



NEW ZEALAND  
ARCHAEOLOGICAL  
ASSOCIATION

## ARCHAEOLOGY IN NEW ZEALAND



This document is made available by The New Zealand Archaeological Association under the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License.

To view a copy of this license, visit  
<http://creativecommons.org/licenses/by-nc-sa/4.0/>.



# 3 ½ YEARS OF FIELDWORK – ARCHAEOLOGY AT PEGASUS

DAN WITTER  
WITTER ARCHAEOLOGY

## Introduction

Pegasus Town is located about 25 km north of Christchurch near Woodend. It is a planned town for 5,000 people and includes a business district, school, artificial lake, golf course and retirement village in a 3 x 2 km area. The archaeological work has been chronicled in AINZ by regular news items and three articles (Witter and Witter 2007, A. Witter 2007 and D. Witter 2008). Now, after 3 ½ years of monitoring, recording, testing, sampling and excavating the fieldwork has finished.

We recorded 770 GPS waypoints as “sites”, and 440 of these were excavated to varying degrees, totalling 2030 m<sup>2</sup>. The unexcavated waypoints consisted of find spots and disturbed deposits. The paperwork includes about 4,500 forms for 1 x 1 m squares, plus stratigraphic sections, plans and other data occupying about 8 m of shelf space. At least 14,500 bags of midden, lithics, fauna, matrix, etc, are stored in cube crates in 6 shipping containers. In addition, over 500 wet wood artefacts (both finished items and by-products) and some fibre, pieces of gourd, etc, were recovered for preservation.

The findings of this fieldwork are summarised below, and a strategy for analysis and write-up outlined.

## Late Moa Hunter

Moa hunter archaeology has been documented in Canterbury at the Rakaia River mouth site (von Haast 1872) and in the Sumner area of the Avon-Heathcote mouth (Trotter 1975). None has been found at the present day Waimakariri River mouth, but at the time the Waimakariri probably flowed south of Banks Peninsula into Lake Ellesmere/Waihora and through Kaitorete Spit (McFadgen and Goff 2005).

On the Pegasus sand plain a series of sites were found with small fragments of moa leg bone (Figure 1). There were no fishhooks, nor evidence of

fishhook manufacture and few tool marks on the bone. The moa bone was mixed with estuarine shellfish midden, predominantly cockle, concentrations of small-sized fish such as could be caught by net (Witter A. 2007), and small bird bone as well as the occasional barbed bird spear point. Debitage was sparse, but from a wide range of materials, mostly local. Argillite was uncommon and obsidian rare. There was a single greenstone adze, but no greenstone flaking.

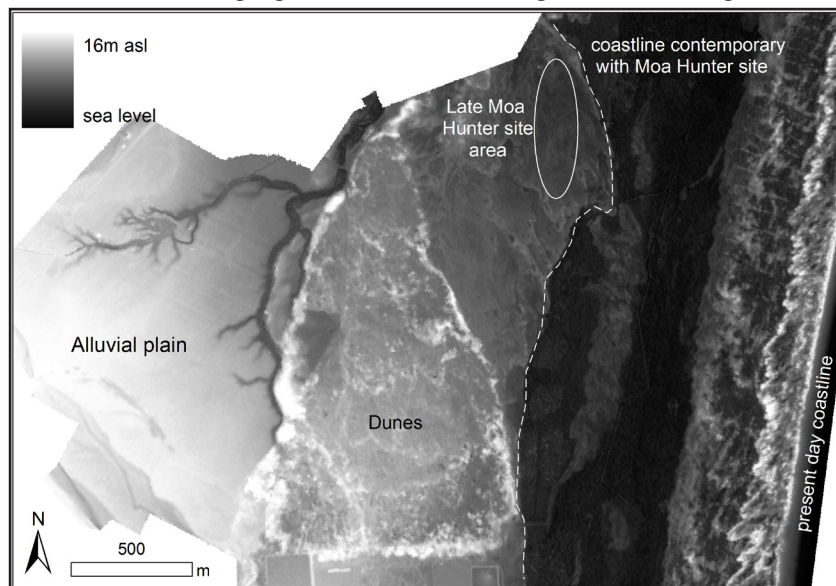


Figure 1. Map showing the location of the main late moa hunter sites, and shoreline at the time of occupation.

