Late Prehistoric Subsistence Practices at Parewanui, Lower Rangitikei River, New Zealand

R. J. S. Cassels

Manawatu Museum

and

Kevin L. Jones, A. Walton

Conservation Sciences Centre, Department of Conservation, Wellington

and

Trevor H. Worthy

National Museum of New Zealand

ABSTRACT

Parewanui is the site of Te Awamate pa, an important early nineteenth century pa according to the oral traditions of Ngati Apa. The pa lay in the backswamps of the Rangitikei River meander belt adjacent to unstable coastal dunes, and stable, inland forested dune country. Archaeological evidence indicates subsistence was based on fowling and eeling, with some fish and shellfish from the coast.

Long linear depressions running between former shallow lakelets were eel channels. The channels were dug through dry sandy topsoils to a depth of about 50 cm in moist, sandy subsoils. Eels preferred these channels for migration and could be easily caught in the course of summer/autumn migrations.

Keywords: MANAWATU, CONTACT PERIOD, TE AWAMATE PA, NGATI APA, BACKSWAMPS, EEL-TRAPPING CHANNELS, EELS, EXTINCT AVIFAUNA.

INTRODUCTION

In 1986, salvage excavations were undertaken at Te Awamate, near Parewanui, on the lower Rangitikei River (Fig. 1). The excavations were limited in scope and were intended to test the identification of some possible eel-trapping channels and recover information on the pattern of resource exploitation in the Rangitikei-Manawatu area. Site surveys in the summers of 1983–4 and 1984–5 had already shown that the area around Te Awamate lagoon contained an unusual number of sites including a pa, middens, ovens, and the eel-trapping channels. The pa (S23/61) was identified as Te Awamate, a pa mentioned in Ngati Apa and Rangitane oral traditions (Downes 1909, McEwen 1986). It was inhabited in the early nineteenth century but is likely to have been first occupied in the late prehistoric period, to judge from the traditions cited by McEwen (1986: 118–120).

Te Awamate Pa lies in the backswamps of the Rangitikei River meander belt, adjacent to the boundary between unstable coastal dunes and stable inland dune country. The pa itself occupies an island in an old meander scar and the surrounding area was formerly a mosaic

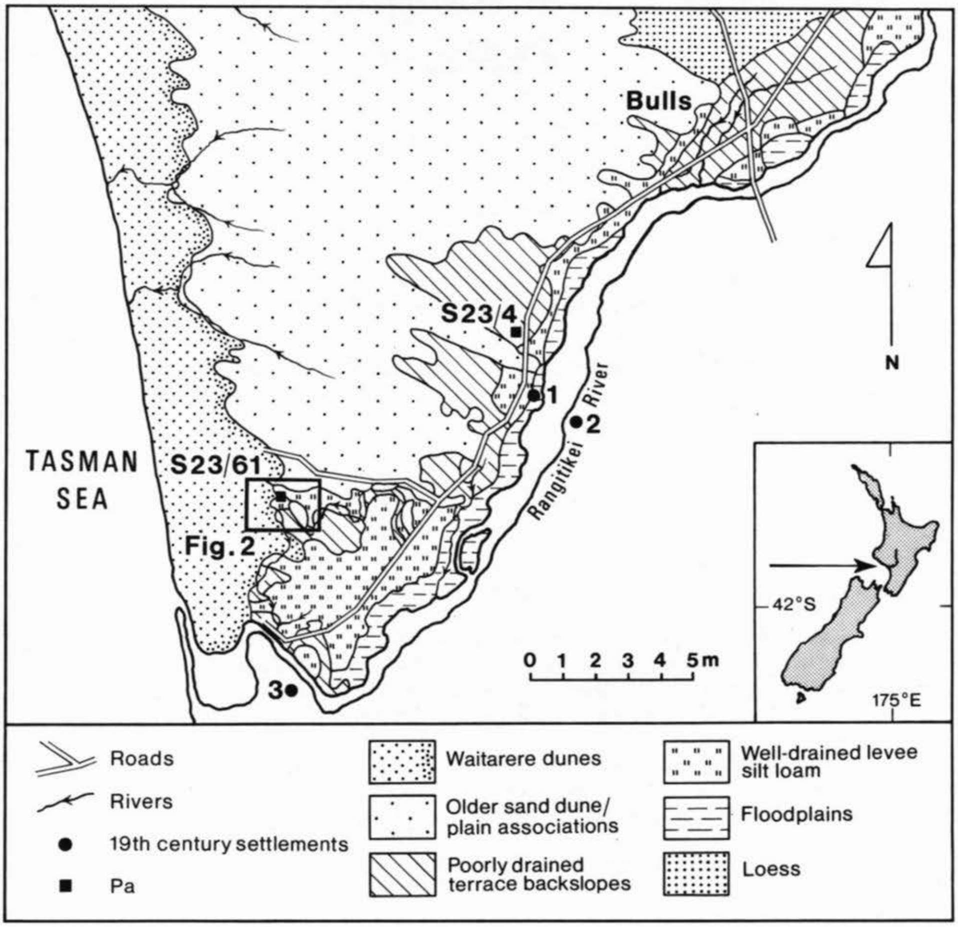

Figure 1: Western part of lower Rangitikei River Valley showing soils and pa location. Nineteenth century settlements are numbered: (1) Parewanui; (2) Maramaihoea; (3) Te Awahou.

of dunes, sand plains, backswamps, and lakes. The name of the pa reflects its location: *awamate* translates either as the ditch of a pa, or as an old river channel (Williams 1957). Wetlands were a rich resource zone in prehistory, and Te Awamate was in an ideal position in relation to the coast, the backswamps of the river, and the wetlands of the sand country.

In January 1986, in the wake of afforestation, salvage excavations were undertaken on a midden (S23/71) and possible eel channels (S23/66) adjacent to Te Awamate pa. Most middens in the vicinity of Te Awamate pa contained freshwater mussel (*Hyridella menziesii*) or tuatua (*Paphies subtriangulata*), or both, as did the middens on the pa itself. The middens could have been expected to reflect exploitation of a range of habitats but close inspection showed only S23/71 contained fish and bird bone. Adjacent to the excavated midden was one of a number of rather enigmatic long linear channels. Excavation of these features was to test the idea that they were eel-trapping channels similar in function to those reported in Horowhenua (Adkin 1948) and the Manawatu (Downes 1909: Plate 11).

GENERAL BACKGROUND

The excavations took place against a background of recent research into the prehistory of the Rangitikei-Manawatu areas that has focused on changes in the environment during the period of human settlement (McFadgen 1972) and a growing recognition that there are significant gaps in the archaeological record. The paucity of archaeological evidence of large scale eeling is of particular interest as historical records show it to have been a significant activity in the wetlands of the Rangitikei, Manawatu, and Horowhenua sand country in recent times.

The sand country has undergone three distinct periods of sand accumulation in the last 1000 years. These periods (dune-building phases) have been inferred from sharp differences in the degree of ground soil development. The Motuiti Dune-building Phase is dated 960 to 650 years ago. The older Waitarere dune-building episode is dated to 550 to 350 years ago, while the younger Waitarere dune-building episode is younger than European settlement (McFadgen 1985: 47). On the boundary between the Motuiti and Waitarere dunes is a line of lakes and wetlands which are subject to seasonal and long-term fluctuations in extent. This belt of wetlands is an ecotone on which prehistoric exploitation was focused.

