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AN ARCHAEOLOGICAL SURVEY AND ENVIRONMENTAL
INTERPRETATION OF THE WHANGARA DUNES, EAST COAST,
NORTH ISLAND

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During a brief visit to a sand quarry at Whangara, about 20 km north-east of Gisborne, in February 1983, an exposed section on the east side of the quarry (Area C; see Fig. 2) revealed two ovens and several large articulated vertebrae. On loose sand below the ovens was a one-piece fish-hook, and a large obsidian blade was found nearby. Elsewhere in the quarry were extensive deflation areas with obsidian, chert, and a range of bones, including moa, scattered over the surface. The general character of the site appeared to be of Archaic affinity. Moa bones (*Euryapteryx curtus*) exist in at least one private collection known to have come from Whangara, and bone and egg shell were described as 'abundant' in the Pakarae vicinity in the early part of this century (Hill, 1914).

Archaic (1000-1600 A.D.) sites are extremely rare on the East Coast and the question immediately arose as to whether sand quarrying should continue under the relevant provisions of the Historic Places Act 1980. Because cultural and faunal material is very thinly scattered there was little case against continued use of the quarry, and the development was seen as providing an opportunity to inspect the largest possible area of the site.

The site was re-visited and recorded in March 1983, with a third visit in September 1983. There had been less quarrying and less wind deflation than expected after the 1983 winter, and the September visit produced little additional information from the sand quarry proper. The opportunity was taken to make a closer inspection of blowouts in the rest of the dune area, concentrating on one particular site (the dam site) in the dunes 500 m inland from the present beach. This report covers the results of work in the Whangara area to date.

General setting

Whangara Beach lies between the Pakarae River to the north, and Whangara Island to the south (Fig. 1). There is a strong contrast in geology, land form and soil type either side of the Pakarae River (Ridd, 1964; N.Z. Soil Bureau, 1954), and a related contrast in the range of archaeological evidence (Jones, 1984).

Sand dunes occupy an area some 2 km long and up to 700 m wide behind the beach, partly covering a series of fine up-lifted Holocene marine terraces cut into the relatively soft Tertiary rocks (Ota *et al.*, 1983). The dunes narrow considerably to the south-west where they are confined by a steep-sided ridge; the 'quarry site' N98/132 is situated at this point.

The higher, and presumably older, dunes contain minor Taupo pumice and so predate human occupation. The 'dam site' N98/134 was near a stock dam at the south-west end of these older dunes. Dunes seaward of this point postdate the deposition of a drift pumice (Ota *et al.*, 1983), which is inferred to be Loisel's pumice (see Wellman, 1962:78-9) dating to about 600-700 years BP (McFadgen, 1982).

The 'sand quarry site' (N98/132, 604489)

The 'sand quarry site' lies about 1 km north of Whangara township at the foot of a steep hill. On top of the hill is a group of kumara storage pits. It is an area of dunes 150-250 m wide and some 700 m long south-west of the clearly delineated broad series of beach ridges.

There is a well preserved stable dune and swale behind the current, eroding beach front, the dune becoming more pronounced in height and width as it trends to the north and east (Fig. 2). Behind (north-west) of the dune and swale is an area of hummocky dunes which broadens to the north, and falls to a distinct swale at the foot of the main hill. The hummocky dunes are the products of southerly winds carrying sand from exposed loose areas in the south.

The East Coast 'coach road' and stock route passed through the seaward of the two swales. This road was in use late last century and earlier this century (Mackay, 1966:349), and is responsible for a great many horse skeletons and 19th century bottle glass in the area of the site.

The sand quarry was, in 1983, gradually being extended at a face through the swale behind the dune. 'Hard fill' and rubbish were used to refill the excavation and cover the quarry floor, giving access to the actively quarried face. There was less fill going back than sand taken out, leaving unstable scarps on either side of the quarry pit, about 2 m high in the south and 5 m high in the main face.

Stratigraphy

As the sides of the cut collapsed or deflated, cultural and faunal material, including ovens, was left on a sand surface (Fig. 2, Areas B and E). In the vicinity of the active cut,

