

and an absence of widespread burning. Forest growing on Foxton dunes would have provided the seed source, and the absence of widespread burning would seem to indicate a small human population. By European settlement, however, the vegetation on both Motuiti and Old Waitarere dunes was largely bracken fern, scrub, and natural grasses (Adkin 1948; McFadgen 1985), suggesting that only late in the prehistoric period were there enough people in the region to clear the forest and keep it clear.

4. Archaeology

The dune belt is widely known for its island pa in Lakes Horowhenua, Papaitonga, and Waitawa (Adkin 1948; Buller 1893; Rolston 1944, 1947, 1948). In former times, eel weirs, and eel channels (Whakamate) joining bodies of water, were especially numerous and some still survive (Adkin 1948; Sheppard and Walton 1983). Marine shell middens are surprisingly few considering the long stretch of sandy coast. There are recorded concentrations at only a few places: west of Lake Horowhenua, on the south side of the Waikawa River, just north of the Waitohu Stream (Adkin 1948), just north of Waikanae River (Smart 1962), and in Queen Elizabeth Park. Shell middens at two places on the western shore of Lake Horowhenua are mainly pipi with some paua (S. Forbes pers. comm. 1995), but otherwise middens on the shores of Lakes Horowhenua and Papaitonga are predominantly fresh water mussel. Apart from these remains, sites in the region are either difficult to find, being covered with trees or pasture, or have not survived the drainage of swamps, farming of the sand country, or growth of towns.

Two types of middens are distinguished and are illustrated by those between Lake Horowhenua and the sea (Figure 5) (Adkin 1948). Here there are two belts of middens: a coastal belt, up to 400 m from the coast, and an inland belt, between 600 m and 2000 m from the coast. Middens of the coastal belt are heaps of loose scattered pipi shells with a few tohemanga, oven stones, and almost no artefacts. Middens of the inland belt are extremely compact, mostly pipi with fewer tipatipa and kaikaroro, no tohemanga, and many artefacts of bone and imported stone. The two belts reflect two very different site types which are interpreted by Adkin (1948) as single phase food gathering sites, and 'centres of community activity'.

Excavation of an inland midden (N152/50) at Muhunua West in the Horowhenua is reported by Butts (1981, 1982). The midden was not compact like those described by Adkin (1948), and although only 4 square metres were excavated, a wide range of bird, fish and shellfish species were identified from a range of habitats including coastal, lagoonal, estuarine and forest.

The Waikanae middens show little difference between coast and inland, and those in Queen Elizabeth Park are generally loose scattered shells, mainly pipi, with virtually no bone apparent. Both the Waikanae middens and those in Queen Elizabeth Park appear to be similar to the coastal belt of middens west of Lake Horowhenua.