The Foxton site (S24/3) is on the eastern side of one of the lakes on the Motuiti-Waitarere boundary and has produced evidence of two occupations dated to about 550 $\pm$ 70 BP (NZ 1408B) and 320 $\pm$ 65 BP (NZ 1250B) (McFadgen 1978). The middens contained mostly cockle (*Chione stutchburyi*), tuatua (*Paphies subtriangulata*) and mudsnail (*Amphibola crenata*). Fish and bird bone was common and included snapper (*Chrysophrys auratus*), kahawhai (*Arripis trutta*), pigeon (*Hemiphaga novaeseelandiae*), tui (*Prosthemadera novaeseelandiae*), duck (*Anas* sp.) and eel (*Anguilla* sp.) (McFadgen 1972, 1978).

The site is inferred to have occupied a clearing on the side of a lake in the midst of a podocarp and mixed broadleaf forest characteristic of a wet, rather than a dry, sandplain (McFadgen 1972).

Other recent archaeological work in the Rangitikei-Manawatu area includes the excavation of two shell middens (S24/20, 26) near Himatangi (Butts 1982), and site surveys in the sand country, and along parts of the Rangitikei and Manawatu rivers (Butts 1982; Bailey and Kozyniak 1984; Colless *et al.* 1985). The most numerous sites recorded in these surveys are shell middens. These lie in a belt parallel with the coast and contain mostly tuatua (*Paphies subtriangulata*), small numbers of triangle shells (*Spisula aequilateralis*) and other species, but little or no fish or bird bone. The two excavated middens produced small quantities of sea bird bones, such as fairy prion (*Pachyptila turtur*) (Butts 1982). The contents of the middens were very different from those at Foxton. The distribution and contents of the middens suggested that they were specialised sites for the seasonal collecting and processing of shellfish for consumption in periods of lesser abundance. This interpretation is supported by nineteenth century observations (MacDonald and O'Donnell 1979: 57). It is possible that settlements from which this coastal zone was exploited were situated in the ecotone in which the Foxton site lies.

There were a number of reasons for thinking that excavations in the vicinity of Te Awamate could contribute substantial new information. Sites in the Te Awamate area occupy a similar location in relation to the coast and river as the Foxton site, although the setting is more complex as the area lies on the boundary between the floodplain of the Rangitikei river and the sand country, as well as on the boundary between the Waitarere and Motuiti dunes (Fig. 2). It is in the Te Awamate locality, uniquely, that the wetlands of the Rangitikei river floodplain merge with those on the boundary of the Waitarere and Motuiti dunes. The encroachment of windblown sand on to the floodplain has contributed to the mosaic of conditions found around Te Awamate. Soils range from windblown sands to alluvial silt loams, and drainage from poorly drained to excessively drained (Cowie *et al.* 1967: 41–42; Campbell 1979). The waters of the backswamps drain in a seaward direction parallel to the course of the river, but modern drains have dramatically reduced the extent of the wetlands.

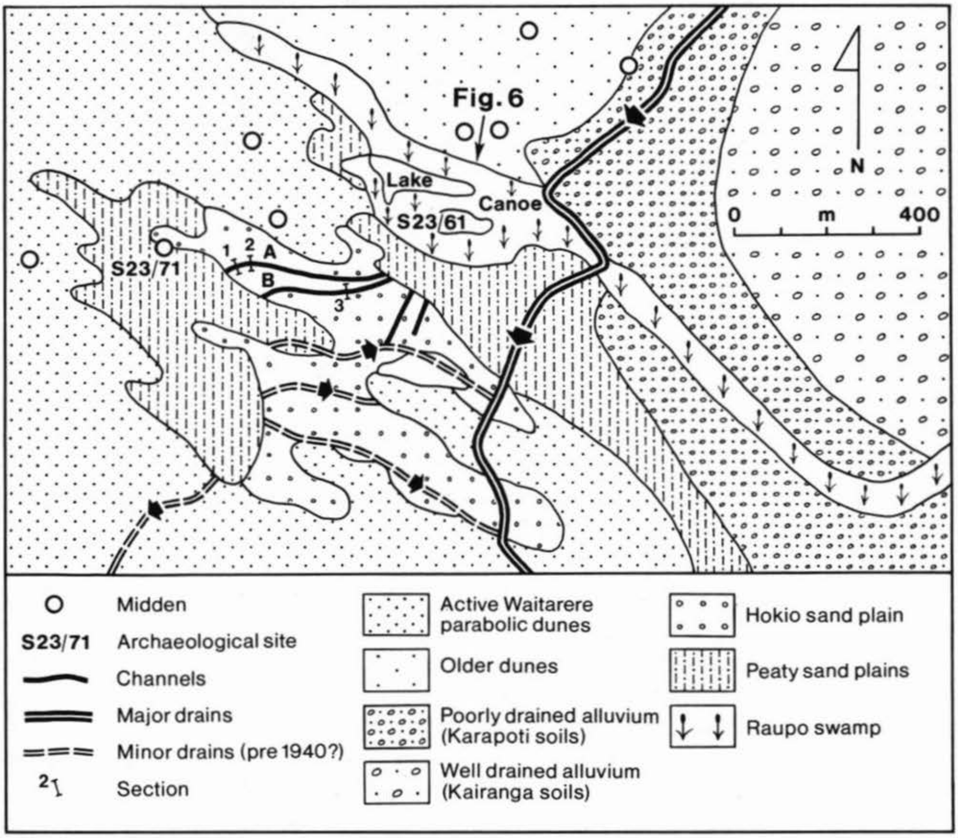

Figure 2: Te Awamate lagoon, associated soils, and the location of channels, based in part on Campbell (1979), Bailey and Kozyniak (1984), and aerial photographs. Section numbers refer to Figure 6.

The pattern of late prehistoric and nineteenth century vegetation is summarised in Table 1 and Figure 1. Generally, the older stable surfaces had a mature forest cover, and the Waitarere-Hokio association had a relatively immature vegetation cover.

The lower Rangitikei River is in a general climatic zone in which west to north-west winds predominate with relatively frequent gales. Mean annual rainfall is between 850 and 1000 mm. There is a distinct low in the rainfall pattern in late summer-early autumn, with corresponding drying of sandy soils, a matter of some consequence in considering migration routes for eels in this season. Summers are warm and winters mild (McLintock 1959: 19–22, Cowie *et al.* 1967: 9–13).