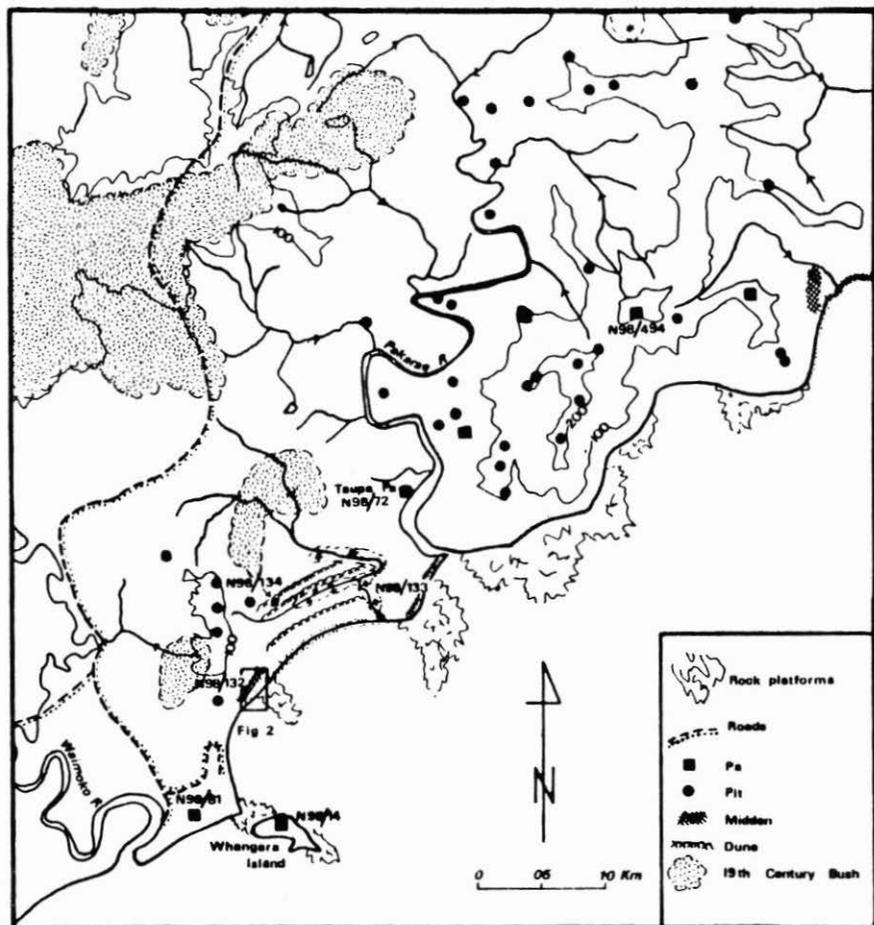


FIGURE 1. Lower Pakarae River vicinity, showing pa, kumara storage pits, and location of sites referred to in text.

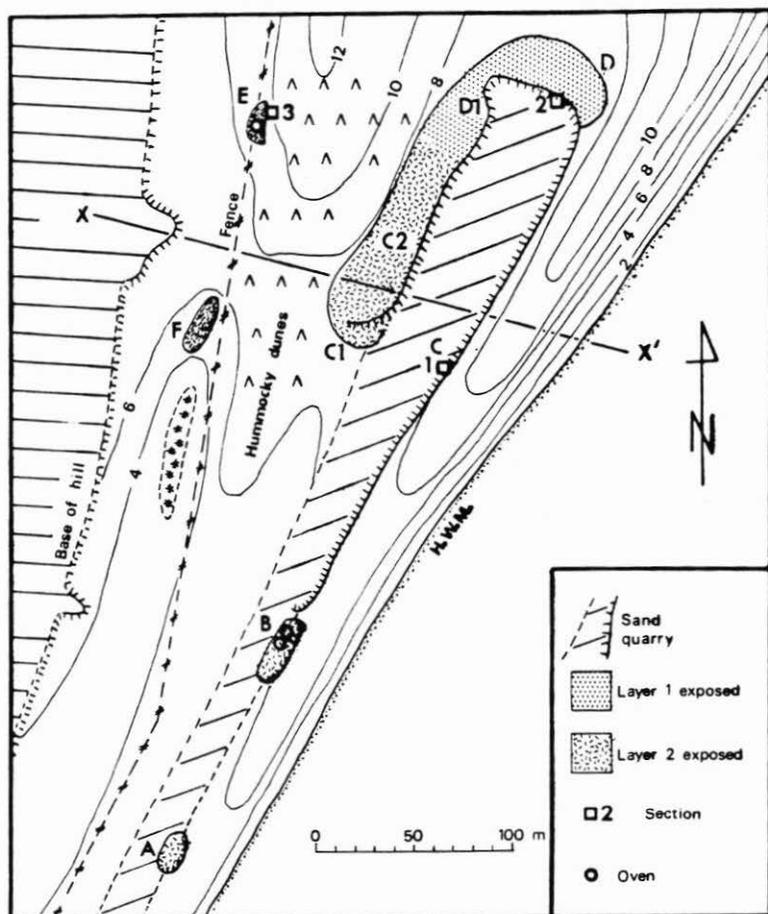


FIGURE 2. The Whangara sand quarry N98/132.

some dark charcoally sand and superficial vegetation had been bulldozed off, to get access to 'clean' sand or 'natural' below. The resulting soft stripped surface was deflated (but not markedly), exposing a cultural and faunal assemblage on the surface (Fig. 2, Areas C¹ and D). The surface-collected fauna from these areas is listed in Table 1.

Stratigraphy of the site was established from three sections, two located along the walls of the quarry and one in a naturally eroding bank further west. These were cleaned up with a spade to clearly expose all cultural layers and the underlying 'natural' (dune sand). Two main layers were identified (Fig. 3): Layer 1, a dark, charcoal-rich layer up to 30 cm thick; and Layer 2, a lower brown sand up to 1 m thick containing diffuse zones of charcoal, scattered bones, landsnails and coprolites. The brown sand (Layer 2) overlies clean yellow sand (Layer 2B). The upper, charcoal-rich layer is generally overlain by a brown sand which contains very minor, probably reworked, charcoal. The surfaces in C1 and C2 that were surface-collected therefore comprise both Layer 1 and Layer 2 materials with some bulldozer mixing of recent materials. The lower parts of Layer 2 seemed to be relatively impoverished of faunal and cultural material, with the majority in Layer 1 or at the diffuse interface between Layers 1 and 2. In September 1983, a bulldozer cut running east-west had been made in the south of area C1 and C2. This showed a cap of the dark charcoally sand Layer 1 overlying Layer 2 sand. No obvious cultural material showed in the exposed Layer 2 sand. Overall stratigraphy of the site is shown schematically in Figure 4.