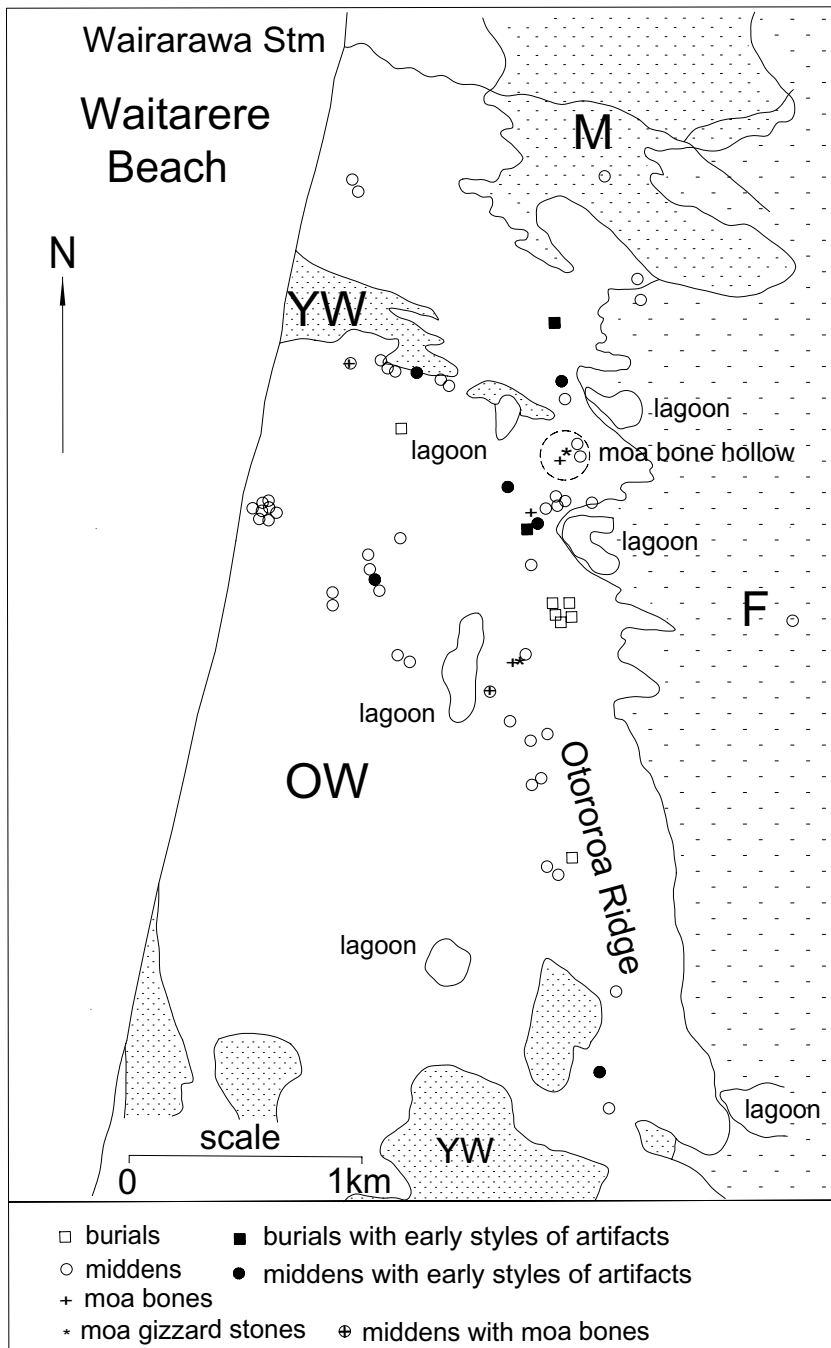


FIGURE 5. SKETCH MAP OF WAITARERE BEACH AREA SHOWING ARCHAEOLOGICAL REMAINS IN RELATION TO WIND BLOWN SANDS FROM FOUR DEPOSITIONAL EPISODES: YW = YOUNGER WAITARERE, OW = OLDER WAITARERE, M = MOTUITI, F = FOXTON. EXTENT OF THE FOUR SANDS FROM COWIE AND FITZGERALD (1966) SOIL MAP. FORMER OR EXISTING LAGOONS AND ARCHAEOLOGICAL REMAINS FROM ADKIN (1948). MAP PREPARED BY MATCHING THE SOIL MAP WITH FIG.6 (ADKIN 1948).

Moa bones are reported in the inland middens west of Lake Horowhenua (Adkin 1948), in middens at Waikanae (Field 1891a,b), and in ovens at Paekakariki (Enys 1873) and Raumati (Beckett 1957). They are also found from time to time in natural deposits (Adkin 1948). Adkin (1948) infers the pursuit of moas into the high Tararuas from the chance find of a flint knife and gizzard stones on Mt Waiopahu. Archaeological excavations at two sites at the extreme ends of the sub-region, Paekakariki (R26/247, Davidson 1988), and near Foxton on a site about 2 km north of the Manawatu River (S24/3; McFadgen 1972, 1978), confirm moa hunting in prehistoric times.

Many of the old forest clearings on the sandstone and alluvial gravels just east of the dune belt are reported to be old cultivation grounds (Adkin 1948). It is uncertain what crop was grown and when the cultivation grounds were used.

