

**PRELIMINARY
ARCHAEOLOGICAL SURVEY
AND
IDENTIFICATION OF THREATS TO
ARCHAEOLOGICAL RESOURCES

MAUAO HISTORIC RESERVE

TAURANGA**

PREPARED BY

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FOR

TAURANGA DISTRICT COUNCIL

AUGUST 2003



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Preliminary Archaeological Survey and Identification of Threats to the Archaeological Resource Mauao Historic Reserve

PART I THE ARCHAEOLOGY OF MAUAO

1.0 INTRODUCTION

This report presents the results of a preliminary archaeological survey of Mauao Historic Reserve and provides general recommendations for the management and conservation of the archaeological resource.

An archaeological site is defined in the Historic Places Act as:

... any place in New Zealand that —

1. Either —

(i) Was associated with human activity that occurred before 1900; or

*(ii) Is the site of the wreck of any vessel where that wreck occurred before 1900;
and*

*2. Is or may be able through investigation by archaeological methods to provide
evidence relating to the history of New Zealand.*

All archaeological sites are protected under the provisions of the Historic Places Act 1993 and may only be destroyed, damaged or modified by authority granted by the New Zealand Historic Places Trust pursuant to that Act.

The archaeological landscape within the Mauao Historic Reserve is of local, national and international significance. It represents the physical remains of approximately 600 years of human occupation. The archaeological / cultural landscape constitutes the reserve's most important and non-renewable resource and is the reason for the reserve's 'Historic' status.

The archaeological features on Mauao have considerable cultural significance to iwi of Tauranga moana. This report deals specifically with the physical evidence relating to pre 1900 human activity on Mauao that can be identified and investigated using accepted archaeological methodology. An assessment of the cultural significance of an area can only be competently made by the affected tangata whenua. It should be noted that an assessment of cultural significance might not necessarily correlate with an assessment of archaeological significance.

2.0 METHODOLOGY

Prior to the survey the records of the New Zealand Archaeological Association (NZAA) relating to recorded archaeological sites on and in the immediate vicinity of Mauao were inspected. Relevant literature, early Deposited Plans, and aerial photographs of the area were examined for archaeological and or historical information.

2.1 Field Work

All accessible areas within the reserve were inspected with the exception of the steep talus slopes below the north, east and western sides of the summit. These areas were avoided due to safety concerns following the January 2003 fire. The instability of the talus slopes also significantly reduces the likelihood of archaeological features being present.

Surface visibility varied considerably throughout the reserve. Pastoral areas on the lower southern slopes enabled easy identification of surface features, however, rank pasture (kaikuia) prevented accurate archaeological survey on the lower eastern slopes.

Land affected by the January 2003 fire was inspected before the commencement of restoration planting programs. Surface visibility was excellent, however, with the exception of parts of the summit pa, the fire primarily affected steeper sections on the north face of Mauao where archaeological features are unlikely to be present.

Bush covered slopes on the steep eastern and western slopes were inspected with particular attention paid to areas of level to gently sloping ground where archaeological features were most likely to occur.

The southern spur was inspected where vegetation cover allowed. Ground cover, including blackberry and gorse, prevented accurate archaeological survey in some areas.

All vehicle and pedestrian tracks were walked as well as accessible sections of the foreshore.

2.2 GPS Mapping

Visible archaeological features were mapped using a Trimble GPS unit supplied by Tauranga District Council. Accuracy of the data is +/- 0.25 metres. Elevation of each feature could not be established using the GPS unit but the Tauranga District Councils Geographic Information System can provide elevation information to within 1 metre for most features.

Trimble GPS readings were unable to be achieved in some areas of bush due to tree canopy cover. A Garmin Etrex hand held GPS unit was used where the Trimble could not operate. Accuracy achieved by the Garmin was generally within 8 metres. Where neither the Trimble or Etrex could achieve coordinates, features were marked on large scale aerial photos and then transposed onto the survey plan. The accuracy of this data will be less than that achieved by the GPS units but is considered adequate for management purposes.

Archaeological features were identified by the GPS as polygons, lines or points depending on the nature of the feature. Further field visits were undertaken to manually add detail and conventional archaeological symbols in order to more clearly illustrate the feature type and spatial relationship of one feature to another.

