrae were recognised. The bird bone was from relatively small species and has not yet been identified. A fragment of moa bone was recovered by one of the middens. This had been weathered and probably had been lagged on a blow-out surface where the shells had been dumped. It showed tooth marks from rat gnawing. In one of the domestic deposits dolphin bone was present and in another there was seal bone.

Ovens

Ovens or hearths containing fire-cracked greywacke cobbles and little or no shell were found (Table 2). In addition to these, many of the middens had cooking features associated. The nearest source of the stone is an outcrop of the Rangiora fan gravels about 1.3 km west of the Pegasus Stages 1–5 area. This outcrop also has had two large borrow pits dug in it to provide gravel for kumara garden mulch.

- Cooking Pits. All of the cooking pits contained fire-cracked greywacke cobbles, and most seemed to have been stirred to recover whole stones or large pieces. The pits included shallow basins about 10–20 cm deep and between 50 and 120 cm in diameter. These probably had a single layer of cooking stones laid over the coals. There also were deeper pits about half a metre in depth and with a diameter of between a half and one metre. The cooking stones were usually scattered in the pit fill rather than as a compact mass. There were two examples where pits had been dug into previous cooking pit material.
- Cooking stones. The cooking pits associated with the middens suggest that cooking stones were used sparingly and most were probably about 10 cm in size, although this was difficult to assess because almost all were fire fractured. It is likely that most of the larger stones were re-cycled.
- Charcoal. The cooking pits often produced large chunks of charcoal. This should reveal something of the cooking process and provide information on the fuel available and the surrounding vegetation.

- Concentrations of fire-cracked rock. Some of the excavations produced concentrations of fragmented cooking stones not associated with middens and had been re-deposited by deflation with no intact cooking feature. Most had a few weathered shell fragments present and one had a few pieces of flaked stone.

Living Areas

Almost all of the sites found are considered to have been activity areas located away from settlements and in an area of inland dunes. It is a landscape which could have been maintained as a fernroot habitat by burning. This situation is consistent with a process of fernroot harvesting and preparation in which shellfish were brought in to provide the protein component.

The domestic middens mentioned above indicate that habitations were present. A lens of charcoal about 3 m in diameter containing charcoal, scattered fire-cracked greywacke and pieces of a heavily burnt argillite adze was excavated within 4 m of two domestic type middens. Between the floor and the middens there were obsidian workshops and industrial moa bone working. No postholes or stone-lined fireplace was found, but it is likely that this was a temporarily occupied circular dwelling structure (Anderson 1986)

Within about 20 m of a multiple deposit type midden another site was excavated which was thought to be a house floor. This was in a 20 cm deep depression, but no postholes or fireplaces were found. However, it had numerous fish bones, mostly burnt, as well as flaked stone, including a large greywacke flake tool with usewear on the edge. A broken elongated greywacke cobble with battering also was found.

Spatial Patterning of Middens

There was a tendency for the site variation in the sand dunes to be grouped. Figure 2 shows the grouping which has been identified so far.

Group 1 middens are shell deposits closely associated with basin-like hearths. The shells are mostly large sized cockles. The hearths are shallow with a single layer of stones on top and shells are dumped adjacent to them. These are within a roughly 200 x 200 m area in which there are 11 middens. One of these is a multiple deposit type and another seems to be a dwelling floor.

Group 2 contains the three domestic middens within a 100 m diameter area and includes a charcoal lens thought to be a dwelling floor and obsidian workshop.

Group 3 consists of 20 middens, some with extremely large sized shells. The shells were mostly cockles but sometimes pipis were dominant.

Ovens were found but not in association with midden deposits. This group is about 300 x 200 m in size with 25 sites.

Group 4 consists of cockle middens, mostly small sized and which seem relatively unweathered. The cooking features are probably near-by, but have not yet been identified. These are in a 100 x 150 m area and 8 sites have been identified, one of which was a multiple deposit type.

Group 5 has middens of mostly large cockles associated with their cooking features but these are deeper bucket-like ovens containing fragmented cooking stones. This group consists of 7 sites in a 100 x 100 m area.

Group 6 has middens, mostly cockle, and deep pit ovens. There are 7 sites within 100 x 50 m.

Group 7 consists of middens and ovens. One of the oven areas is a massive deposit of charcoal with fire fractured rock only. There are no shells, bone or artefacts in this site, although it is within 50 m of middens. There are 6 sites in a 150 x 100 m area.

Issues

The Pegasus Stages 1-5 area has a density of 66 middens in roughly 60 ha. It is also adjacent to the Hohouponamu site on the Western Ridge which has midden over an area of about 500 x 100 m. The middens probably start from around 1500 AD which is the date of the tectonic activity (Goff and McFadgen 2002) and the formation of the coastal lagoon, and continue until Kaiapoi Pa was destroyed by Te Rauparaha in 1832 AD.

The harvesting and transport of very large volumes of shellfish and cooking them represents a substantial amount of labour. If this was combined with fernroot gathering then the labour involved would have been much greater. It is proposed that fernroot in the dune habitat would have been a high bulk commodity and stock-piled at strategic central places. Shellfish, fuel and cooking stones would have been transported to these places.