Kumara and taro were reportedly grown in the region (Adkin 1948; Carkeek 1966) and Adkin (1948) refers to the spreading of alluvial gravel around kumara and taro in cultivation grounds near Otaki. The soil on the sandstone, mapped as Koputaroa sandy loam (Cowie 1968), is friable and high in potassium, which is an important requirement for kumara (Coleman 1972). Maize, wheat, and potatoes were grown by Maori in some of the clearings in the region after about 1840 (Adkin 1948, Carkeek 1966).

The dune soils do not appear to have been cultivated until after European crops were introduced (Carkeek 1966). They are less weathered than the sandstone soils, have less clay and organic matter, and dry out more quickly.

Although alluvial soils are reported to have been a source of sand and gravel for mulching kumara, there are no archaeological descriptions of either gardened soils or borrow pits. The only direct archaeological evidence for gardening is digging sticks and other garden tools found in swamps and lakes, and the remains of a few storage pits.

Kumara storage pits are reported by Adkin (1948) at Panui-o-marama on an old dune west of Lake Horowhenua, and on sandstone near Lake Waitawa and the Waitohu Stream. He records an exceptionally large storage pit, which measured nearly 6 m by 5 m by 3 m deep, on the sandstone southwest of Manakau. It is not known if any of the pits reported by Adkin (1948) still exist, but there are good examples of pits (R26/180-183) on the greywacke ridge overlooking Paekakariki which may have stored produce grown on the dunes and alluvium below.

Artifacts from the dune belt form a distinctive collection. Many are wooden, found from time to time in swamps and lakes, but unfortunately there is no direct indication of their age. The collection includes gardening tools, spears, paddles, adze handles, clubs, beaters, a burial chest, pounders, tops, and floats recovered from the bed of Lake Horowhenua (Adkin 1948; Rolston 1944, 1947, 1948), and a canoe and outrigger float recovered from near Te Horo (Adkin 1962; Barrow and Keyes 1966). Being of wood, the collection is unusual for New Zealand archaeological assemblages (Golson 1959), and it illustrates an aspect of Maori life not normally found on archaeological sites.

Other artefacts include two elongated whalebone patu of unusual style recovered from the Horowhenua District (Adkin 1948, 1952a), and the usual range of stone and bone tools and ornaments found on New Zealand archaeological sites (Adkin 1948, 1950, 1963). Unfortunately, there is no ready means of dating them. Many are from wind eroded sites, from locations now uncertain, or were dug up in uncontrolled excavations.

Greywacke is the only source of stone in the region suitable for artefacts, but even this was unsuitable for many tasks requiring a keen, long lasting cutting edge, or resistance to hammering or pounding without fracturing. Stone suitable for adzes was imported from outside the area, such as metamorphosed argillite and nephrite from the South Island. One remarkable adze from the Horowhenua is of typically East Polynesian style and more than 0.5 m long (National Museum of New Zealand 1989). For smaller cutting tools, obsidian was imported from sources in the Central Volcanic region, Bay of Plenty, and North Auckland (*unpublished notes*). Chert was imported, probably across the Tararua Ranges from the Wairarapa.

Although the Tararua Ranges are a formidable-looking barrier, their early exploration is suggested by a radiocarbon date (NZ1057, Appendix 1) for an oven site on the Maymorn Ridge in the southern Tararuas (Park 1970). Moahunting has been inferred from the finds on Mt Waiopahu (Adkin 1948), and other artifacts have occasionally been found in the ranges (Adkin 1948). Tracks across them provided access to the Wairarapa, and traditionally the ranges provided refuge for people in times of warfare (Adkin 1948).

4.1 CHRONOLOGY OF ARCHAEOLOGICAL OCCUPATION: EARLY PERIOD

The earliest known archaeological site is in the Whirokino cut and buried by Motuiti sand (Cowie 1963; Wellman 1962). No other details are known about the site. There are, however, sites on Motuiti soils which are earlier than, or contemporary with, the advance of Old Waitarere dunes. The most extensively investigated of these is the Foxton moa hunter site 2 km north of the Manawatu River (McFadgen 1972, 1978, 1985). The site is on the inland shore of a small lake, at the boundary between the Old Waitarere and Motuiti dunes. It is just inside the Wanganui Conservancy, but it gives a good insight into the likely nature of early sites in the Horowhenua sand country and their probable setting.