In the interests of site security some archaeological features identified during the survey are not presented in this report or shown on accompanying plans.

2.3 Subsurface Testing

Exposed cuttings and disturbed soils were examined in order to determine if buried archaeological deposits could be identified. Soil profiles were also established from spade test pits in areas with no visible archaeological features. This was carried out in an attempt to determine the possible function of open areas on the lower eastern and western slopes.

3.0 PHYSICAL LANDSCAPE

3.1 Geology

Mauao is the remnant of a large lava dome, formed by upwelling and outpouring of viscous rhyolite lava about 4.3 million years ago.¹ Its outline has since been considerably modified by erosion, however, its volcanic origins can still be evidenced by the lava flows that characterize the northern shoreline.

Deep pyroclastic tephra deposits formed the lower slopes of Mauao about 65000 years ago² which were subsequently mantled by many airfall volcanic ash deposits from the Okataina, Taupo, Maroa and Tuhua volcanic centers.

The island of Mauao later became connected to the mainland by a prograding sand spit (tombolo) that also connected the former island of nearby Hopukioire (Mt Drury).³ The tombolo comprises 50 closely spaced parallel dunes of Plio-pleistocene sediments. The dunes increase in age from east to west and are thought to have begun forming about 6000 years ago.⁴ A volcanic ash mantle from the Kaharoa eruption of AD 1314 provides evidence that the tombolo had completely formed when Polynesians first arrived at Mauao⁵. Conclusive archaeological evidence of Polynesian settlement has yet to be identified below Kaharoa Ash.

3.2 Soils

Soils on Mauao include Katikati sandy loams and Katikati hill soils on the broad terrace formations on the lower southwestern and northeastern slopes and on the level summit. These soils are classified as Typic Orthic Allophanic soils derived from thin rhyolitic tephra (Taupo pumice and tuhua tephra). They are characterized by a black gritty sandy loam A Horizon and a yellow brown silt loam B horizon.⁶

The Katikati soils are generally well drained and are used extensively in other parts of Tauranga district for the cultivation of subtropical crops such as kiwifruit and citrus.

¹ Rutherford 1978

² Hall 1994:23

³ Hall 1994:27

⁴ Pullar & Cowie 1967. See also Dahm 1983.

⁵ Hogg et al 2003

⁶ Rijkse 1995

They would have been suitable for the cultivation of traditional Polynesian crops during the Maori occupation of Mauao.

Soils on the steeper faces are Otanewainuku steepland soils derived from rhyolitic tephra.

3.3 Vegetation

The greater part of the archaeological landscape on Mauao is currently covered in pasture and managed by grazing. Archaeological features on the southern spur are covered in weeds and regenerating bush. Vegetation on the summit archaeology includes Kanuka, Pohutukawa and regenerating bush (post January 2003 fire).⁷

The vegetation cover of Mauao during pre European Maori occupation was likely to have been minimal. New Zealand had a forest cover of 85% immediately prior to human settlement, which, by the time European settlement began, had been reduced to 55%.⁸ Deforestation would have been particularly extensive in coastal areas where early settlement was focused.

The most severe human impact on vegetation in the Tauranga area occurred between 1280 – 1500 AD⁹. Palaeo-environmental studies of soil profiles on Matakana Island to the north west of Mauao¹⁰ and the Papamoa dunes to the south east¹¹ have shown a rapid increase in charcoal and a change from tree pollen to that of grasses and bracken beginning at the end of the 13th century.

Fires on Mauao in the past two decades have shown the vulnerability of vegetation on the steep topography. Initial deforestation of Mauao probably occurred very rapidly following first settlement. Vegetation cover throughout the 500 - 600 years of occupation may have included Pohutukawa and Karaka on the coastal scarps, ferns in the spring gullies and shrubland on the talus slopes. Many of the mature native trees such as the Karaka on the southern slopes were planted within the past 100 years.

Taro still grows in a spring gully (Punawaitapu) immediately above the southern end of the Motor Camp and may represent a remnant pre European Maori crop. Taro is said to have been extensive in this area before the development of the tennis courts, bowling greens and motor camp extensions.¹²

The current vegetation cover of Mauao is the result of pastoral land-use, numerous fires and planting programs over the past 100 years and probably has little resemblance to the scant vegetation cover during Maori occupation.