TABLE 1
VEGETATION ASSOCIATIONS IN TYPICAL MANAWATU DUNE COUNTRY (after Cowie *et al.* 1967: 13–14)

	Younger Dunes (Hokio-Waitarere)	Older Dunes (Himatangi-Motuiti)	Forest Types
Dunes and drier flats	spinifex pingao sand coprosma sand pimelea	manuka bracken fern native grasses	totara titoki
Wetter flats	sand gunnera red rush toetoe flax	*Olearia* spp. *Coprosma* spp. flax mariscus toetoe, rushes cabbage tree	pukatea kahikatea tawa
Swamps	flax raupo	flax raupo	

HISTORICAL BACKGROUND

In the 1840s and 1850s, some 259 people lived in the vicinity of the Rangitikei river mouth. The first census was taken in 1843 when Rev. Richard Taylor counted 188 people living in the settlements of Parewanui, Tawhirihoa, and Paroa. Two further censuses were taken around 1850. By this time there had been some changes in settlement. The settlement of Maramaihoea, for example, was first mentioned by Taylor in early 1848 when it was noted as a new pa (Mead 1966: 120). Kemp's census (Great Britain Parliamentary Papers 1851/1420: 231–245) was detailed and broke down the population by sex, adult or child, and by religion. It also gave figures on houses, huts, crops, livestock, and so on. The census indicated a total population of 259 living in the three settlements of Parewanui (105), Maramaihoea (94), and Te Awahou (60) (Fig. 1). Each settlement had cultivations of maize, potatoes, and kumara. Pigs were kept and flax was traded. A second census done at about the same time produced similar figures for Parewanui and Te Awahou but was unable to get an accurate count of the number of Ngati Raukawa and Ngati Rangitahi at Maramaihoea as they were regarded as squatters by Ngati Apa and they did not want to be counted (NM 8 1851/284).

Nineteenth century historical evidence indicates that eels were an important part of the diet in Rangitikei, Manawatu, and Horowhenua. Taylor visited Parewanui in November 1848 and noted "that there was a plentiful supply of food of which dried eels were the most prominent articles" (Wilson 1914: 19). The significance attached to the eel is indicated by the fact that when the land between the Rangitikei and Turakina rivers was sold in 1849, local hapu kept some small areas of land for their own use, but also retained the right to take eels (Wilson 1914: 38). Eel-trapping channels were in use in the nineteeth century (MacDonald and O'Donnell 1979) and the remains of such channels have been reported in Manawatu (Downes 1909: Plate 11) and in Horowhenua (Adkin 1948; Sheppard and Walton 1983).

The inhabitants of the lower Rangitikei River exploited coastal, riverine, and wetland resources, often at some distance from the main settlements. Downes (1909: 95) notes that the inhabitants of one up-river settlement "very often went to the mouth of the Rangitikei

River fishing, when they would send large supplies of food to their own places". In April 1840, Wakefield (1845 I: 265) visited a

> fishing-village about two miles up the north bank of the river, where the sand-banks on either side were replaced by extensive swamps, bearing a high growth of flax and reeds. We here found about fifty of the Ngatiapa, or aboriginal tribe, who had provided large stores of food with which to regale our party .... One of our hosts used to bring to my tent every morning a dozen of delicious eels ... and of vegetable there was profusion.

Later that same year he noted that "the very houses which had formerly sheltered my large party ... seemed to have been removed" (Wakefield 1845 I: 377–8). Sites along rivers have proved very difficult to locate, partly because of farm development but also because of changes in the courses of the rivers. Taylor reports that in early 1861 the Rangitikei changed course and swept away a settlement and the adjacent cultivations (Mead 1966: 236). In 1872 the pa at Parewanui was washed away in a flood (Mead 1966: 256; for other examples see Wilson 1914).

The extensive swamps noted by Wakefield formed a belt parallel to the coast and are shown on early survey plans (e.g., SO 10754 dated 1866). It is in this belt of wetlands that the Foxton and Te Awamate sites are located. In 1854, Taylor attempted a short cut to the coast through this belt but got lost in the maze of sandhills covered in scrub, and the swamps (Mead 1966: 209). The water levels apparently fluctuated markedly, as in 1856 Taylor noted that some of the lakes between Parewanui and the coast were dry and were being used to grow wheat (Mead 1966: 210).

EEL-TRAPPING CHANNELS (Figures 2, 3)

The context of the long linear depressions suggested they were eel trapping channels. Interpretation was difficult because, although many channels were visible on old aerial photographs, most had been obliterated in subsequent land development and the original pattern of wetlands had been altered by drainage works. The best preserved channels cross a slightly higher sheet of sand between lower-lying, formerly swampy, areas and range from 30 to 120 m in length. They vary in width from 2 to 4 m, with depths of about 40 cm. In February 1986, the base of the depressions had a green grass cover, in striking contrast to the dense sward of the seedheads of harestail grass (*Lagurus ovatus*) on either side. The moisture difference between the channels and the surrounding grassland results in different grasses and a clear "signature" on the aerial photographs. The plan of the channels in Figure 2 is derived from a recent late-summer aerial photograph, SN 5609N/2. Aerial photographs RN 1660/3–5, taken in May 1949, show numbers of other possible channels.

EXCAVATED SECTIONS (Figure 4)

Four sections were excavated across the channels. The location of the three illustrated is shown on Figure 2. The fourth section, which is not illustrated here, was cut at the high point. The channel at this point was indistinct on the surface and, contrary to expectations, no distinct sign of a channel was found on excavation. The section showed clear evidence of ploughing in the form of inverted turfs and is probably an area where a plough had been lowered for a short run. This may explain why the surface evidence here was indistinct. It is possible that the channel was missed altogether by the excavation.

The sections generally show that a natural layer of grey sand has been cut into to form a channel. The present fill of the channel can be distinguished from the sides by a lack of

Figure 3: Channel A (S23/66) through sand plain, looking north-east. The eastern end of the channel in peaty sands is shown above, with Te Awamate pa in the background. The western end is shown below with section 2 in the foreground.