The main group of moa hunter sites occurred as clusters of ovens and midden deposits. A moa hunter house floor was found surfaced with compacted and fragmented shell and a few shallow postholes. It was located on a low sand knoll and part of an old sand and gravel beach system described further north as the “Highway 1” ridge (Schulmeister and Kirk 1996). To the east of the old beach ridge was a shoreline and barrier bar.

### Tairutu Gully Pa

The Tairutu Gully pa (Figure 2) was bounded on three sides by the banks of Tairutu Gully and two side channels (Witter 2008). It did not have ditch and

bank defences on the open side but a 50 m long row of palisade postholes only. These palisade postholes were exceptionally large and up to 1.5 m deep.

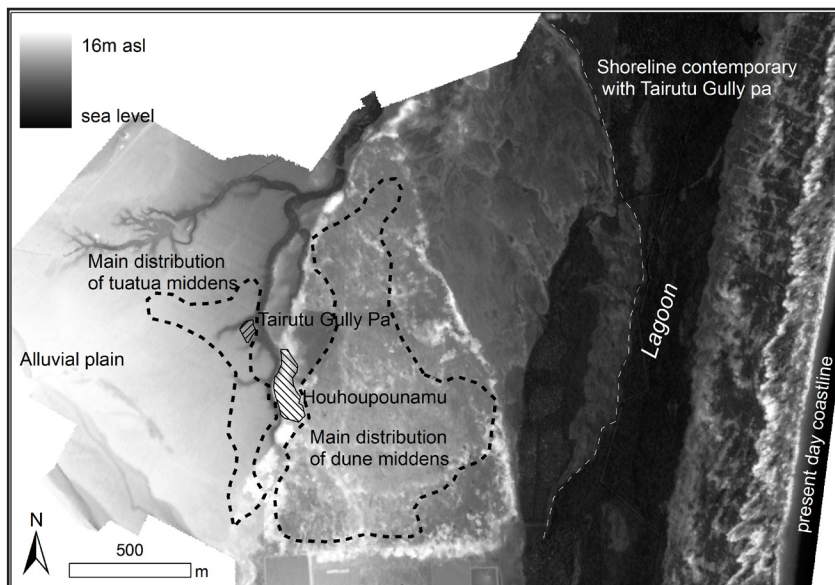


Figure 2, Map showing the Tairutu Gully Pa and associated tuatua midden sites, and the shoreline. Also shown is the Houhoupounamu site, dunefield middens and the newly formed lagoon.

When first seen the side channels were no more than swales in a ploughed field, as they were partly filled in by soil. Under the ploughed soil, on the slope of the northeast side-channel, was a midden deposit about 70 m long and up to 0.5 m thick. This midden contrasted strongly with the late Moa hunter deposits. It consisted of small tuatua (often dominant) and freshwater mussel (sometimes dominant in the lower layers), and the estuarine mix of cockles, pipi and mudsnails. It also produced rat bone and a remarkably large amount of dog bone, as well as fish and bird bone. The small tuatua probably matches the thin intermittent basal lens on the nearby Hohoupounamu site dated to about 500 years ago (Challis 1995:26). The earlier barrier bar would have become a new beach, providing a habitat for the tuatua. The small shell size would reflect an ecologically unstable condition of the habitat which prevented them from achieving full size.

In the midden were over 3,000 greenstone flakes and preforms in varying stages of production. There were about 60 adze/chisels (mostly greenstone),

pendants of greenstone and bone (finished and unfinished), various stone and bone tools, including a surprising number of needles with tiny eyes, and four drilled shark's teeth belonging to a necklace. An estimated 8,000 artefacts were recovered from the site.

Underneath this midden was about 0.5 m of clay which overlay a wood layer of tree stumps and logs. The logs were arranged parallel to each other and at right angles to the channels. On top of these were shorter logs which are interpreted as rollers for a canoe landing.