⁷ Refer: Mauao management Plan 1998:28

⁸ Newnham et al 1999:593

⁹ McGlone 1989

¹⁰ Giles et al 1999

¹¹ Newnham et al 1995

¹² Taro observations by Kathleen Fletcher MS 105

4.0 TRADITIONAL HISTORY

A synthesis of the traditional history has been presented in previous management plans for Mauao¹³. References to traditional history within this report are derived from these and other published accounts accessible to the general public and are included to aid the interpretation of archaeological features where appropriate.

Published information regarding traditional accounts of the human history of Mauao is confined to three or four significant events. These include the first human settlement in the 13th century, the expelling of Ngamarama people, the battle of Kokowai, and finally, the Ngapuhi incursion into the Bay of Plenty in the early part of the 19th century.

The taking of the pa of Maunganui by Kotorerua has been retold in countless articles and publications most notably Tapsell 1940, Stafford 1967, Stokes 1980 and Crosby 1999. All accounts appear to be un-referenced or embellished versions provided by Judge Wilson¹⁴ in 1906. No secondary sources appear to question the accuracy of Wilson's account.

Tangata whenua remain the primary source of information regarding the traditional history of Mauao.

5.0 PREVIOUS ARCHAEOLOGICAL RESEARCH

5.1 19th Century

First observations of the archaeological landscape on Mauao were made by Colenso in 1838 when together with Rev. W Williams he climbed to the top of the Mount gathering geological specimens. Colenso writes *"This hill has been strongly fortified. The labour bestowed on it has been immense yet it was taken and the slaughter was very great. It appears to have been inhabited to the very top. The sites of houses, the fireplaces and ancient excavations for stones and skulls still remain."*

A year later Bidwell, in his "Rambles in New Zealand", describes Mount Maunganui and notes *"It was formerly a very strong Pa, a native fort or village, for the words mean eitherThe land sides are terraced from top to bottom, and must have been inhabited for a very long period, as the greater portion of the soil of which the terraces are formed is composed of cockle shells."*¹⁵

In 1841 Hochstetter noted many former and very extensive native villages on its sides but also commented on its complete desertion at this time.

5.2 20th century

There would be few amateur and professional archaeologists working in New Zealand over the past 50 years that have not made time to explore the archaeology on Mauao or at least are aware of the size and significance of the archaeological landscape.

¹³ Mauao Management Plan 1980:8

¹⁴ Wilson 1906

¹⁵ Bidwell 1839:7

Ken Moore, while New Zealand Archaeological Association filekeeper for the Bay of Plenty, recorded the summit and south west pa on Mauao in the late 1960s. Ohia and Clarke of the Tauranga Historical Society completed the first sketch plans of the summit and south west pa in the late 1960s and early 1970s.

Perhaps the most devoted study of the archaeology of Mauao to date was carried out by Kathleen Fletcher between 1968 and 1981. Fletcher was a keen amateur archaeologist who retired to Tauranga from Christchurch in the late 1960s. She made extended visits to many of the significant archaeological landscapes in the Tauranga District and made the first attempts to identify, map and interpret archaeological features on Mauao. Fletcher also made the important discovery of archaeological evidence indicating very early human settlement at Pilot Bay.¹⁶

In October 1968 Janet Davidson (then archaeologist, Auckland Museum), along with '24 members of the Tauranga Historical Society and the Maori Cultural Committee'¹⁷ inspected archaeological features on the summit of Mauao following vegetation clearance by members of the 'Maori Cultural Committee'.

During the mid 1980s the New Zealand Historic Places Trust funded archaeological surveys of the Bay of Plenty. During these surveys Peter Bristow completed a 'pace and compass' plan of the western pa and in 1985 McFadgen (Jnr) and Staines completed sketch plans of some of the archaeological feature concentrations on Mauao.

Prior to the 2003 Preliminary archaeological survey there were seven recorded archaeological sites on or in the immediate vicinity of Mauao. These include three pre European Maori sites and four historic sites.