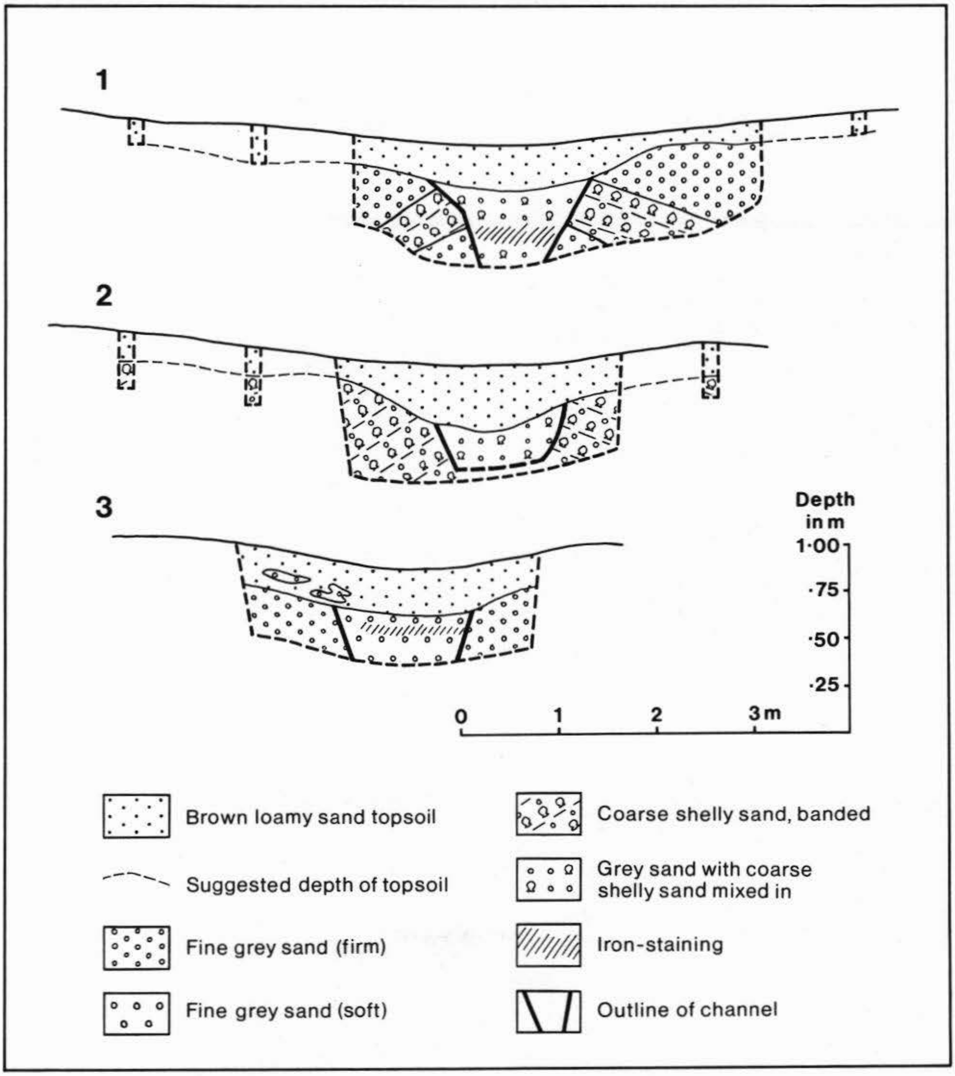

Figure 4: Sections through channels. Plan of channels in Figure 2.

banding, relative softness, and iron-stains or mottling. The actual depth of the channel was not clear but a minimum depth of 50 cm below existing topsoil is reasonable.

LEVELS (Figure 5)

Levels were taken at 20 m intervals along the length of the longest and most distinctive channel (A in Fig. 2). These show the channel to have had a rise and fall of some 30 cm to and from a central high point at 170 cm below an arbitrary datum. Irrespective of where water may have flowed to and from, a mean slope of the order of 1 : 500 is minimal for any water at all to have flowed. There was no sign of any scouring of the channel, and the variation in the slope of the channel also suggested a lack of flow. The base of the west lakelet was 50 cm below the high point of channel A, or 220 cm below datum. The peaty soil around Te Awamate lagoon was at about the same level, 220 cm, with the present day raupo and water level at 310 cm below datum.

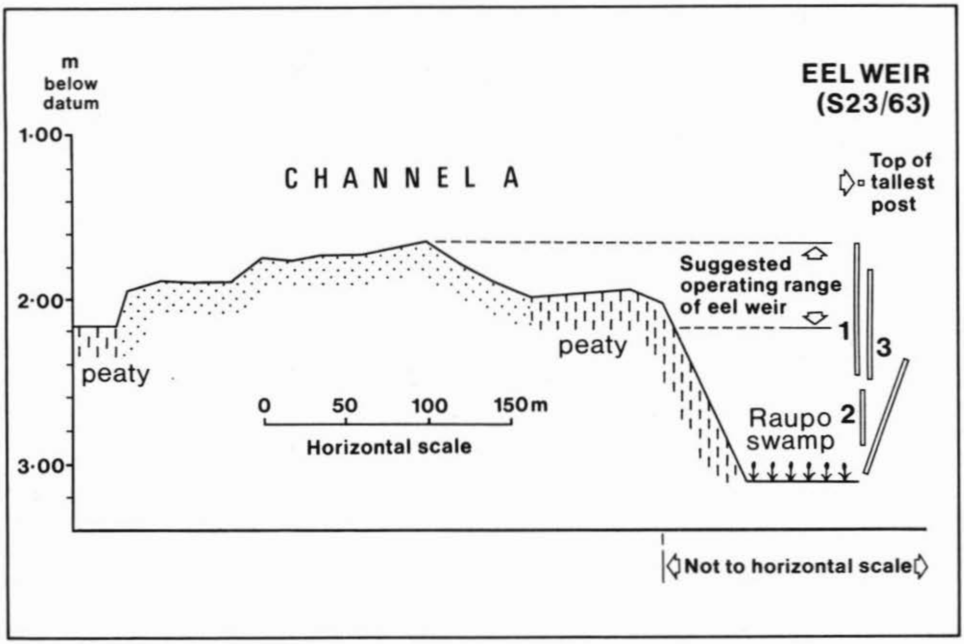

Figure 5: Levels along the length of channel A; levels of eel weir (S23/63) are reduced to the same datum. The positions of the posts numbered 1 to 3 are shown on Figure 6.

The maximum level of the Te Awamate lagoon can be judged from the level of the surrounding peaty soils and the existence of a stranded eel weir (S23/63) on its north side. This structure consists of two more or less converging lines of posts, inferred to have a *hīnaki* (basket-like eel net) at one end (Fig. 6). The posts lie parallel to the bank of the lagoon, while a second line of posts runs at right angles to the main structure. The second line of posts is presumably a walkway on to the trap. The height of the tallest post is 130 cm below datum and the highest base of any of the posts is at 250 cm. This suggests a working level for the lake from about 230–170 cm below datum.

Some of the posts have hand-forged nails in them, and a canoe further along the main drainage channel is patched with copper sheet, suggesting a nineteenth or early twentieth century date for some eel trapping and general lake usage.

At 170 cm below datum, a flooding Te Awamate lagoon would flow out across the highest point of the sand plain and into the western lakelet, assuming that there was no lower outlet. As noted above, a flow of water is relatively unlikely since this would have scoured the channel considerably. It is difficult to construct any scenario in which the channels were used to create a flow between two bodies of water. The interpretation suggested is that the channels were moist strips created by removing the dry sandy topsoil, and that this would be sufficient to attract migrating eels.

No levels were taken along the north-west south-east line of the band of sand. Natural drainage patterns (Fig. 2) indicate that the band and its continuation on to the low-lying