When the digger cut through the side channel it broke into a slurry of mud. This was a spring-fed bog deposit with an extraordinary assemblage of wet wood artefacts. There were approximately 50 finished items such as adze handles, digging sticks, clubs, tops, etc, and even part of a mania carving. There was a further range of wooden items in various stages of manufacture, square-cornered house posts, split boards, and a variety of by-products from wood working.

The pa was not in isolation (Figure 2). Scattered across the alluvial plain, within about 0.5 km were 15 other sites with the Tairutu Gully Pa signature middens: small tuatua, freshwater mussels, estuarine shells, rat, dog, fish, and bird bone, worked greenstone and other artefacts. These usually seem to be in some kind of pit feature intact below the plough zone, and appear to belong to a domestic refuse deposit. The pattern of these sites suggests a hamlet with small domestic dwellings 100 m or so apart.

## **Hohoupounamu and the Dunefield**

Around 500 years ago a major tectonic event in the Southern Alps shook loose masses of rock, and huge amounts of sand were carried by the rivers into the sea. This began a major new cycle in progradation and dune building on the Canterbury coast (McFadgen and Goff 2005).

On the Pegasus coast a new off-shore barrier bar was built up to become a beach and then a dune, forming a lagoonal system from the Ashley/Rakahuri River to the Waimakariri. This lagoon provided a large and extremely productive habitat for cockles and pipi, as well as for fish and bird life. The massive middens belonging to the Hohoupounamu site on the Western Ridge date to this time (Challis 1995:80).

Soil stripping of the adjacent dunefield revealed two house floors, three stratified middens, an obsidian workshop, 27 ovens without midden, two multiple deposit middens (i.e. contiguous shell heaps), and 125 midden lenses

sometimes with ovens. One of the middens was associated with a latrine, two caches of pipi shell tools, and a great quantity of fishbone.

The 125 midden lenses need explanation. These mostly ranged from 4 to 12 m<sup>2</sup> in size, up to 20 cm thick, showed no indication of a hiatus in their deposition, and are interpreted as single events. Fishbone and artefacts were rare. The shell was all estuarine, with cockles the most abundant, and pipi only occasionally dominant. Mudsail was often present. The middens showed no association with the margin of the lagoon where the shellfish were gathered, but were distributed singly and in clusters throughout the dunefield. Most were grouped around Hohoupounamu in a radius of about 500 m, and showed no tendency to be associated with Kaiapoi Pa (Figure 2).

During excavation taphonomic observations were made on the method of shell disposal (Witter and Witter 2007: 37). Sometimes there was a relatively loose pile, with the shells (especially the cockles) often tilted within the heap, looking as though after the meal the shell had been gathered into a container (kete?) and poured out. Another type of deposit was very compact, with the shell so dense it was difficult to get a trowel into it; the shells were nested and packed in fist-sized balls in solid masses the size and shape of the arourou cooking baskets (approximating a 2 litre ice cream container). Examples of shells left scattered on the ground in primary context from a meal were rare.

Another taphonomic process seems to have been oven stone recycling. The dunefield was roughly 1 km from the outcrop of alluvial greywacke gravels which would have been the primary source of heat retainers. Most of the ovens contained loose small-sized fragmented stone, giving the impression the ovens had been stirred up and the larger stones extracted for reuse.

Two large greywacke boulders were found, one on a stratified midden and the other on a multiple midden deposit. Residue analysis may show evidence of their use as bracken rhizome anvils. Flotation will also be used to test for charred rhizome bark. Bracken could be maintained by burning off, making a renewable carbohydrate source. Shellfish, the protein component, could be brought to the bracken processing area (Witter and Witter 2007: 40-41) and served to feed the occupants of the Hohoupounamu site.