NZAA Site No.	Site Name	Recorded	Information provided
U14/149	Summit Pa	1967 K. Moore 1968 Ohia & Clarke 1970 Ohia & Clarke	Description Sketch Plan Description
U14/173	Western Pa	1972 K. Moore 1975 Clarke 1985 P. Bristow 1985 O'Keeffe & Hall	Description Sketch Plan Pace & Compass Sketch Plan Description
U14/250	Stone Steps	1981 K. Fletcher	Description
U14/251	Trail	1977 K. Fletcher	Description
U14/361	Stone Jetty	1981 K. Fletcher	Description, Plan, Photo
U14/362	Jetty & water tanks	1981 K. Fletcher	Description and location map
U14/363	Archaic Midden	1981 K. Fletcher	Description, location map
U14/3118	Maunganui Pa	2003 K Phillips	Refer: this report

Table 1. Recorded archaeological sites on Mauao as at 1 August 2003.

¹⁶ Archaic is an archaeological term used to describe an early New Zealand Maori cultural phase relating to the first colonists who brought with them a distinctly Polynesian material culture up to about 1500 AD. When classic Maori material culture becomes predominant.

¹⁷ JTHS 1968 No. 35. P.9.

6.0 THE ARCHAEOLOGICAL RESOURCE

6.1 Introduction

The archaeological resource on Mauao forms a significant component of a once larger archaeological / cultural landscape encompassing the ocean and harbour beaches and intervening sand dunes to the east as well as the smaller rhyolite formations of Moturiki and Hopukiore.

The visible archaeological resource comprises numerous terraces, pits and middens and three defended pa and covers the greater part of the summit and the southern slopes of Mauao.

The southern side of Mauao was the favored area of occupation for a number of obvious reasons. The gently sloping topography of the lower southern slopes offered suitable soils for cultivations as well as free draining areas easily terraced for occupation and crop storage. Several prolific springs provided the vital commodity of fresh water and the beaches of Waikorere offered launching and beaching areas for sea craft as well as ready access to the large harbour shellfish beds.

6.2 Components of the Archaeological Landscape

The archaeological landscape on Mauao comprises numerous visible archaeological features and deposits. The following section provides a brief definition of the most prevalent archaeological features found on Mauao based on accepted definitions provided by the New Zealand Archaeological Association Site Recording Handbook¹⁸

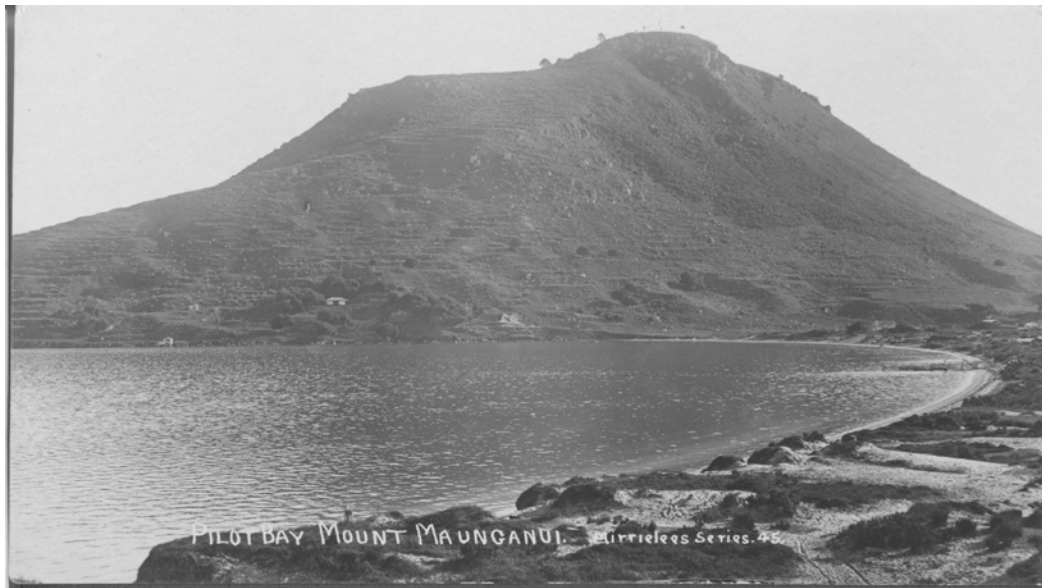


Figure 1. Early view of Mauao showing occupation terraces extending from the foreshore to the summit.