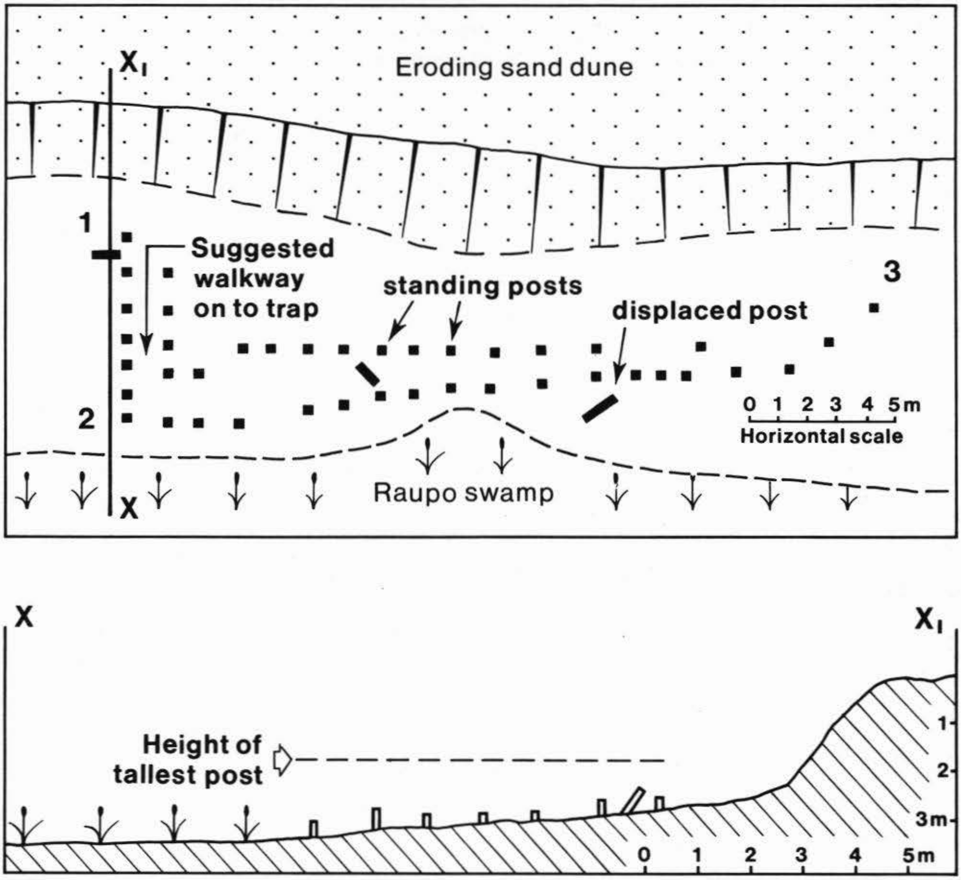

Figure 6: Eel weir (S23/63) at Te Awamate (after Colless and Snell, New Zealand Archaeological Association site record). Levels according to arbitrary datum of Figure 5.

back-slope levee soils is fairly level. The modern drainage pattern, cutting across this band in a north-east to south-west direction in the same general line as the channels themselves, indicates that the sand plain is an important drainage barrier. Eels would have to cross this barrier in the course of migration.

MIDDEN EXCAVATION

The aim of the midden excavation was simply to obtain a worthwhile sample of fish and bird bone, in order to shed light on the diet of the occupants, and the kind of environment they lived in. Five square metres were excavated in what was estimated to be the centre of the site. The approximate extent of the midden was determined by further test pitting in the vicinity of the shell exposed by the furrows dug to plant trees (Fig. 7A). Six squares, 1 × 1 m, were opened up. Sieving was done through a 5 mm mesh.

The midden lies on the edge of the sheet of sand into which the eel channels were cut (Fig. 2). The midden was deposited in an area which is likely to have been swampy at the time of occupation. Next to the midden in a blowout were two large river-rounded stones

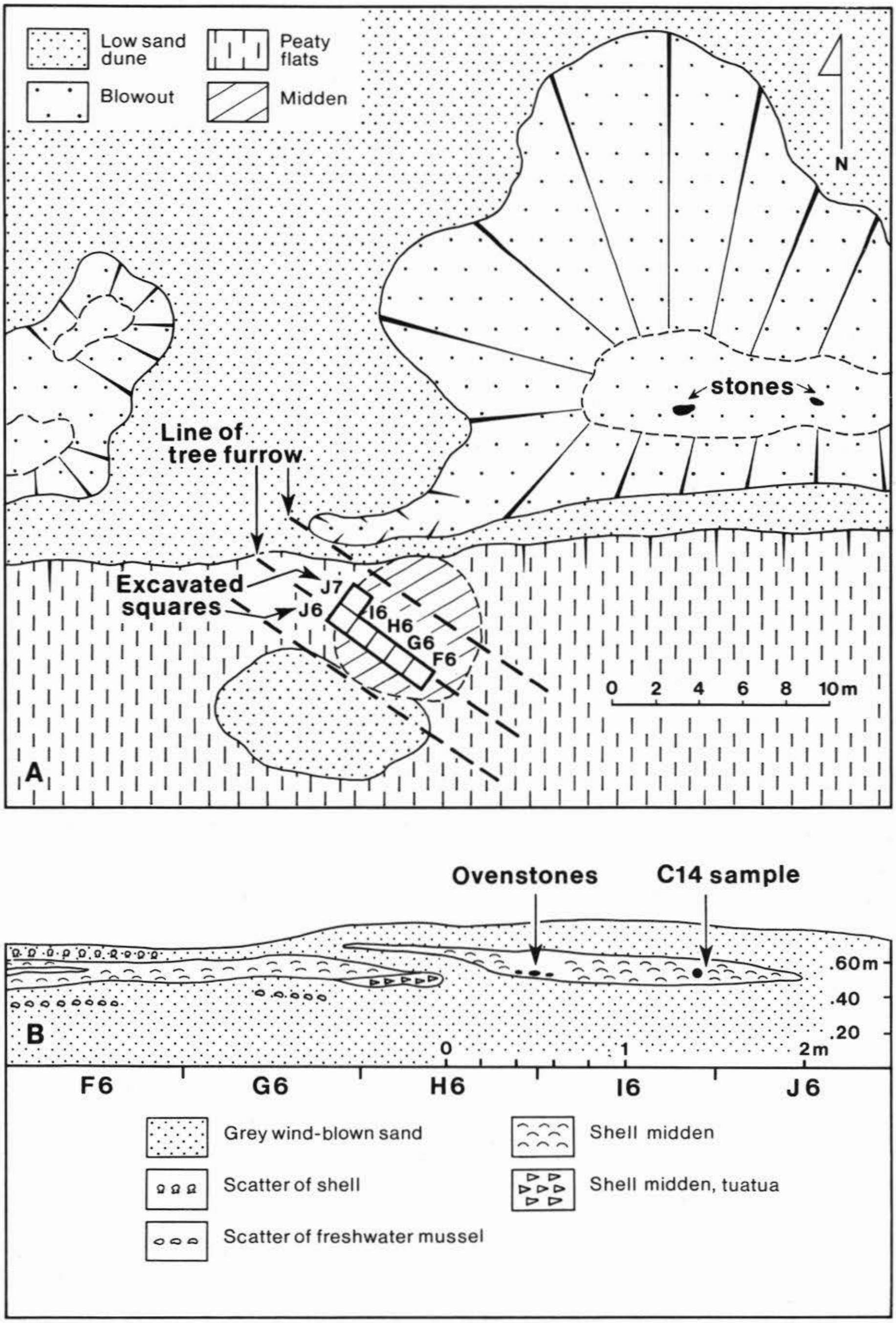

Figure 7: Plan (A) and south section (B) of midden (S23/71).

which are not of natural occurrence in this location. Generally the topography and soils suggest that the inhabitants lived on the higher ground and deposited their rubbish on the edge of the swamp.

STRATIGRAPHY(Figure 7B)

In several places it was possible to distinguish up to four separate lenses of midden. However, none of these lenses extended any distance, and effectively the deposit should be treated as one layer with many small lenses. Some sand had accumulated rapidly during the deposition of the midden.

Figure 7B shows the stratigraphy of the southern section of squares F6–J6. The principal midden layer 3 was some 20–35 cm thick and lay in a matrix of grey sand, similar to that of the adjacent dune blowouts. The midden is regarded as having been deposited over a short period of time during which there was some rapid sand movement. There were minor lenses of shell above and below the principal lens. There were occasional ovenstones throughout layer 3, with one concentrated lens.

The midden analyses and radiocarbon date which follow are all derived from layer 3 midden.

RADIOCARBON DATE

A radiocarbon date of less than 250 years B.P. was obtained on tuatua shell (*Paphies subtriangulata* (NZ 7354). This confirms that the midden, like Te Awamate pa, belongs to the late prehistoric or early contact period or both.