The available sections (Fig. 3) also exposed some cultural material, and landsnails suitable for an interpretation of the original vegetation cover. In Section 1 (Area C), two ovens (with hangi stones) were present, one in Layer 1 and a second approximately 20 cm below the top of the Layer 2 brown sand (Fig. 3). A one-piece fish-hook (Fig. 5) and some moa bone (unidentified) were found on the surface near a group of hangi stones fallen out of the section, most likely from the upper oven. The Layer 2 brown sand includes a basal layer (Layer 2B) 15 cm thick, of orange-brown sand with patches of diffuse charcoal near the top. About 10 cm above the basal layer were several articulated sea lion (*Phocarctos hookeri*) vertebrae in clean sand.

A similar sequence is exposed at Section 2. The basal orange-brown sand (Layer 2B; 20 cm thick) contains common land snails *Therasia zelandiae*, some fish bone, and abundant coprolites at the top. *Rhytida greenwoodi* land snails are common in the underlying 'natural' sand. The upper charcoal-rich layer is eroded, and nearby the deflating surface of

FISCS:

Unidentified fish		A ¹ , A, C ₂ (jaws)
Unidentified shark		C ₂ (tooth)
Allomycterus jaculiferus	Porcupine fish	D (jaws) C ₂ (jaws)
Unidentified ray		A ¹ , A, C ₂ (pharyngeal plates)
Sesus japonicus	John Dory	A
Thyriscites stum	Barracouta	A ¹
Parika scaber	leatherjacket	C ² (spines)

REPTILIA:

Sphenodon punctatus	Tuatara	A ¹ , A, C ₁ , C ₂ , D
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AVES:

Moa egg shell		D, C ₁ , C ₂
Eurypteryx curtus	Moa	A(vert, fem, tt), C(vert, fib, rib), C(tt), C ₂ (vert), D(fem, tt)
Pachyornis neppini	Moa	A(quadrate, C ₁ (tmt)
Unidentified moa	Moa	A ¹ , A(phal, vert, rib, tt), B(tt), C ₁ (unguis, rib), C ₂ (phal, vert, fem) D(fem) *
Eudyptes chrysolome	Rockhopper penguin	C ₁
Eudyptes creatatus	Crested penguin	C ₁ , C ₂
Eudyptula minor	Little blue penguin	A ¹ , A, C, C ₂ , D
Puffinus griseus	Sooty shearwater	A ¹ , A, C ₂
P. tenuirostris	Short-tailed shearwater	A, C ₂
P. gavia	Fluttering shearwater	A, C ₂
P. assimilis	Allied shearwater	C ₂ , D
Pachyptila turtur	Fairy prion	A, C ₂
Pelecanoides urinatrix	Diving petrel	C ₂

AVES (continued)

Phalacrocorax varius	Pied cormorant	A, C ₁
Larus dominicanus	Black-backed gull	C ₂
Coturnix novaezealandiae	Extinct NZ quail	C ₂
Gallirallus australis	Meka	A ¹ , A, C ₁ , C ₂
Hemiphysalis novaezealandiae	Pigeon	A ¹ , A, B, C ₁
Strigops habroptilus	Kakapo	C ₂ , D
Nestor meridionalis	Kaka	A ¹ , A, C ₂
Cyanorhynchus novaezealandiae	Red-crowned parakeet	A ¹ , A
Callaeas cinerea	Kokako	C ₁
Prosthemadera novaezealandiae	Tui	C ₂
Palaeocorax scoriurus	Extinct crow	A, B, C, C ₂ , D
Apteryx owenii	Little grey kiwi	C ₂

MAMMALIA:

Mirounga leonina	Elephant seal	D(cran, maxilla)
Phocartos hookeri	Hookers sea lion	C(canine), D(canine)
Unidentified phocid	Sea lion	A ¹ C(rib, vert), C ₁ (vert), D ₁ (earbones)
Arctocephalus forsteri	Fur seal	A(various), C(vert), C ₂ (various), C ₁ (phal)
Unidentified seal	Seal	A(various)
Rattus exulans	Kiore - Rat	A ¹ , A, C ₂ , D
Equus caballus	Horse	C ₂
Bos taurus	Ow	
Ovis domestica	Sheep	A, C ₂
Sus scrofa	Pig	B
Lepus europaeus	Hare	C ₂
Oryctolagus cuniculus	Rabbit	C ₂
Unidentified mammal		C ₂
Erinaceus europaeus	Hedgehog	D

TABLE 1. Faunal identifications for site N98/132 (P.R. Millener May 1983, with additions by R. Sheppard.