The Foxton site was first occupied before the lake existed, at least in its present position. The site contained a well-stratified shell midden from which were recovered seeds and land snails of species that indicate a well-developed forest vegetation around the site. Analysis of soils separating the occupation layers confirm the forest as podocarp-dominated. The second and third occupations were after the lake had begun forming in its present position and, in contrast to the first occupation, the midden contained many duck bones. Small lagoon molluscs found in the midden (McFadgen 1972), and the chemistry of the buried soils (*unpublished notes*), indicate damper conditions than those of the first occupation. Before the end of the third occupation the advance of Old Waitarere dunes raised the ground-water table, the lake level rose, and the site was flooded.

During its later and better known occupations, the site was a small hamlet with a house, cooking shelter, ovens, shell midden and flaking floor, all sheltered by a substantial windbreak. It contained many items made of materials which had been brought from far afield, including nephrite from the South Island west coast, obsidian from North Auckland and the Bay of Plenty, and chert from the Wairarapa (*unpublished notes*). Most striking, however, was the large number of bones in the midden from marine and fresh water fish and birds, and forest birds. One midden lens alone contained the bones of more than 500 individual birds, principally from four species: pigeons, kaka, tui, and parakeets (*unpublished notes*). At least five species of moas are identified, including *Anomalopteryx didiformis*, *Pachyornis mappini*, *Dinornis struthioides*, *Euryapteryx curtus*, and possibly *Euryapteryx geranoides*.

The site is remarkable for its illustration of the cultural activities which were carried out at a small lakeside settlement, and for the environmental and cultural processes which determined its history. Possibly similar sites in the

Horowhenua are in a poor condition (Adkin 1948). They include middens of the inland belt in the dunes seawards of Lake Horowhenua, which contained many artefacts of bone and imported stone; and the wind eroded sites nearby on the Otororoa Ridge (Figure 5), which contained moa bones, gizzard stones, burials and early artefact types made of imported obsidian, chert and argillite.

Descriptions of the Horowhenua sites are based on what was fortuitously exposed by the wind some fifty or more years ago, at the time they were visited. Their locations within Old Waitarere dunes (Figure 5) suggests that they may be younger than the Old Waitarere dune advance. But the sites were discovered in badly wind-eroded dunes, and the possibility that they may have been situated on underlying Motuiti dunes cannot be ruled out. Very little else is known about the sites. The Foxton site is thus very important, first as an example of the early occupation of the dune belt, and second as an example of what Adkin (1948) has called a 'centre of community activity'.

At Paraparaumu, Beckett (1957) reports the remains of a whare buried under very pumiceous sand which may possibly have been part of the Taupo Pumice-rich Old Waitarere dune.

Shell middens stratified in Old Waitarere dunes are exposed by wave erosion between Raumati South and the Whareroa Stream (Figure 3), but they appear to contain only shells and a few fish bones. They contrast strongly with the Paekakariki moa hunter midden (R26/247, Davidson 1988) right at the coast just south of the Fisherman's Table restaurant, a location which places it very close to, if not within, the Old Waitarere dunes. The Paekakariki midden (R26/247) contained many artefacts, remains of several moas from three different species, and the remains of 111 other birds including 62 tui.

The large number of forest birds in the Paekakariki midden (R26/247) is consistent with the inferred vegetation on the Foxton dunes prior to the advance of the Old Waitarere dunes. In the bulldozed part of the dunes just north of Fisherman's Table restaurant were old shell middens, some on the old buried Foxton soil, others higher up in the sand on old surfaces that had been briefly stable. Land snails and freshwater molluscs from the midden on the buried Foxton sand (Site R26/255) are those mentioned above as indicative of an environment similar to that at the Waikanae Nikau Reserve today. Not surprisingly, the higher middens, which were deposited on fresh sand or on a thin soil, were devoid of land snails and freshwater molluscs.

The picture of the early part of the prehistoric period inferred from the sites described above is of a well-forested sand dune environment with plenty of food resources obtained from the surrounding forest, the sea shore and nearby lakes and lagoons. The settlement pattern appears to be characterised by a central site with evidence of houses, food gathering and processing, cooking, artefact manufacture, and imported stone resources from outside the region.