MARINE SHELLFISH

Three samples were taken to count the proportions of the different shellfish species. The main species were: freshwater mussels or kakahi (*Hyridella menziesii*); tuatua (*Paphies subtriangulata*) from the ocean beach; mud snail (*Amphibola crenata*) from mud flats. Their proportions are shown in Table 2.

TABLE 2
MINIMUM NUMBER OF INDIVIDUALS (MNI) FROM QUANTIFIED SAMPLES OF SHELLFISH FROM S23/71

	Sample 1		Sample 2		Sample 3	
	MNI	%	MNI	%	MNI	%
Freshwater mussel	70	76	1	2	3	6
Tuatua	22	24	50	88	51	94
Toheroa	–		–		1	
Mud Snail	–		6	11	–	
	92		57		55	

This analysis indicates that tuatua from the ocean beach was the most important food. However, it is difficult to compensate for the fragility of freshwater mussel which means that they may be under-represented in this analysis.

Other shellfish were present in very small numbers. They were: toheroa (*Paphies ventricosa*) (ocean beach); pipi (*Paphies australis*) (river mouth); mactra (*Mactra discors*) (ocean beach); *Alcithoe arabica* (mud flats or fossil beds) two examples both used as tools; scallop (*Pecten novaezelandiae*) (sand and mud banks); *Penion sulcatus* perhaps used as a tool (rocky shore); paua (*Haliotis* sp.) (rocky shore).

Most of these species could have come from the Rangitikei river estuary and the nearby ocean beaches, although the paua must have come from much further away, for example, the Kapiti Island coast or the shoreline north of Turakina. The toheroa is represented in the samples by a single shell, and as it is also uncommon in the Foxton site (McFadgen pers. comm. 1987), and other middens in Rangitikei-Manawatu, it appears that it was very rare.

Both of the gastropod species were represented by shells that had had the outer layers broken off, leaving only the solid axis. In all three cases it looked as though they had been used as, or would serve as, sharp chiselling tools.

LAND AND FRESHWATER MOLLUSCA

A sample of shells, approximately 5 litres, was sampled for landsnails. Only a small number were found, indicating a low concentration. The shells were kindly identified by Dr F. Climo of the National Museum. The results are given in Table 3.

TABLE 3
NUMBER OF LANDSNAILS

	Number
CHAROPIDAE	
Cavellia buccinella (Reeve)	2
Mocella eta (Pfeiffer)	2
Charopa bianca (Hutton)	2
PLANORBIIDAE	
"Planorbia" corinna (Grey)	3
PUNCTIDAE	
Paralaoma caputspinulae (Reeve)	1

Dr Climo comments that this assemblage reflects a habitat of scrub and swamp, definitely not of forest. *"Planorbia" corinna* is a freshwater mollusc which is normally found only on lake weed stems. Its presence is a further indication that the midden lay at the edge of a wetland.

PLANT REMAINS

One carbonised kernel of the seed of tawa (*Beilschmiedia tawa*) was identified by one of us (K. J.) from comparative collections held in the New Zealand Historic Places Trust Wellington Office. This species occurs in the Manawatu lowlands today (see Table 1). The berries were an important food source available in late summer or autumn.

BONE

All deposits were sieved through a 5 mm sieve. Selected samples were washed through 2 mm mesh. All bone found in the sieves was retained.

Mammals

Rat bones were common in the midden. They were confirmed to be kiore (*Rattus exulans* Peale), and not the European-introduced mouse (*Mus musculus* L.), by Ms Michelle Horwood. There were nine each of left and right mandibles, two right femora, and one left femur. In addition there were four fragmentary, apparently juvenile tibiae, and two maxillae fragments. This represents a minimum number of individuals (MNI) of 10.

Birds

The bird bones were identified by one of us (T.W.) with reference to the collections of the National Museum of New Zealand. MNI for the various species are shown in Table 4. The birds are from oceanic, wetland, and forest habitats.

TABLE 4
MINIMUM NUMBERS OF INIDIVIDUALS OF BIRD SPECIES FROM S23/71

		MNI	Totals
OCEANIC			
Pachyptila cf. *turtur*	Fairy Prion	4	
Puffinus gavia	Fluttering Shearwater	3	
Puffinus cf. *assimilis*	cf. Little Shearwater	1	
Pterodroma cf. *cooki*	Cook's Petrel	1	
			9
WETLAND			
Anas superciliosa	Grey Duck	6	
Anas cf. *aucklandica*	Brown Teal	2	
Podiceps rufopectus	NZ Dabchick	1	
Rallus phillipensis	Banded Rail	1	
Porphyrio melanotus	Pukeko	2	
Tribonyx hodgeni	NZ Gallinule (extinct)	1	
			13
FOREST			
Prosthemadera novaeseelandiae	Tui	1	
Cyanoramphus sp.	Parakeet	1	
Nestor meridionalis	Kaka	2	
			4

The *Pachyptila* species is one of the smaller prions, probably the common fairy prion rather than *P. crassirostris*, which is not known to have bred on the New Zealand mainland. The fluttering shearwater *P. gavia* and Cooks petrel (*Pterodroma cooki*) are both common species. Sub-fossil evidence suggests that both species bred in inland areas until recently (Millener 1981).

Among the ducks, *Anas superciliosa* (grey duck) predominated. A small teal was represented mainly by fragmentary bones. The only complete bones (two radii) were of *A. aucklandica* (brown teal) rather than *A. gibberifrons* (grey teal). The last two species are Australian adventives known to have become naturally established by the nineteenth century (Williams 1973: 310–312). Some bones identified as *A. aucklandica* may be *Aythya novaeseelandiae* (New Zealand scaup).

Of the two pukeko, one was juvenile, the other adult, indicating that there may have been a breeding population in the area less than 250 years ago.

Many of the bird bones, including coracoids, were broken. The coracoid is a small strong bone in volant species, and is virtually never broken in natural deposits. Its broken condition may reflect butchering practice.

The species represented are consistent with the site's location on the edge of a coastal wetland, with some forest further inland. The presence of dabchick indicates a lake habitat. The contrast with species from an estuarine site such as Tiwai Point, Southland (Sutton and Marshall 1980), is striking.

Estimates of the age of the midden can be made from the radiocarbon date obtained, and from the rat species present. The presence of Polynesian rat, *Rattus exulans*, rather than rats introduced by Europeans is strong evidence that the site is older than the nineteenth century, and an eighteenth century date for the midden is favoured.

Gallinula hodgeni, the extinct New Zealand gallinule or moor-hen, is rare in archaeological sites. The identification was made from a comparison with the bones of *Capellirallus*, *Rallus*, and *Gallinula ventralis*.

This is the second time that this species has been reported from a dated archaeological context. The relatively late date of this find is notable because this species is usually grouped with the moa and other flightless birds that became extinct before European contact (see Cassels 1984).

Gallinula hodgeni has previously been identified at Kaupokonui, South Taranaki, and Ocean Beach at Whangarei (see Foley 1980: 41), and Lake Grassmere (Scarlett 1979: 89). At Ocean Beach and Lake Grassmere the specimens were obtained from dunes and may not be associated with the archaeological material. Most of the occupation at the Kaupokonui site has been dated to the earlier centuries of Polynesian settlement (600–700 B.P.), and this is the most likely date for the occurrence of *Gallinula hodgeni* at the site.