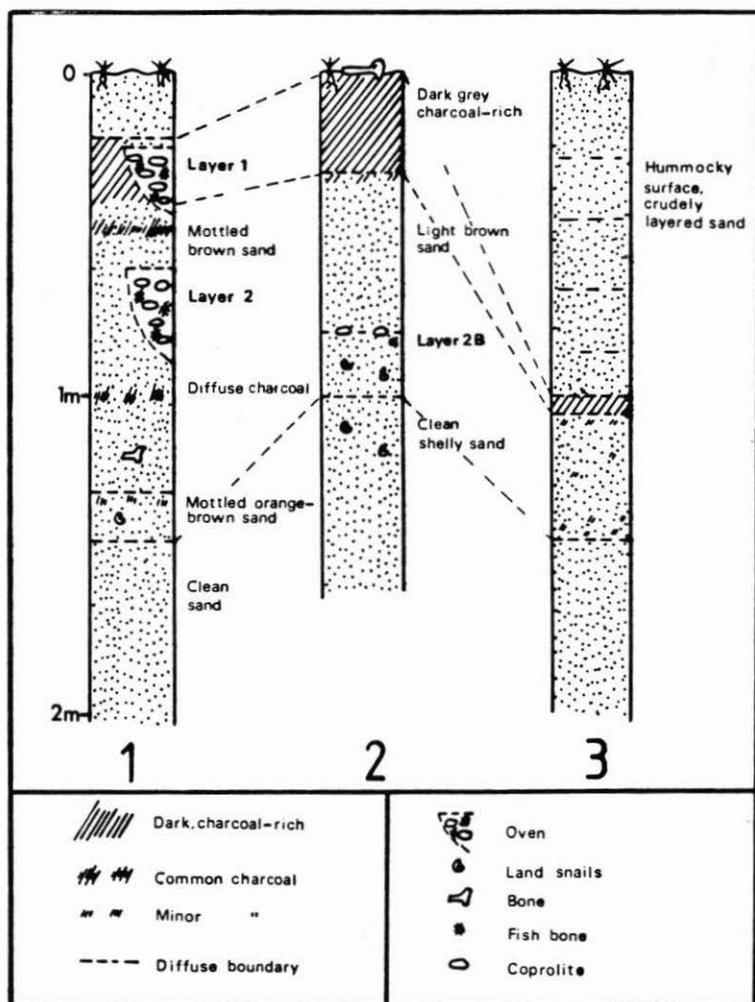


FIGURE 3. Stratigraphic sections for N98/132.

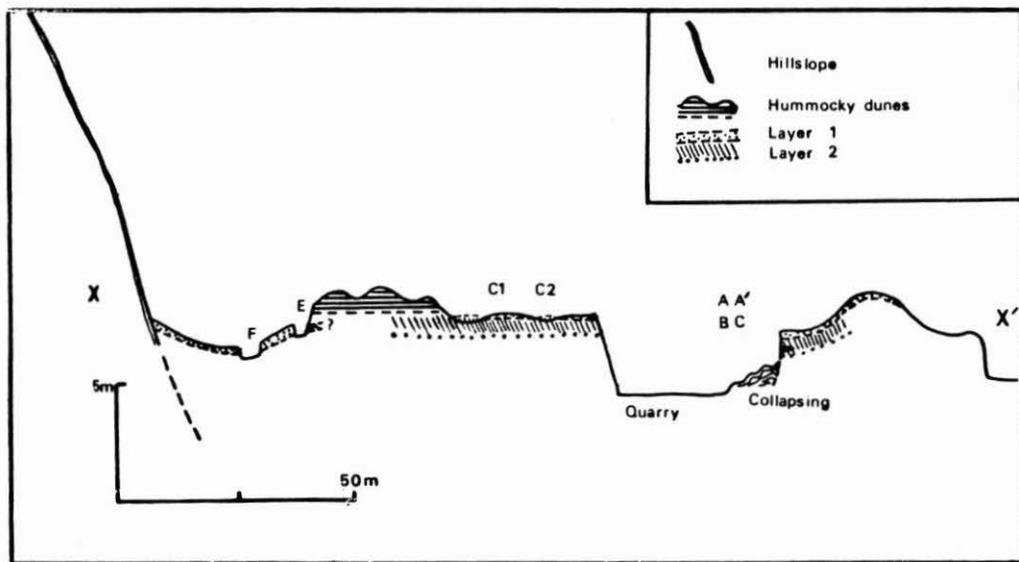


FIGURE 4. Schematic east/west section through Areas E, F and C, N98/132.

Layer 1 is strewn with moa egg shell, possibly wind-blown out of the sand quarry, and horse bones pressed into the surface.

Exposed by a bulldozed fence cutting, the cultural sequence at Section 3 (Area E) is much thinner, with the charcoal-rich Layer 1 reduced to only 5 cm. Part of this layer may have been removed by erosion, and charcoal reworked into the overlying brown sand of which the hummocky dunes (Fig. 2) are comprised. The basal orange-brown sand (Layer 2B) was not identified in this section. Some ovens had collapsed from the vicinity of this section into the fence cutting.

In Area B, the deflated ovens (Fig. 2) were made in a matrix of the Layer 1 charcoal-rich sand.

Environmental interpretation

From the three stratigraphic sections examined, and exposures of the charcoal-rich Layer 1 in deflation areas, cultural activity clearly covered a considerable area. Initial occupation probably occurred near, rather than on, mobile sand dunes in a narrow zone of coastal forest at the foot of the steep inland hills. Rhytida greenwoodi, which is common in the 'natural' in Section 2, rarely occurs outside well-established forest, and requires leaf litter or rotting logs to survive (F. Climo, pers. comm). On the other hand, the overlying orange-brown sand Layer 2B contains common Therapsia zelandiae which prefer a cover of low grasses and sedges in open clearings and bush edges. The appearance of finely dispersed charcoal with a change in the land snail fauna suggests there was probably progressive clearing of the forest by burning, and encroachment of dune sand into areas formerly occupied by coastal forest.