Satellite sites include single phase coastal food gathering sites similar to those represented by the middens stratified in the Old Waitarere dunes between Raumati South and Paekakariki, and south of the Paekakariki moahunter midden (R26/247) and Fisherman's Table restaurant (Adkin 1951; Fleming 1965). It is possible that some of the middens in Adkin's (1948) coastal belt west of Lake Horowhenua may belong to the early part of the prehistoric sequence, but there is no evidence for this either way. Although gardening may

have played a part in the economy of the sub-region's inhabitants, there is no direct evidence for it.

4.2 CHRONOLOGY OF ARCHAEOLOGICAL OCCUPATION: LATE PERIOD

Later sites appear to be much more numerous than the early sites described above. Most of what is known about them is recorded by Adkin (1948) who visited many of the sites and obtained his information about them from Maori and European informants between about 1927 and 1948. His informants described what Adkin understood to be a traditional account of the settlements and history of the Horowhenua in late pre-European times or shortly after European contact.

The settlement pattern inferred from Adkin's account appears to be very different from that indicated by the early sites described above. According to Adkin (1948), pa sites are located along river courses and along the inner boundary of the sand dune belt (Figure 6). In such locations the pa were well-placed for their occupants to exploit the swamps, lakes and forest. Island pa in the larger lakes include artificial islands specially built for defence. With two exceptions, the pa sites do not appear to contain shell middens. There is almost no bird or fish bone on them despite their proximity to lake and forest. There are large numbers of mostly wooden artefacts from some pa sites, but very little imported stone, and almost no obsidian. These pa sites do not appear to be the equivalent of the early settlements such as Foxton.

The two pa with shell midden are Pakakutu pa, near Otaki; and Mangaroa pa, which is an artificial island in Lake Horowhenua (Adkin 1948). Nearly all of the shell midden on Mangaroa pa is freshwater mussel and appears to have been dredged from the lake bed to provide a foundation for the pa. Only a small amount of the shell is marine.

Adkin (1948) records few kainga or village sites on the dunes, even though eel fishing in the dune lakes was an important pursuit. Some kainga were in forest clearings and were probably birding camps or gardening hamlets, but like the pa sites, most are located along rivers, where transport would have been easy and fish plentiful, and along the inner boundary of the dune belt (Figure 6).

Cultivation grounds in the Horowhenua were located in many of the forest clearings on the sandstone inland of the dune belt (Adkin 1948). Soils on the sand dunes were not gardened until after European contact. An apparent exception is a garden where the Hokio Stream leaves Lake Horowhenua, but the garden may have been on old river alluvium, not sand. Cultivation grounds south of the Otaki River are reported on river alluvium east of the dune belt (Carkeek 1966). Soils on the dunes were gardened after European contact using European crops.

Shell middens on sand dunes near the coast probably mark the sites of temporary camps for fishing and shell fish gathering. Surprisingly little midden has been found on other sites.