¹⁸ Tony Walton (ed) 1999

6.2.0 Terraces

A Terrace is an artificially levelled area consisting of a tread and one or more risers. The tread is the level area, the riser is an artificially steepened scarp up-slope or down-slope of the tread or both. Terraces served a variety of different functions that in many cases can only be determined by excavation. There are more than 200 recorded terraces on Mauao ranging in size between 8 m² to 160 m². Function includes living or occupation terraces, crop storage terraces encompassing one or more storage pits, and cultivation terraces.

6.2.1 Pits

Pits are generally described as either rectangular or square surface pits or subterranean pits that may either be bell shaped with an entrance at the top or a cave type with an entrance at the side.

The surface expression of open pits is often a rectangular or square depression while the surface expression of subterranean pits is often little more than a 1 or 2 metre diameter circular depression at the back of a terrace tread or in the up-slope riser.

There are approximately 100 recorded pits on Mauao, however, there are likely to be many more infilled pits with no surface expression. Deliberate infilling is a common feature of crop storage pits in the Bay of Plenty. This possibly reflects a limited life span of storage pits due to fungal infection and resultant crop spoilage. Consequently storage pits with surface expression may account for only a small percentage of total storage capacity on Mauao.

6.2.2 House Floors

House floors may be recognised as shallow rectangular depressions with distinct level bases surrounded by a low bank. The bank may be open at one end. They vary in size but many are comparable in size to storage pits. It is often only possible to differentiate house floors and pits by excavation. Some of the more distinct house floors occur on the upper reaches of the western pa.

6.2.3 Midden

Middens are refuse from occupation. Contents may include shell, bone, stone and charcoal. They are often exposed by erosion or other ground disturbance and are often the only visible evidence indicating occupation. There are approximately 100 discrete middens on Mauao ranging from midden spills below occupation terraces to large midden mounds possibly associated with the preparation of food for an important gathering. The middens of Mauao are dominated by estuarine shellfish species but closer inspection reveals many other components.



Figure 2. Pest damage to shell mound showing stratified layers of whole, crushed and burnt shell.



Figure 3. A quarried shell midden mound beside the base track.

The vast shell middens on Mauao were quarried and used as aggregate soon after the first Europeans settled in the area. Mission records of the late 1830s indicate shell was sourced from Mauao for burning into lime.¹⁹ Captain Carmichael (first Harbour

¹⁹ Cunningham et al 1989:8

Master / Pilot) records using shell on paths around his newly constructed Pilot house in January 1867.²⁰ During the later part of the 19th Century the shell middens on Mauao were quarried on a much larger scale and used for aggregate on local roads including Cameron Road in central Tauranga. More recently middens were quarried and used as aggregate on the base track. Several of the larger middens near the two Pilot Bay jetties still exhibit quarry damage from this later episode.

6.2.4 Artifacts

Many artifacts have been found on Mauao over the past 150 years and variously sold, squirreled away by collectors or submitted to museums. Anton Coffin has reviewed the history of 19th and 20th artifact collecting in the Tauranga District and has compiled a detailed inventory of artifacts from the Tauranga District held in Museums and private collections throughout New Zealand.²¹

Pre European Maori Artifacts submitted to museums in the last 10 – 15 years have reduced significantly and are almost exclusively derived from professional archaeological investigations or chance finds during land development.

Coffin lists only two artifacts with clear provenance to Mauao; namely a whale bone patu found on the northern coast and an obsidian core sourced from a midden on the flanks of Mauao. More significant to the antiquity of settlement on and around Mauao are the collections with general provenance to Mt. Maunganui. This assemblage includes hundreds of lithic and bone artifacts. Many of these artifacts were sourced from the once high dunes that backed Pilot Bay and are typical of early ‘archaic’ items found in coastal Coromandel sites dating to the 13th and 14th Century.

6.2.5 Pa

In ethnographic texts, such as Elsdon Best’s ‘The Pa Maori’²² the term pa is used to describe a fortified place constructed by Maori. The common identifying features of a pa include earthwork defenses (ditches and banks), palisades (palisades do not usually survive in an archaeological context) and naturally defended positions. Sites described as Pa by archaeologists generally exhibit one or more of these defensive elements.²³ There are three recorded pa on Mauao. The summit and the western pa utilize areas with excellent natural defensive qualities. The third pa (Maunganui Pa) is extraordinary in both its size and defensive perimeter.