Following initial settlement, the occupation has spread across the entire dune area. At the time the dune surface was probably more uniform (mostly 5-8 m above sea level) and at least partly stabilised. Dunes may also have extended further seaward than at present, providing greater shelter from on-shore winds. During the peak of occupation, represented by the dark, charcoal-rich layer, the site as recorded in these exposures, covered an area of at least six hectares. The quantity of charcoal in this layer is such that any remaining coastal forest must have been severely depleted.

After abandonment of the site, dune sand probably encroached very quickly, preserving the cultural sequence almost intact. There is no evidence of occupation post-dating the charcoal-rich layer other than the European coast road evidence which comprises horse bones and 19th century bottle glass.

Distribution of faunal and cultural material

There were three distinct areas of deflation:

1. the collapsing seaward scarp of the cut (area A¹, A and B),
 2. surfaces stripped of the dark brown sand near the active face (areas C¹, C², and part of D), and
 3. stock-eroded blowouts at the foot of the hill (areas E and F).
- Most of the faunal and cultural material is inferred to derive from the upper parts of Layer 2, and from Layer 1.

There were quantities of coprolites and moa egg shell on the C1 and C2 surfaces and on the adjacent eroding edge of the main cut. To the north of the active face, in Area D, the dark brown sand had not been completely stripped. Southerly winds, funnelling through the open cut, had blown lighter material, particularly moa egg shell, out of the cut and on to the surface of the brown sand (Fig. 2). This was then associated with horse skeletons impressed into the Layer 1 dark brown surface.

Other significant exposures were in the second dune swale at the foot of the main hill slope and behind the hummocky dunes (Fig. 2, Areas E and F). Faunal material in these blowouts caused by stock trampling was limited, but there were ovens and chert debris.

Faunal assemblages

The sand quarry (N98/132) was systematically surface collected in March 1983. In September 1983 Area C¹ and a new area south of A recorded as A¹ (not in figure) were collected again. Identifications were carried out by Phil Millener, then of the National Museum, and are shown in Table 1. The bulk of material is inferred to come from Layer 2 loose brown sand or the dark brown charcoally sand Layer 1. Molluscs were not collected, although there were numerous rocky shore gastropods and some bivalves on the surfaces, A, B, C and D (but not E, F). Coprolites were found in Areas C, C¹ and C².

The species are all within their natural range, except for the rock-hopper penguin (*Eudyptes chrysocome*) which has a reputation for straggling. An important question arises as to whether some or all of the species represent natural faunal deposits which, in the course of dune formation and stabilisation, have worked their way into culturally modified deposits. The original newly formed dunes would have offered a breeding ground for the marine-ranging and coastal birds, as would the dunes modified by fire and subject to further advances of sand. The moas and other flightless birds and birds occupying the forest canopy would not become incorporated in

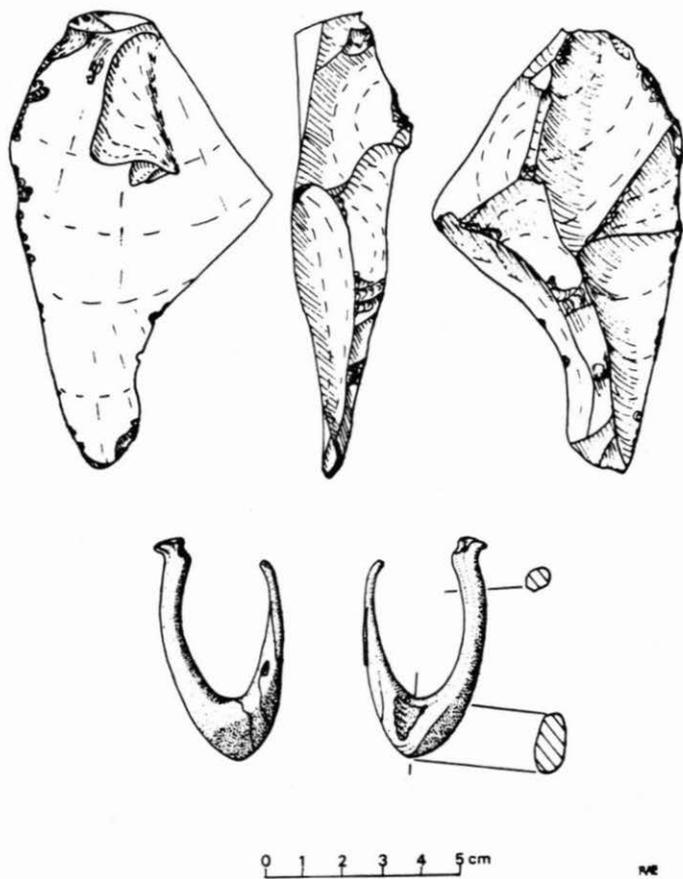


FIGURE 5. Obsidian blade and one piece fishhook found in Area C, N98/132.

the same deposit by any agency other than human. The larger fish (shark, ray) must occur by human agency, as do the short sections of articulated sea lion vertebrae adjacent to ovens in Area C (Section 1). The remaining sea mammals could be from natural deaths in a haulout area.

The coprolites are inferred to be from dog, since they contain many small sharp fragments of fishbone. The coprolites are fragile, and their survival suggests little reworking of the deposits, and indeed that only surface deposits were affected by bulldozing. The small proportion of fish bone from the site seems relatively surprising (particularly the absence of snapper); the presence of dog would explain this shortage, since the carcasses of fish would be scavenged.