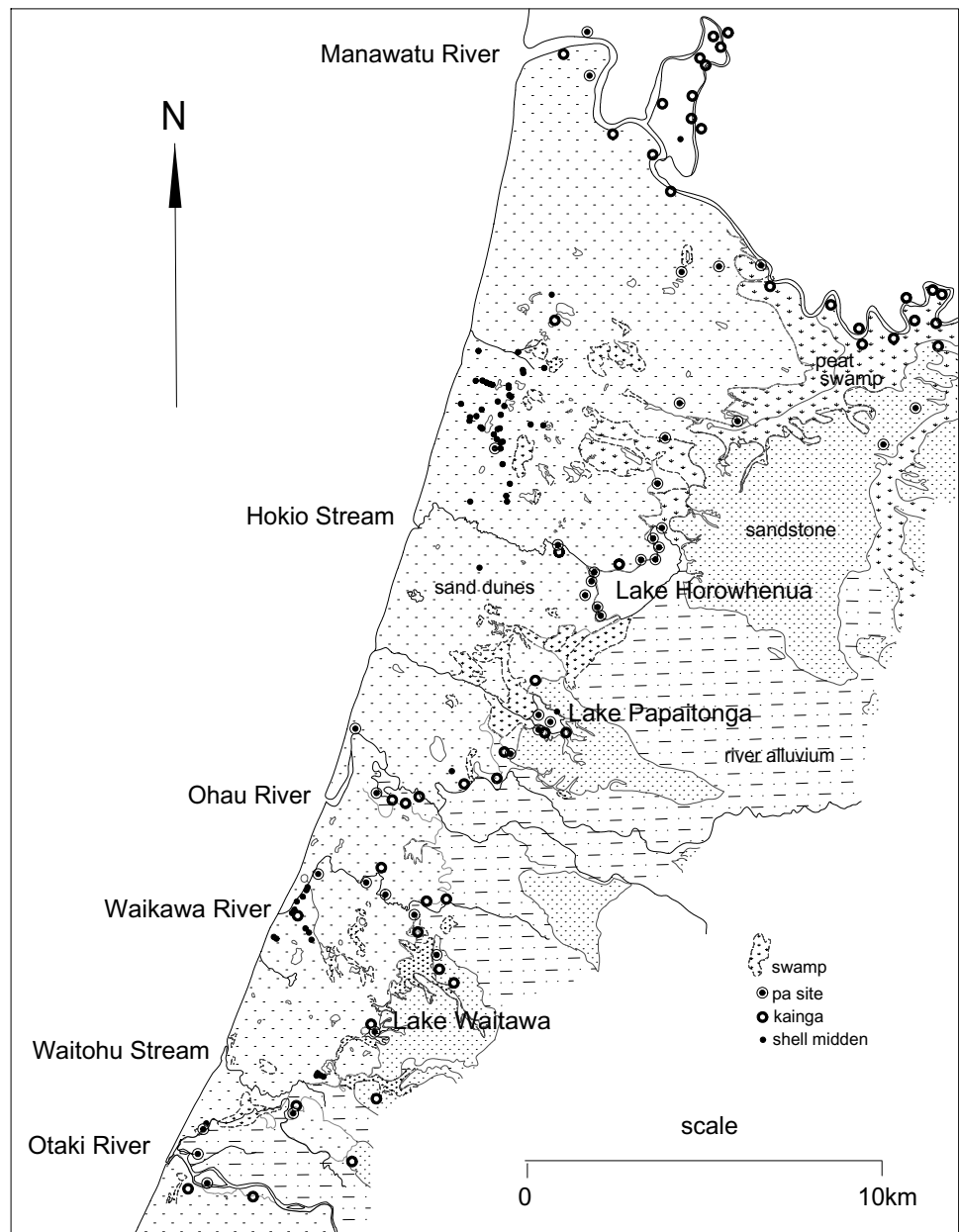


FIGURE 6. DISTRIBUTION OF PA, KAINGA AND SHELL MIDDENS RECORDED BY ADKIN (1948) COMPARED WITH SURFACE GEOLOGY. NOTE THE APPARENT CLOSE RELATIONSHIP OF PA AND KAINGA WITH WET LANDS (PEAT SWAMPS, STREAMS AND RIVERS, AND LAKES AND LAGOONS). FOR DETAIL OF MIDDEN DISTRIBUTION BETWEEN LAKE HOROWHENUA AND THE SEA, SEE FIGURE 5.

No sites are identified which correspond to the early settlement at Foxton, the Paekakariki moa hunter site, or even the inner belt of middens between Lake Horowhenua and the sea. There appears to be a general absence of imported stone, which is surprising considering that stone sources for making artefacts were almost non-existent in the region. Few animal species are found on the later sites, which again is surprising because the numerous lakes and peat swamps in the low-lying hollows between the dunes would have been an important source of eels and water birds, and the region was widely renowned for its eels (Adkin 1948). In contrast to the early settlement pattern, the later pattern appears to be dispersed, without the central settlements which might be the focus for a community.