The shellfish represent a logistical process from their habitat to the place of cooking. To appreciate this it is important to determine the source of the shellfish, and how far they were carried. An estuarine tidal lagoon was probably available between the inner sand dunes and the present coastal dunes between 500 and 400 years ago. As this estuary began to fill and transform into a fresh water swamp, the available shellfish beds would have retreated further north to the Ashley River mouth. There would however have been some access by canoe. Some of the middens seem to have had hand-picked shells, but others may have been mass-gathered by a dredge or other methods. It is assumed that the harvesting and transport of shellfish was by women and children. Thus, how many kilograms of shellfish would be carried by a

woman, and how far? How many people were involved in providing the shellfish for particular meal events? It is assumed that the shellfish were a garnish or a supplement to the main diet which was probably bracken rhizome starch. If so, how many women would have been involved in the entire process, and how would this work have been coordinated?

The cooking technologies were varied, and include basin-like hearths with a single layer of stones as well as deeper stone-filled pits. The disposal of shells was sometimes close to the cooking features and sometimes at a distance. The method of disposal also varied. Some were dumps of shells out of containers. This resulted in jumbled shells which were tilted at various angles, the same as when shells are poured into a pile from a bucket. In other cases the shells were bunched. These were tight clusters of shells, some of which were nested in each other, and appear to have been gathered in the hand and placed in a container which was then placed in the disposal area. There were only a few scatters of shells in thin patchy clusters which were probably consumption places which were not cleaned up. Why was there such extensive cleaning up and disposal of the shells? How much labour was involved in this, and how was it directed?

Material for dating has not yet been submitted. However, it is expected that the variability of midden assemblages in the midden groups will form a chronological sequence. The material to be submitted will include some paired charcoal (atmospheric ^{14}C) and cockle shells (marine ^{14}C) from the same cooking event. This should help to determine the delta R for the estuarine shells which is probably different from the fully marine conditions.

The archaeology at Pegasus Town is remarkable for its abundance and variety over an entire landscape. There is great variability among the middens, and this will be defined in detail by analysis. Dates for this variability should be explicable in terms of landscape evolution. The patterning of the archaeology over the landscape may give a perspective on processes of cultural change during 300 year period. This would be in the context the evolution of a greenstone manufacturing and exchange centre and the development of a political focus for the Canterbury region.

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References

- Anderson A. 1986. "Makeshift structures of little importance": a reconsideration of Maori round huts. *Journal of the Polynesian Society*, 95(1): 91–114.
- Anderson, A. 1998. *The Welcome of Strangers*. University of Otago Press, Dunedin.
- Burrage, S. 1975. The end of an era. *Canterbury Museum Archaeological Society Newsletter*, 31.
- Boffa Miskell, n.d. Ashley River Floodplain Management Regional Plan (Map 4.3 Floodplain Geomorphology, Canterbury Regional Council) and Soils and Agriculture of the Downs and Plains of Canterbury and North Otago, New Zealand, Soil Bureau Bulletin No. 14. Planning map, Boffa Miskell.
- Challis, A. 1995. *Ka Pakihi Whakatekateka O Waitaha: The Archaeology of Canterbury in Maori Times*. Department of Conservation, Wellington.
- Evison, H. 1997. *The Long Dispute*. Canterbury University Press, Christchurch.
- Goff, J. and B. McFadgen 2002. Seismic driving of nationwide changes in geomorphology and prehistoric settlement – a 15th century New Zealand example. *Quaternary Science Reviews*, 21: 2229–2236.
- Jacomb, C. 1997. Report of a site survey carried out for Pegasus Bay Coastal Estates, near Woodend, North Canterbury. Unpublished report.
- Jacomb, C. 1998. Report of a site survey carried out for Brockenhurst Estates, near Woodend, North Canterbury. Unpublished report.
- McFadgen, B. and J. Goff 2005. An earth systems approach to understanding the tectonic and cultural landscapes of linked marine embayments: Avon-Heathcote Estuary (Ihutai) and Lake Ellesmere (Waihora), New Zealand. *Journal of Quaternary Science*, 20(3) :227–237.
- Slater, H. 1912. The fall of the Canterbury pas. *New Zealand Military Journal*, July 1912 (in NZAA site record M35/7).
- Stack, J. 1893. *Kaiapohia: The Story of a Siege*. Whitcombe and Tombs, Christchurch.
- Taylor, W. 1950. *Lore and History of the South Island Maori*. Bascands Limited, Christchurch.
- Trotter, M. 1998. Pegasus Bay Coastal Estates Proposal. Statement in support of a submission by Gaye Stanley/Te Ngai Tuahuriri Runanga Resource Management Committee.
- Trotter, M. 2001. Brief of evidence of Michael Malthus Trotter, archaeologist and retired museum director. Submission for the Environment Court.
- Trotter, M, and B. McCulloch 2005. Final results of archaeological field work undertaken for Waimakariri District Council as a condition of Authority 2005/67. Kairaki sand dunes. Unpublished report.
- Witter, D. 2005. Historic Places Act Section 12 Authority Application for Pegasus Town. Supporting document prepared for Pegasus Town Corporation.