Overall it is suggested that land-dwelling animals are in the site by human agency. Most but not all of the sea-ranging animals are also probably introduced. A determination of minimum numbers of species is not warranted in this case, since nearly all the material is surface-collected, and initial examination showed that all species are represented by small numbers of bones with no species predominant.

The bird fauna was undoubtedly seasonally exploited; the bush-dwelling birds, for example the pigeon, would be at their best in late autumn/early winter. The coastal and marine birds would have nested in summer, when they would be easily taken, with young muttonbirds (Puffinus griseus) taken in late summer.

Cultural material

This comprises ovens, chert and obsidian tools and waste. Surviving ovens (in Areas B and E) had deflated as partly broken-up units in a matrix of the dark brown charcoally sand (Layer 1). The exceptions are the ovens exposed in situ in Layers 1 and 2 in Area C (Section 1). Oven stones were mainly of fractured sandstone. There were many heat-fractured chert cobbles in exposed parts of the site, but none were found in intact ovens.

A one-piece hook (Fig. 5) in good condition was found in Area C (Section 1) (registered under the Antiquities Act 1975 as Z 3631).

An obsidian blade (Fig. 5) was found adjacent to Section 1 where it is associated with ovens, and sea lion vertebrae. There were occasional flakes of obsidian in Areas A-D, most of it smaller than usable size which indicates that flakes were made at the site. The obsidian is green in transmitted light.

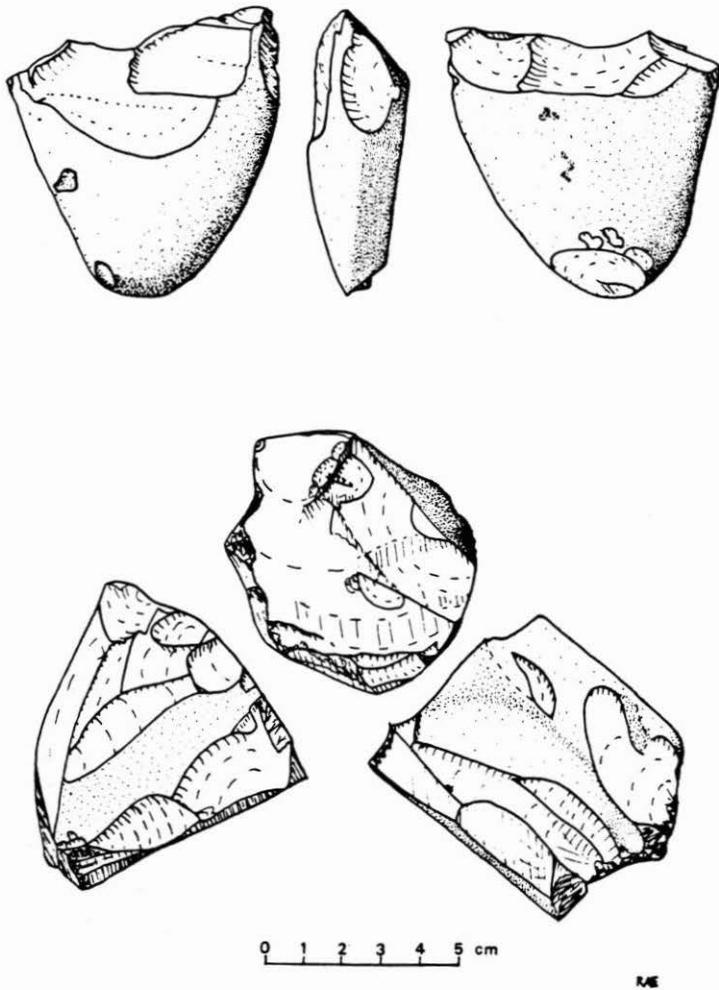


FIGURE 6. Chert cores from Area F, N98/132: above, a cutting implement; below, a partly worked prismatic core with a prepared striking platform.

No adze debris, ground flakes, or flakes of any size made from basalt or argillite was found.

All of the chert has river or beach-rolled surfaces. Similar material can be picked up at the Pakarae River mouth today. Chert occurrences in the Panikau Road vicinity are a likely source of material in the Pakarae River. Chert cobbles had been used by initially striking off one or more usable flakes, or by striking in half to form a core (Fig. 6). One core showed selection and preparation of a striking platform with elongated flakes (blades) being struck from the perimeter leaving a residual prismatic core (Area F) (Fig. 6). This isolated example of a prismatic core technique provides a parallel with the Central Otago blade industry in silcrete (Leach, 1969).

Chronology and function of the site

Most of the faunal and cultural material is inferred to derive from the diffuse Layer 2 deposits. The survival of material in Areas C¹ and C² after bulldozing of the firm Layer 1, suggests some deflation of the softer Layer 2 materials in which the material lay. The considerable mixing of European or introduced fauna in this area results from re-deposition of sand in the area described as 'hummocky' dunes. The presence of many extinct species, the prismatic chert core, large sea mammals, and perhaps the green obsidian and the one-piece hook taken with the inferred stratigraphic position, all strongly suggest that Layer 2 is Archaic in date. This remains to be confirmed by C¹⁴ dating of charcoals from the only firmly stratified deposit, the oven in section 1.