Gallinula hodgeni was a flightless rail, related to the flighted black-tailed native hen of Australia, *Tribonyx ventralis* (see Olson 1975, 1977: 370), and also the flightless Tasmanian native hen *Tribonyx mortieri* (Bull and Whitaker 1975: 263). *Tribonyx ventralis* has been recorded as occasionally reaching New Zealand. Flightless rails are common in the list of bird extinctions which can be linked to prehistoric people (Cassels 1984).

The implications of the Parewanui date for understanding bird extinctions in New Zealand is that *Gallinula hodgeni*, and possibly other smaller species, may have become extinct late in the prehistoric sequence or even have survived until changes caused by European contact completed the process. This would lead to a change in our perception of prehistoric patterns of bird extinction (Cassels 1984).

Fish and crustaceans

Fish bones were identified by Dr Janet Davidson with reference to the comparative collection at the Otago Anthropology Department. Minimum numbers were calculated according to the method described by Leach (1986) and are presented in Table 4. Dr Davidson comments that the eel bones, which consist mainly of vertebrae, dentaries and some maxillae, are all from small specimens. This contrasts with what might be expected from nineteenth century Maori eeling practice as it is generally understood. This involves the mass seaward migration of adult eels for spawning and suggests that there is no functional relationship between the midden and the eel-trapping channels discussed above.

Elasmobranch vetebrae were common in the midden. Their identification as to species was not possible but many of them may belong to school shark. Skate and southern dogfish were identified from distinctive spines but may also be represented by vertebrae.

One fragment of crab was found.

TABLE 5
MINIMUM NUMBERS OF INDIVIDUALS OF IDENTIFIED FISH SPECIES

Taxon number*	Taxon name	Common name	MNI
2	*Anguilla* sp.	Eel	29
9	*Chrysophrys auratus*	Snapper	10
12	Elasmobranchii	Sharks and Rays	12
64	*Zeus japonicus*	John Dory	2
27	*Polyprion oxygeneios*	Groper	1

* In Otago fishbone data base

ARTEFACTS

Artefacts were a worked piece of wood, and two modified columns of gastropods which appear to have been used for polishing the haft of something like a wooden spear. The survival of wood indicates that either the site is young or there were anaerobic conditions in the midden. Anaerobic conditions are relatively unlikely, given the seasonal and longer term fluctuations in the water level. No European artefacts were found and none occur in the deflated areas nearby, suggesting a late prehistoric or early nineteenth century date.

DISCUSSION

A reconstruction of the environment, and historical records, suggest that eels were an important part of the diet in the Rangitikei-Manawatu area in prehistory. Eel bone has, however, seldom been found in archaeological sites in New Zealand, even in areas where large scale eel fishing is well attested in nineteenth century accounts. This has created doubts about the extent to which historical accounts of eel fishing may be extrapolated to the prehistoric context (Marshall 1987). In the vicinity of Te Awamate pa, however, there are two forms of archaeological evidence of eel fishing.

Eel-trapping channels at Te Awamate are not unlike eel-trapping channels in Horowhenua (Adkin 1948, Sheppard and Walton 1983). Mature eels migrate seaward in late summer or early autumn (Todd 1981). Passage need not be through water, but passage across dry land is eased by following damp patches of ground. Eel-trapping channels were designed to concentrate the migration of eels into a confined path to facilitate capture. Channels with a damp base could be readily created by excavating a relatively superficial layer of very dry sands or sandy loam topsoils into damp sand. This would explain the apparent lack of evidence suggesting actual water flows in the channels at Te Awamate, or at Tangimate (Sheppard and Walton 1983).

The multiplicity of channels also deserves some comment. Apart from running across the lowest section of the higher ground separating one low-lying area from another there is little pattern. Other interpretations of these features considered were that they were stock tracks, or boundary trenches for Maori horticulture. However, three of the four sections excavated across one channel, and the one section cut across another channel, indicate a distinct cutting of the channels, making stock tracks an unlikely explanation. Trench boundaries are also unlikely as there is no sign of deep cultivation of adjacent soils in the manner generally recognised for Maori cultivated soils (e.g., Pullar and Vucetich 1960), and other soils in the vicinity, such as the well drained Karapoti silt loam, would appear to have fewer limitations for gardening.

The channels may all have been in use at the same time and provided different groups with access to the resource. Such groups may have had an exclusive interest in a single eel channel.

The antiquity of the channels has not been established. Adkin (1948) suggested the Horowhenua eel trapping channels he described belonged to the comparatively recent past. The Te Awamate channels probably also date to the late eighteenth or early nineteenth century.

S23/71 is unusual in that it does contain eel bone, but the remains are probably those of young elvers migrating into the lakes and swamps rather than mature eels taken during their migration to the sea. The latter were the focus of eel fishing according to historical records. The possibility that large scale eel fishing was a development of the contact period is not ruled out by the results of this excavation. It does, however, seem unlikely that a rich food resource such as the eel fishery was developed as late as the contact period, particularly when changes in the environment, such as clearance of forests (McGlone 1983), might be expected to have made it important in late prehistory.

The composition of the middens on Te Awamate pa, and most of those in the vicinity, with the exception of S23/71, is similar and suggests that they belong to the same subsistence and settlement patterns. Oral traditions indicate that Te Awamate pa was occupied late, and the radiocarbon date indicates a late date for S23/71.

S23/71 may represent a seasonal camp site of a family group, associated with the settlement of Te Awamate. While at the site they made several trips to the ocean beach to collect tuatua and, on at least one occasion, they brought back food from the estuary of the Rangitikei River. Freshwater shellfish were also collected from nearby swamps and lakes and water fowl taken.

The absence of pelagic fish such as kahawai or barracouta seems rather surprising. The volume of marine species is not large and it is possible that those represented were collected dead from the beach. Line fishing even for the deep-dwelling species cannot, however, be ruled out. A plausible argument could be made for contents of the midden being gathered in an opportunistic manner in the course of other activities. This would explain the collection of odd species from a variety of activities. Certainly the midden is not a product of intensive exploitation of any one species.

The vegetation of the immediate area seems to have been scrub, rather than forest, at the time of occupation, although forest was near enough for tawa berries and kaka to have been a source of food. Flax, raupo, and toetoe would have been available locally but the use of such materials seldom leaves any trace in the archaeological record.

The excavation has shed light on the life of the late prehistoric people who occupied the swamp and lake country that commonly occurs behind the sand dunes of the west coast. This habitat was a major resource zone and the lakes provided good sites for fortified villages, from which people spread out in certain seasons for subsistence activities. Te Awamate is at the intersection of extensive sand country wetlands, river backswamps, and within reach of river and coast.

Change in the prehistoric landscape of New Zealand in the span of human occupation has long been recognised: forest cover diminished and there were changes in coastal and river systems (McGlone 1983; Grant 1985; McFadgen 1985). The general effects of environmental change on subsistence have been much discussed (see Davidson 1984: 130–137) but the archaeological record does not seem to be telling the whole story, and relevant information may survive only in few sites.

CONCLUSIONS

The conclusions that can be drawn from the excavations, although limited, must be viewed against a background of a paucity of archaeological data relating to late prehistoric subsistence patterns in the Rangitikei, Manawatu, and Horowhenua areas. Along with Foxton, Te Awamate demonstrates the importance of wetland ecotones in the settlement of the region. The problem of "missing data" remains a key one in discussions of late prehistoric subsistence in this region.