It is possible that the distinction between the early and late sites is due to the different nature of the evidence — the early sites are known only from archaeological evidence that includes, in one instance, careful excavation. The late sites were visited, but no excavation was carried out other than required to obtain artefacts, and much of the information about them is from informants' memories. No late site such as a pa, which might be expected to correspond to the early sites in the range of activities and remains found on it, has been excavated to find out what the purpose of these sites actually was. Ethnohistorical research, for example into accounts of some of the early European colonists, may clarify the nature of the later settlement pattern, but the question is only likely to be resolved by the closer examination of a pa and of the sites in the Old Waitarere dunes west of Lake Horowhenua.

5. Future research

The western dune belt is a dynamic place where coastal accretion and erosion are the norm, and dune advances have overwhelmed coastal forest and places of human habitation. A succession of different human communities, Maori and European, have adapted their way of life to suit the land and, in turn, have dramatically altered the landscape to suit their ways of life. Dune building phases are the key to the natural and cultural character of the sand dune country.

Suggestions for future research are intended to clarify aspects of the natural and cultural history of the dune belt and show how those aspects are related. They are not exhaustive and are intended only as a guide. First, they focus on finding out what the dune belt was like at the times of Maori and European settlement, and what changes have occurred since human settlement. Second, they focus on how the Maori adapted to the dune belt environment, and how that environment was adapted to their requirements. In order to untangle natural and cultural processes which have shaped the region, a thorough understanding is necessary of the processes that were operating in the pre-human environment.

Radiocarbon dating of events before and after human settlement will be important for understanding the processes. The usefulness of radiocarbon dates is improved when there are many dates for an event, therefore, because dates are expensive to obtain, emphasis should be given to dating those events, either cultural or natural, which are also time horizons.

The landscape changed dramatically after Maori settlement, and even more dramatically after European settlement. A combination of field and documentary research should enable the major landscape components to be mapped as they were at the time of European settlement, but field research is likely to be the only source of information for pre-European times.

It is inferred above that the coast from Paekakariki south to beyond Pukerua Bay may once have been much sandier than it is today. More information about the sand on the cliff tops south of Pukerua Bay, its distribution, age and origin,

may help to determine the former extent of the dune belt and its subsequent erosion.

Of particular importance is the mapping, dating and close examination of the dunes of the Old Waitarere Dune-building Phase. There are three immediate reasons for this. The first relates to the age of moa bones and artefacts; the second, to the protection of sites in the dune belt still likely to be substantially intact; the third to differences in the distribution of early and late sites.

Adkin (1948) reports moa bones, moa gizzard stones, and artefacts of apparently early styles from Old Waitarere dunes between Lake Horowhenua and the sea. When these remains were found, the dunes were in a very eroded state. It is possible that they may relate stratigraphically to older dunes buried by the Old Waitarere sand advance. Their occurrence is not entirely unexpected because moa bones and early styles of artefacts were found on the Foxton site in the Manawatu, dating from the time of the Old Waitarere dune advance. If the moa remains and early styles of artefacts between Lake Horowhenua and the sea were deposited on the Old Waitarere dunes then, on the current evidence for the age of the Old Waitarere dunes, they would be remarkably late for New Zealand prehistory, and would have significant implications for the study of prehistoric culture change.

The second reason for a close interest in the Old Waitarere dunes is the likelihood that they bury largely intact sites. Between Raumati and Paekakariki, the Old Waitarere dunes overlie Foxton soils and shell middens. At Paraparaumu, the old whare described by Beckett (1957) beneath pumiceous sand was in a remarkable state of preservation, complete with post butts and flax items. It is expected that other sites still exist, protected from farming and other development by the overlying Old Waitarere dunes. Such sites are likely to provide a range of information about the cultural and natural history of the dune belt no longer obtainable from sites on the present ground surface. Modern land development frequently entails earthmoving like that which recently occurred just north of the Fishermans Table restaurant at Paekakariki. If sites under the Old Waitarere dunes are to continue to be protected until the time is appropriate for their investigation, then the Old Waitarere dunes first need to be identified and mapped.

The third reason follows on from the other two. The dispersed nature of the late settlement pattern compared with the early has already been mentioned. A further contrast is that late sites are spread along the inland edge of the dune belt (Figure 6), whereas the few known early sites are much closer to the sea. It is acknowledged that these differences may be due to insufficient data about the sites, but there is an alternative possibility suggested by two major events: the retreat of the forest edge and the advance of the Old Waitarere dunes.