There is no tephra or Loisel's pumice (Wellman, 1962; McFadgen, 1982) in the deep (3 m or more) sections of the sand quarry. The position and elevation of the dunes is therefore consistent with their formation later than the 'terrace III' beach ridge and dunes to the north-east (Ota et al, 1983).

The cultural assemblage is that of a site of specialised function, viz., the butchering and cooking of bush and marine fauna. The small volume of unusable obsidian and chert flake waste indicates the manufacture of cutting implements for butchery. Tools that would be associated with a wider range of activities, for example adze debris or drill points, do not occur. The site itself is relatively exposed to the south, much more so than the site of the present Whangara township where there might well have been a permanent settlement. The associated pa (N98/14, 81) need not be of the same age, but they are in themselves evidence at this location of a permanent

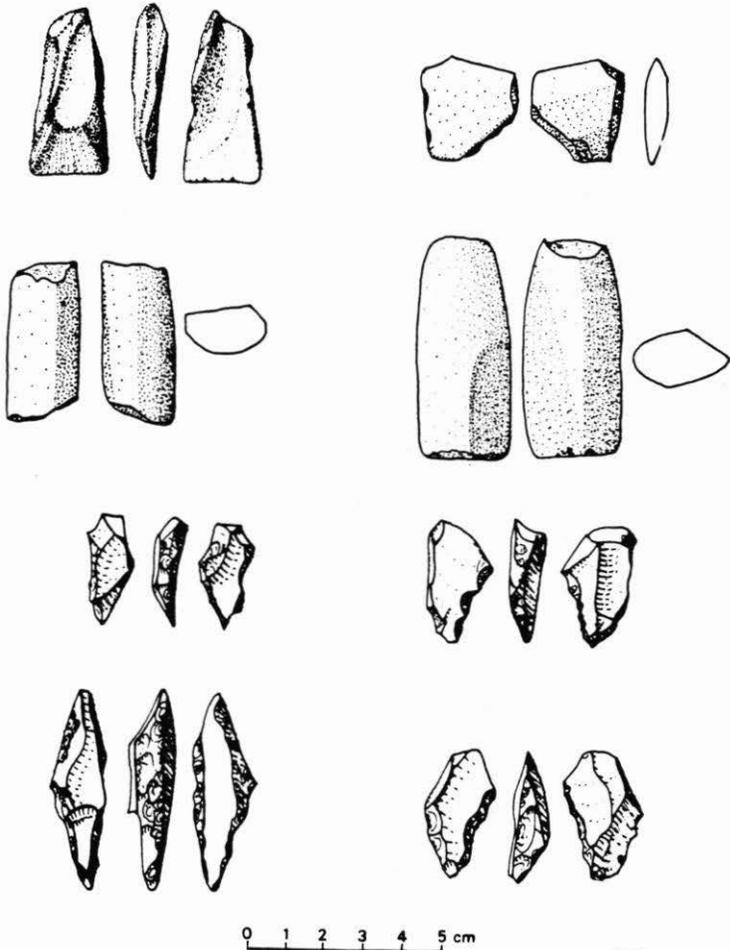


FIGURE 7. Sandstone files and chert drillpoints from Whangara dam site, N98/134.

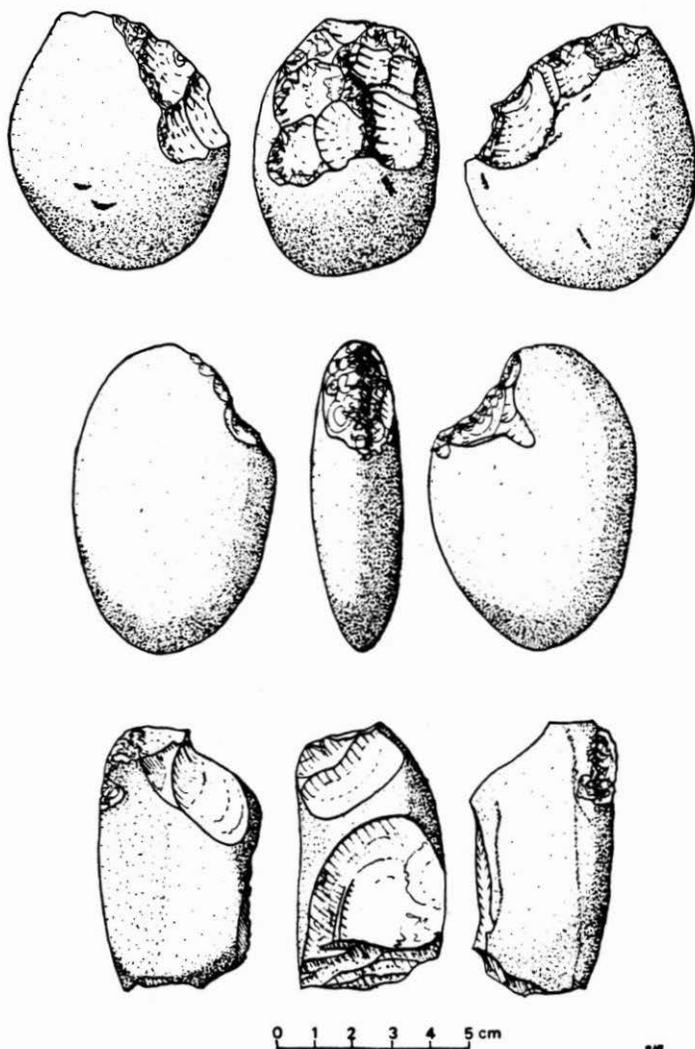


FIGURE 8. N98/134: top and bottom, chert cores; centre, dressing hammer.

settlement. Indeed, N98/132 could be part of a zone of specialised outliers of an earlier permanent settlement, with its advantages being good access to the inland bush of the present day Whangara B5 Station and Pakarae Valley and access to sea resources on the offshore rock platform.