The vicinity of Te Awamate pa was occupied in late prehistory and into the nineteenth century. Wetlands were the most important resources of the site locality, including eels and water fowl. The area had a cover of fairly open scrubland, with patches of bush which were more extensive inland from the site. Most of the linear depressions at Te Awamate were eel channels. The channels did not necessarily have a distinct flow of water but were dug through sandy, dry topsoils to gleyed or moist sandy subsoils on a high water table. The moist subsoils attracted eels to these channels in their migration path.

ACKNOWLEDGEMENTS

The landowners concerned, Carter Holt Ltd., and Mr W. Smith, are thanked for their support and interest. We are particularly grateful for the interest and enthusiasm of the *tangata whenua* of Parewanui. Although reluctant to single out individuals in the community, we note the contribution of Judge H. B. Marumaru of the Maori Land Court, Wanganui, Messrs Darcy Karamea, Naka Taiora, and the Rangitane Tribal Committee. Drs Frank Climo and Janet Davidson of the National Museum of New Zealand kindly identified the landsnails and fishbone respectively. Mr R. McGovern-Wilson checked the identification of the rails, and Ms M. Horwood the Polynesian rat bones. Finally, many thanks to the excavation volunteers: Kelvin Day, Randall Springer, Robin Caley, Glen Standring, Warren Warbrick, Harvey Taylor, Blake Abernethy, Lenore Bush, Jessica Frean and Cindy Lilburn. Staff time and the curatorial facilities of the Manawatu Museum are gratefully acknowledged.

REFERENCES

Adkin, G. L. 1948. *Horowhenua: its Maori Place Names and their Topographical and Historical Background*. Department of Internal Affairs, Wellington.

Bailey, D. and Kozyniak, J. 1984. Report on an archaeological survey of the coastal strip between the Manawatu and Rangitikei Rivers. *Manawatu Museum Fieldwork Report*, 1.

Bull, P. C. and Whitacker, A. H. 1975. The amphibians, reptiles, birds and mammals. *In* G. Kuschel (Ed.), *Biogeography and Ecology in New Zealand*, pp. 231–276. Dr W. Junk, The Hague.

Butts, D. 1982. Preliminary observations relating to the coastal shell middens of Manawatu. *New Zealand Archaeological Association Newsletter* 25: 268–276.

Campbell, I. B. 1979. Soils of Rangitikei County, North Island, New Zealand. *New Zealand Soil Survey Report* 38. New Zealand Soil Bureau.

Cassels, R., 1984. The role of prehistoric man in the faunal extinctions of New Zealand and the other Pacific Islands. *In* P. S. Martin and R. G. Klein (Eds), *Quaternary Extinctions: A Prehistoric Revolution*, pp. 741–767. University of Arizona Press, Tuscon.

Colless, L., Snell, A. and Cassels, R. 1985. An archaeological survey of the lower Rangitikei River, North Island, New Zealand. *Manawatu Museum Fieldwork Report* 3.

Cowie, J. D., Fitzgerald, P. and Owers, W. 1967. Soils of the Manawatu-Rangitikei Sand Country. *New Zealand Soil Bureau Bulletin* 29.

Davidson, J. 1984. *The Prehistory of New Zealand.* Longman Paul, Auckland.

Downes, T. W. 1909. Early history of Rangitikei, and notes on the Ngati Apa tribe. *Transactions of the New Zealand Institute* 42: 74–114.

Foley, D., 1980. Analysis of Faunal Remains from the Kaupokonui Site (N128/3B). Unpublished M.A. thesis, Anthropology, University of Auckland.

Grant, P. J. 1985. Major periods of erosion and alluvial sedimentation in New Zealand during the late Holocene. *Journal of the Royal Society of New Zealand* 15: 67–121.

Leach, B. F. 1986. A method for the analysis of Pacific Island fishbone assemblages and an associated data base management system. *Journal of Archaeological Science* 13: 147–159.

MacDonald, R. A. and O'Donnell, E. 1979. *Te Hekenga: Early Days in Horowhenua.* Bennett, Palmerston North.

McEwen, J. M. 1986. *Rangitane: a Tribal History.* Reed Methuen, Wellington.

McFadgen, B. G. 1972. Palaeoenvironmental Studies in the Manawatu Flood Plain with Particular Reference To Foxton. Unpublished MA Thesis, Anthropology, University of Otago.

McFadgen, B. G. 1978. Environment and Archaeology in New Zealand. Unpublished PhD Thesis, Geology, Victoria University of Wellington.

McFadgen, B. G. 1985. Late Holocene stratigraphy of coastal deposits between Auckland and Dunedin, New Zealand. *Journal of the Royal Society of New Zealand* 15: 27–65.

McGlone, M. 1983. The Polynesian deforestation of New Zealand: a preliminary synthesis. *Archaeology in Oceania* 18: 11–25.

McLintock, A. H. 1959. *A Descriptive Atlas of New Zealand.* Government Printer, Wellington.

Marshall, Y. 1987. Maori mass capture of freshwater eels: an ethnoarchaeological reconstruction of prehistoric subsistence and social behaviour. *New Zealand Journal of Archaeology* 9: 55–79.

Mead, A. D. 1966. *Richard Taylor: Missionary Tramper.* Reed, Wellington.

Millener, P. 1981. The Quaternary Avifauna of the North Island, New Zealand. Unpublished Ph.D thesis, Geology, University of Auckland.

NM. Archives of the Province of New Munster. National Archives, Wellington.

Olson, S. L., 1975. A review of the extinct rails of the New Zealand region. *Records of the National Museum of New Zealand* 1(3): 63–79.

Olson, S. L., 1977. A synopsis of the fossil Rallidae. *In* S. D. Ripley (Ed.) *Rails of the World*, pp. 339–374. Godine, Boston.

Pullar, W. A. and Vucetich, C. G. 1960. Problems of site interpretation in archaeology: pedology. *New Zealand Archaeological Association Newsletter* 3(4): 4–8.

Scarlett, R. J., 1979. Avifauna and Man. *In* A. Anderson (Ed.) *Birds of a Feather*, pp. 75–90. British Archaeological Reports, International Series 62.

Sheppard, B. and Walton, A. 1983. Eel trapping channels at Tangimate Lagoon, Horowhenua. *New Zealand Archaeological Association Newsletter* 26: 137–144.

Sutton, D. G. and Marshall, Y. M. 1980. Coastal hunting in the Sub-Antarctic zone. *New Zealand Journal of Archaeology* 2: 25–50.

Todd, P. R. 1981. Timing and periodicity of migrating New Zealand freshwater eels (*Anguilla* spp.). *New Zealand Journal of Marine and Freshwater Research* 15: 225–235.

Wakefield, E. J. 1845. *Adventure in New Zealand.* 2 vols. John Murray, London.

Williams, G. R. 1973. Birds. *In* G.R. Williams (Ed.), *The Natural History of New Zealand: an Ecological Survey*, pp. 304–333. Reed, Wellington.

Williams, H. W. 1957. *A Dictionary of the Maori Language*. Government Printer, Wellington.

Wilson, J. G. 1914. *Old Rangitikei.* Whitcombe and Tombs, Christchurch.

Received 30 October 1987