## **Kaiapoi Pa**

Kaiapoi Pa, renowned for its sack by Te Rauparaha and the Ngati Toa from Kapiti Island in 1832, is not on Pegasus but immediately adjacent. The description of the attack makes explicit reference to a kumara garden south of the pa (Tau and Anderson 2008: 184). This garden is within Pegasus and recognisable by a pair of large borrow pits and an extensive area of gravel mulch (Figure 3). The gravel mulch area was still well defined even after over 100

years of ploughing (Jacomb 1998). Other borrow pits are known to extend for about 4 km to Tuahiwi (Walton 1985).

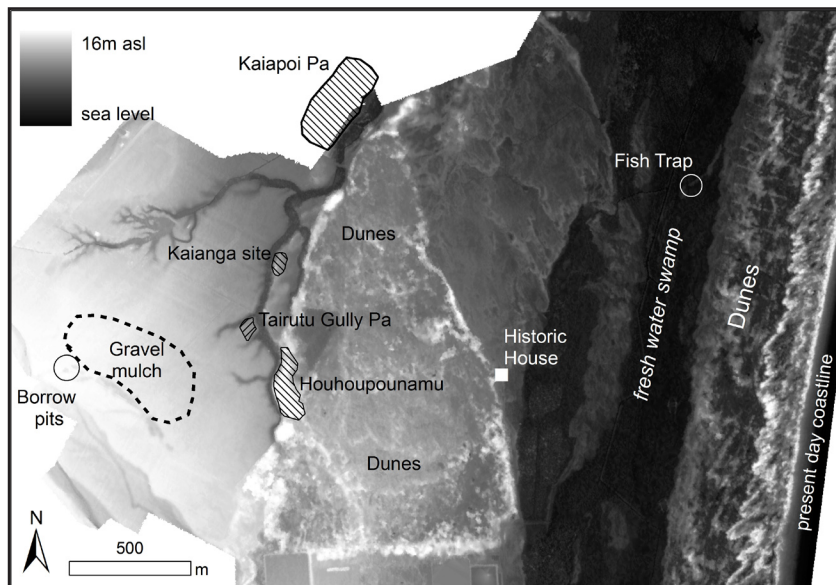


Figure 3. Map showing Kaiapoi Pa, borrow pits and plaggen soil, the Kainga Site, fish trap and the new freshwater swamp. The historic house location is also shown.

It will be possible to date the plaggen soil, and by inference the borrow pits which produced the gravel. Underneath the artificial gravel layer are in situ cockle midden deposits and ovens. This should clarify whether the gardens were functioning during the time of the Hohoupounamu site or were later, belonging to Kaiapoi Pa. Pegasus is close to the current limit of effective kumara cultivation (about 70 km further south at Taumutu). It is possible that kumara gardening had not been reliable earlier because of a cooler climate (Challis 1995:56).

All of the alluvial plain has been ploughed, churning up a zone about 20 cm thick down to the subsoil, and apart from the garden mulch and borrow pits, no other sites were previously recorded. While monitoring the motor scrapers, sites appeared everywhere, including 164 middens. Many of these were in the cavities left by rotted-out or burnt-out stumps, and others were patches of



fragmented and scattered shell in the plough zone. There also were 113 ovens of different sizes, pit shapes and density of oven stones.

A small village (the Kainga site) was also on the alluvial plain, just north of the Tairutu Gully pa on the eastern edge of the Tairutu Gully channel (Figure 3). It had cockle midden and a scatter of freshwater mussels, a few pieces of elephant fish (the only occurrence of this species at Pegasus) and some other fishbone. Stone artefacts were scarce with little greenstone working. The site produced a large number of square-sided house posts which were driven in the ground without digging postholes. These frequently had the wood still in the ground, although very degraded. The state of preservation of the bone, wood and shell gave the impression that this was a very recent site, probably contemporaneous with Kaiapoi Pa.