The forest edge was an important source of fruits and berries, and of the birds attracted to them. Maori living close to the forest edge in late times had immediate access to its resources. The forest edge was closer to the coast in early times than in late times and, if the Foxton site is any indication, it was just as desirable a place to live. It was, however, not static and for a variety of reasons retreated inland. This alone would probably have been insufficient to have induced a corresponding retreat of sites if enough patches of forest survived, but the advance of the Old Waitarere dunes would have clinched the

matter by overwhelming the surviving forest and making sites close to the coast uninhabitable. It is of interest to note that a pollen core from Lake Papaitonga shows charcoal only near its top (G.N. Park, *pers. comm.*), consistent with late occupation around the lake and late forest clearance in its vicinity. Further cores from other lakes and swamps are necessary if changes to the vegetation of the sub-region are to be more fully understood.

The possibility that the focus of settlement shifted inland in late times due to environmental changes, and that early sites in the Horowhenua are now buried under Old Waitarere dunes, needs further investigation. The Old Waitarere dunes, their stratigraphy and soils, are important factors to be considered.

Both Maori tradition and archaeology confirm wetlands as having been an important economic resource to the Maori. The Foxton site shows that wetlands in their natural state are dynamic entities, which raises questions about the relationship of island pa, eel channels and weirs to hydrology, and about how the Maori in the past adapted to changes in the ground-water level. Conversely, knowledge of the development and decline of wetlands may be relevant for correlation and dating of archaeological remains. As shown by the Foxton site, some archaeological sites may encapsulate a history of the rises and falls of the local ground-water table, and there is probably a ground-water history to be unravelled in the chronology of eel channels and eel weirs.

Wetlands, however, are important for another reason. The type of site represented by Foxton appears to be central to understanding the settlement pattern of the early prehistoric period, but no intact equivalent sites are known between the Manawatu River and Paekakariki. If the past extent of wetlands, and the significance of wetlands in the economy of the Foxton site are known, it may be possible to predict the locations of such sites.

Turning now to more specific archaeological tasks, there is a pressing need for archaeological site surveys. Some surveying has been carried out in the Waikanae area (Smart 1962), and in the Waitarere Forest (Nevin and Nevin 1979), but the two major works dealing with the archaeology of the sub-region (Adkin 1948; Carkeek 1966) are based largely on sites which do not appear in the NZ Archaeological Association Site Recording Scheme. Sites around Lake Horowhenua have recently been revisited and recorded (S. Forbes *pers. comm.* 1995), but many of Adkin's (1948) other sites need to be revisited and if they still exist, redescribed and entered into the scheme.

Site surveys are necessary if issues relating, for example, to settlement patterns and midden function are to be studied. They should be carried out with such issues in mind. The early and late settlement patterns contrasted above may be more apparent than real, and an artefact of too little evidence. It is important to re-examine sites in the vicinity of the Otororoa Ridge seawards of Lake Horowhenua to determine their age and geological setting, and then compare them with the island pa in Lake Horowhenua.

A similar comparison needs to be made between the inland and coastal middens to understand the roles of the middens in the settlement pattern of the area. Are they functionally different (Adkin 1948) but part of the same settlement pattern, or of different ages (Adkin 1952b) and part of two different settlement patterns? What does the apparent absence of shell middens along the coast

south of Lake Horowhenua mean for the interpretation of coastal processes, or of Maori shellfishing activities?

A different issue relates to old cultivation grounds. Spreading of sand and gravel around growing crops produces distinctive soils (McFadgen 1980). Can the soils be relocated? If so, can they be dated? Are there any other soil modifications, or any indications of the crops grown?

The Foxton moahunter site (S24/3) is probably the most valuable known site in the dune belt. It has provided information on material culture, settlement layout, soil changes, ground-water changes, vegetation changes, and past fauna, pertinent to the whole of the dune belt. Some of the information is in theses, much is in note form, but it all needs to be brought together, analyses completed, and the results formally published. The site has the potential, to provide unique details about the natural and cultural processes which operated in the dune belt during the early period of Maori occupation.

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