The 'dam site' (N98/134, 606496)

The dam site is a deflating blowout on the crest of the innermost of the inland beach ridge and dune series, "terrace III" of Ota *et al* (1983). It is about 500 m north-east of the sand quarry site (N98/132) and just to seaward of a stock dam. The cap of the dune was a 20-50 cm thick layer of hard brown sand, harder and deeper than Layer 2 of N98/132, which had broken away over an area of about 20 x 6 m. The deflating surface was scattered with stock bones, chert and obsidian flakes. There was some heavier cultural material on the hard brown sand cap and occasional lumps of Taupo pumice on it, so the cultural material originally lay on top of the hard brown sand.

The faunal material consisted solely of a small quantity of rocky shore gastropods and some bivalves. There were some ill-defined ovens with the midden on the edge of the blowout and cut into the hard brown sand. Only the stone material was thoroughly collected. There were large quantities of obsidian and chert flakes, some drill points, sandstone files (Fig. 7) and a quantity of argillite adze flakes suggest a range of activities wider than those at the sand quarry site, such as the making or repair of wooden tools, structures, or hunting and fishing tools.

Chert cores from the site have simple bifacial flaking on part of the perimeter to create usable flake knives (Fig. 8). One flattish rounded chert cobble (Fig. 8) had an area of concave pecking, similar to the hammers interpreted by Leach and Leach (1980:133-135) as used for reducing the edges of adzes or hammer dressing.

A remarkable find was a medalet (defined in the Shorter Oxford English Dictionary as 'a small medal'); this was about 2.3 cm in diameter and struck in brass (Fig. 9). The reverse has a coat of arms, and around the circumference, lettering in capitals and in a Roman style. On the obverse, the date 1761 occurs on either side of a crown in the circumference, with an effigy of George III, styled as a Roman emperor. The circumference is lettered 'GEORGIUS III DEI GRATIA'. There is a hole punched in the medalet which is a variant of a type struck to commemorate the coronation of George III. It was probably

brought to New Zealand on James Cook's first voyage in the 'Endeavour' and given out on the East Coast in October 1769. A fuller description of the medalet is in Jones (1984).

The 'river mouth' site (N93/133, 619498)

This site consists of an eroding soil layer about 400 m long on the north-east end of Whangara Beach and south of the river mouth, on "terrace V" of Ota et al (1983). The layer of archaeological interest is of varying thickness, averaging 25 cm. It is overlain by 20-100 cm of light grey sand. It is a brown-grey sandy soil with a very sparse scatter of gastropods including paua, and bone. Some Loiseis pumice occurs but is very sparse. There are several ovens or hearths in places, but the deposit generally is very sparse and appears to be reworked by wave action.

Burning for horticulture?

The independent confirmation of burning is of interest since a likely cause of burning is for horticulture on the sandy soils of the back beach ridges. The presence of limited volumes of kumara storage pits on the hills immediately above the Whangara dunes but not further inland suggests some horticultural activity on the inner margins of the dunes. The complete absence of pits on the balance of the mudstone hill country inland and west of the Pakarae indicates that these hill soils were unsuitable for Polynesian horticultural practice (Jones, 1984). Horticulture was therefore probably practised on the inner margins of the dunes, in a similar manner to the west coast dunes of Auckland and Northland (Fox and Green, 1982; Jones, in press).

The age of this practice has yet to be determined but the limited cultural material at N98/132 is Archaic in character and underlies or is stratified in the charcoally sand.

Conclusions

The Whangara sand quarry site (N98/132) is a specialised hunting camp, dating to later than 760 years B.P. and containing material Archaic in character. The site may be related to an assumed permanent settlement in the south of the Whangara embayment, which provides much better shelter and has associated pa. The attraction of the site would be an off-shore rocky platform and ready access to an extensive inland forest. Hunted fauna reflects these two environments and is consistent with summer and autumn use of the area.



FIGURE 9. 1761 George III medalet.

The cultural assemblage at the quarry reflects a specialised butchering and probably food preservation function for the site. This is not the case at the dam site (N98/134) which has artefacts of a 'maintenance' kind (adzes and drill points) and very little fauna. There was probably a limited extent of horticulture on the inner margins of the dunes.

The coast-side and quarry area was initially dunes with coastal forest, perhaps extending more seaward than at present. The coastal forest would have extended back to the main hill slopes and on to the broader area of dunes to the north-east towards the Pakarae River mouth. With intensive use in later periods, and repeated firing, a dark brown charcoally sandy soil formed on the older dune caps, sealing the earlier faunal and cultural material. The surface of this sand was on occasion occupied and ovens built. The hard cap of sand in the foredune swale was, in the late 19th century, the route of the East Coast road. The balance of the dunes appear to have been little occupied, except for occasional gathering of shell fish and camping near the river mouth (N98/133).

Acknowledgements

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