On the east side of Pegasus was a swamp area which contained a large site with strips of bark, brush and adze-cut wooden stakes. There was no indication of a row of posts with woven branches as described for eel traps (Best 1929: 131-136). This was a difficult site to excavate with the tangle of bark, branches and loose stakes. It had clearly been used repeatedly and subject to much disturbance. Eventually it emerged that the system consisted of basins about 2 m in diameter and 0.5 m deep with the bottom lined by strips of bark (probably mostly totara) that were pegged in place. Over the top was a cover or roof of branches (probably manuka) which was supported by stakes. No description of a site like this has been found so far, but it resembles some accounts of lamprey traps (Best 1920: 197). The swamp with this fish trap was in the area of the former lagoon. The lagoon deposit contained natural populations of estuarine shells, mainly cockles, below about 40 cm of sediment.

## Historic House

After the destruction of Kaiapoi Pa and the accompanying massacre in 1832, the Maori community scattered, and eventually returned to Tuahiwi. The Pegasus area was occupied by the Reverend Raven in about 1853 (Wood 1993: 37). A paper road reserve connecting Woodend to the Ashley/Rakahuri River mouth at Waikuku went through his property. A squatter's small house with a brick chimney was built on this road reserve, on a low sand dune next to the channel of the swamp (Figure 3).

The house was 10 x 8 ft (2.4 x 3 m) with solid posts and a bare sand floor. Since the floor lacked a sharp boundary the structure was interpreted as canvas on a wood frame. Various items suggested a solitary mariner as occupant. A whale vertebra was used to plug the deflation of a corner posthole and there were several clay pipe fragments with a nautical theme, including one with a tiny modelled mermaid seated on the stem and reclining seductively against



the bowl. Nothing belonging to women or children was found. The chimney was built of very rough bricks, either seconds or from poor clay. The brickwork was neatly but inexpertly done, and the mortar was made from burning shell, probably from the nearby middens. Sheep bones with dog tooth marks were found at the back of the chimney. Near the house there were five piles of black porter bottles with the finish on the necks knocked off. These piles have the look of a party with a case of beer. The style of finish on the porter bottles indicates an age of 1860s to 1880s and this date is further supported by the coins found. A corral-like horse yard with large horseshoes was also nearby on the road reserve.

### **Analysis, Write-up and Model**

With the fieldwork completed the next stage is analysis and write-up, and it is proposed to prepare 24 descriptive reports to account for the range of archaeology found. Following this is a final report to tie it all together. The reports will be written in line with New Zealand Historic Places Trust (NZHPT) standards for descriptive reports, and will not include problem-oriented research. However, descriptions can be done in a variety of ways, and structured to address a range of questions.

The original NZHPT authority research design (Witter 2005) identified geomorphology, chronology and the spatial distribution of sites as major issues. It also proposed in detail a model on the labour organisation needed for greenstone manufacture and shellfish gathering. These topics need to be addressed in the analysis and reporting.

The sequence described here is one of apparently discontinuous settlement events: the late moa hunters were displaced by the builders of the Tairutu Gully pa and associated hamlet. This was followed by Hohoupounamu; then followed by Kaiapoi Pa; then the British. This has the look of a series of colonisations. The term colonisation used here differs from migration. In a migration one population is dispersed to another location and is an additive process to any original population without inflicting basic changes. Colonisation occurs when the incoming population takes over and dominates any original population.

Colonisation is a powerful element in Polynesian culture. It has been described as driven by a developmental process in a ranked social system. A group arrive and settle on a new island; they proceed to exploit it as rapidly as possible as different lineages compete for population and status. Eventually, one lineage dominates sufficiently so that another is forced out to try

elsewhere. This leads to another island being found and the cycle starts again (Kirch 1984:13, 281).

New Zealand was probably initially colonised and settled this way. Eventually defensive pa were constructed, presumably due to a state of chronic warfare or threat of attack. This was probably around 400 or 500 years ago (e.g. Sutton et al. 2003: 195). This assumes a condition of increasing population and competition for resources. It also assumes a level of socio-political development. The coordination of a labour force to dig ditch and bank pa, cut down trees, haul them, and construct a palisade requires a degree of organisation, task allocation and direction. War parties also need an element of leadership. Status societies were a feature of Polynesian culture, and would have been brought to New Zealand. Thus individuals of rank would have been in these positions of authority. The abundance of defensive earthworks in the North Island is extraordinary by Polynesian standards, and all built within about 300 years.

At European contact ranked social organisation was of a relatively high order, with chiefs having considerable authority. This was probably sustained in part by the need for an effective defence system, as well as the capacity to mobilise a military for attacks in an escalating process. It can be expected therefore that occasionally, one tribal group would be pushed out by another and have to relocate elsewhere, but in a place already settled. A factor in achieving this is likely to have been a greater level of social integration and more effective coordination by high ranking individuals.

At Pegasus the late moa hunter sites are interpreted as focalised settlements located at the place of high bulk resources such as estuarine shellfish and netted small fish from a lagoon (Figure 1). Bracken rhizome may have been the main carbohydrate. Birds were taken by spear and probably snare. Moa legs were brought in from kills up country, perhaps the last of the moa in Canterbury. The lithics have a low proportion of imported materials. From the size of the sites, they were probably occupied by small mobile family groups. This system is consistent with that described by Anderson and Smith (1996: 289-290), for developments following the big moa hunter villages.

When the builders of the Tairutu Gully Pa arrived it was with greenstone flaking technology and agriculture. They built the pa as the focus of a hamlet about 300 x 500 m. The small tuatua was particularly distinctive at all these sites. The most likely source would be if the off-shore barrier bar that existed during the late moa hunter period had become a beach (Figure 2). It implies that resources from a wide range of habitats were being brought to the domestic base and indicates a central place foraging strategy. The small domestic sites imply that occupation was at a family level. The pa and greenstone working

floors there however, show that there was higher level organisation as well. The late moa hunters never had a chance.

At the formation of the big lagoonal system about 500 years ago there also was a change in the archaeology, with the development of Hohoupounamu and of associated single event middens on the dunefield. Although these are simple middens, their implications are relatively complex. A strategic location would have been selected for bracken gathering and processing. This was the high bulk commodity and formed the centre of operations for a female work force. One group would have been delegated to gather shellfish from the lagoon. Another would have been responsible for the oven stones, scavenging them from previous ovens, or perhaps bringing more from the outcrop. Gathering firewood would have been another task, as would have been cutting flax and weaving the cooking baskets. The major job however, would have been digging out the bracken rhizomes and stockpiling them for cooking. The next stage would have been roasting the bracken, beating out the starch and making the “cakes”. The shellfish also needed to be cooked.

This process had to be completed in time to bring everyone else in for the meal. These people were probably at Hohoupounamu, possibly engaged in working greenstone. This abundant dunefield and lagoon resource may have been crucial in supporting large scale greenstone production. After the meal came a clean-up process. The shells were gathered up and put into the used cooking baskets or other containers and disposed.

This extended foraging-feeding system was organised on a very different basis from the previous central place logistics associated with the Tairutu Gully pa. It suggests a more stratified social system for a complex process of coordination. The inhabitants of Hohoupounamu may have been relocated from Tairutu Gully pa, but the apparently abrupt change in organisation suggests a different picture. This was a new group looking for a place to colonise, having been out-competed in their home area where they had developed an increased level of social integration and authority. They destroyed the Tairutu Gully pa, erected their settlement on top of the Western Ridge, and with the newly formed and highly productive lagoon, assumed the greenstone trade system as a new process of colonisation.

The next stage is Kaiapoi Pa (Figure 3). The big lagoon which had been such a productive resource was now a freshwater swamp. This may have been due to a gradual in-filling with sediment, or there may have been some uplift. Oral history has it that there was only a small settlement present when the Ngai Tahu arrived (Anderson 1998: 36-37), which on genealogical grounds is thought to have been around 1700 AD (Tau and Anderson 2008: 117). A detailed oral history is available on the founding of Kaiapoi Pa, emphasising that it was for

strategic purposes and not economic, and as the socio-political hub for the Ngai Tahu. Organisation was now at an iwi level with food being brought in from the entire tribal territory along with the produce from local cultivation. Greenstone production went into full swing, and Kaiapoi Pa became the dominant centre for manufacture. Ngai Tahu oral history also details how they were squeezed out of their North Island home and began to migrate to the South Island (Tau and Anderson 2008). This turned into a full colonisation process and subjugation of the local population. My proposition is this was made possible by a greater degree of authority of high ranking chiefs for more effective coordination, and with more tactical experience and skill, acquired in the highly competitive and combative North Island context.

Pegasus offers a remarkable opportunity to infer social, logistical and other forms of organisation from the archaeological record, and the above model offers various opportunities for testing. For example, dating is fundamental to establish the sequence as outlined. Combined with GIS this will show the shifting focus of site distributions over the area. The midden analysis will show the habitat locations and complexity of logistics. The taphonomy of the midden assemblages and variability of the artefact assemblage provides more evidence of behavioural patterning. More detailed geomorphological reconstruction to understand the landscape evolution is also important. It is expected that the descriptive reports will provide a foundation for further research into the theoretical implications of this model, as well as investigate a wide range of other issues with the data recovered.

## Acknowledgements

I would like to thank Alison Witter, Jeremy Habberfield-Short, Annie O'Brien and Iain Gover of the Witter Archaeology team for their help with the manuscript and figures. Indeed, all of those who have worked with me at Pegasus have contributed to the outcome of the fieldwork and my thinking. The terrain data for the maps was supplied by WOODS – engineers, surveyors, planners – [www.woods.co.nz](http://www.woods.co.nz).

## References

- Anderson, A. 1998. *The Welcome of Strangers*. University of Otago Press, Dunedin.
- Anderson, A. and Smith I. 1996. Shag River Mouth as an early Maori village. In Anderson, A. et al (eds.), *Shag River Mouth*. Australian National University Press, Canberra.
- Best, E. 1929. *Fishing Methods and Devices of the Maori*. Dominion Museum Bulletin No. 12. 2005 ed. Te Papa Press, Wellington.
- Challis, A. 1995. *Ka Pakihi Whakatekateka O Waitaha: the archaeology of Canterbury in Maori times*. Department of Conservation, Wellington.

- Haast, von J. 1872. *Moas and moa hunters*. Transactions of the New Zealand Institute 4:66-107.
- Jacomb, C. 1998. Report of a site survey carried out for Brockenhurst Estates, near Woodend, North Canterbury. Unpublished archaeological assessment report.
- Kirch, P. 1984. *The Evolution of the Polynesian Chiefdoms*. Cambridge University Press, Cambridge.
- McFadgen, B. and Goff, J. 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.
- Schulmeister, J. and Kirk, R. 1996. Holocene history and a thermoluminescence based chronology of coastal dune ridges near Leithfield, North Canterbury, New Zealand. *New Zealand Journal of Geology and Geophysics* 39:25-32.
- Sutton, D., Furey, L., and Marshall, Y. 2003. *The Archaeology of Pouterua*. Auckland University Press, Auckland.
- Tau, T. M. and A. Anderson (eds.) 2008. *Ngai Tahu: a Migration History*. Bridget Williams Books, Wellington.
- Trotter, M. 1975. Archaeological investigations at Redcliffs, Canterbury, New Zealand. *Records of the Canterbury Museum* 9(3): 189-220.
- Walton, T. 1985. The distribution and extent of quarry pits near Kaiapoi, Canterbury. *New Zealand Archaeological Association Newsletter* 28(2).
- Witter, A. 2007. Stone net weights at Pegasus Town, North Canterbury. *Archaeology in New Zealand* 50(3):175-185.
- Witter, D. July 2005. Historic Places Act Section 12 Authority Application for Pegasus Town. Supporting document prepared for Pegasus Town Corporation.
- Witter, D. and Witter A. 2007. The middens of Pegasus Town, Canterbury, Stages 1-5. *Archaeology in New Zealand* 50(1): 32-42.
- Witter, D. 2008. Taerutu Gully Pa, Pegasus Town, Canterbury. *Archaeology in New Zealand* 51(3):207-215.
- Wood, P. 1993. *Kaiapoi: A Search for Identity*. Waimakariri District Council, Rangiora.