²⁰ Carmichael 1867 – MS 2

²¹ Coffin 1999a & 1999b

²² Best 1927

²³ For further details on archaeological site terminology refer to Walton (ed) 1999.

Figure 4. Plan drawing of archaeological features.

7.0 THE ARCHAEOLOGICAL LANDSCAPE

7.1 The Summit Pa

The summit pa of Mauao, also referred to as ‘Ranginui’s Pa’,²⁴ was one of the most strategically important locations in the Tauranga District with commanding views along much of the Bay of Plenty coast and inland to the volcanic plateau.

The summit is relatively flat comprising two low ridges branching north and north west from a central high point. The two ridges are separated by a sheltered ‘amphitheatre like’ basin. The summit ridges are terraced while the basin contains a series of long low back scarps creating large open terrace and platform areas. The summit is naturally defended on three sides by rocky bluffs and steep talus slopes while a 10-20 metre scarp on the southern approach was probably strengthened by palisades.

A number of terraces on the summit have stone-faced risers above and/or below the terrace tread. Equally common are terraces with a boulders forming a barrier at each end. While stone faced terraces are relatively rare in the Bay of Plenty their presence on Mauao is not surprising given that stones and boulders form a significant part of the landscape. The summit proper was the probable location of the tihi now occupied by a trig and reserve furniture.

Many of the archaeological features of the summit Pa had been covered by scrub and mature pines since the mid 1920s until vegetation clearance was carried out by tangata whenua in the late 1960s. Soon after the vegetation removal Janet Davidson (archaeologist) inspected the pa during a Tauranga Historical Society outing.

According to a report of the visit archaeological features identified by Davidson included ‘a fire place consisting of stones set on edge, large look-out rocks which also had deep grooves where the edges of adzes had been sharpened, a large flat rock where tools had been sharpened on their flat faces, boundary stones set on edge in straight lines, a water collecting area, large vertical kumara pits (rua Kumara), cooking ovens (umu), house sites, sites of palisading, and rock and earth banks supporting house sites.’²⁵

Notes taken during subsequent visits by Kathleen Fletcher identify many more subtle surface features including hearths and midden scatters. Despite recent fire damage many of these features remain hidden by low vegetation and for security reasons many are not presented in this report.

The archaeological integrity of many features on the summit has suffered significantly from track construction, pedestrian traffic, installation of reserve furniture and vegetation management. The summit desperately needs a management plan established by experts in the field of archaeological site conservation.

²⁴ Management Plan 1980:11

²⁵ JTHS Vol 35, 1968

7.2 The Western Pa

Above the western coastal escarpment are two defended areas on either side of a spring gully. The northern defended area referred to in this report as 'the western pa' is often called Kinonui's Pa²⁶, however, its association with Kinonui's exploits on Mauao is unclear. It comprises a spur descending to the southwest defended by ditch and bank earthworks on the northern and eastern sides.

The elevated northern platform (tihi) encompasses four house floors overlooking a flight of nine or ten terraces descending to the south. Extensive shell middens extend below the southern most terraces.

The antiquity of the western pa has not been determined although some believe it to be of a later construction due to the type of ring ditch defensive system²⁷. However, the antiquity of the ring ditch defensive system has yet to be conclusively established.

The Western Pa survives in very good condition. Stock tracking erosion has occurred in some areas but these are now largely stabilised. The presence of a post and wire fence on the northern side of the pa is the only aesthetic detraction and should be relocated.



Figure 5. Aerial view of Mauao showing location of Summit Pa (top arrow) and Western pa (bottom arrow).

²⁶ Management Plan 1980:11

²⁷ Management Plan 1980:11

7.3 The Southern Spur

Terracing extends from the summit pa down the southern spur to Waikorere. The continuity of the archaeological landscape from the summit to the harbour shore is not currently apparent due to vegetation cover on the upper half of the southern spur. The vegetation cover has also resulted in a perceived discrete division of the archaeological landscape between the summit and the lower slopes that has influenced previous management plans.

Archaeological features on the upper half of the spur are similar in concentration and function to features clearly defined in pasture on the lower slopes. There are numerous rua, evidenced by many circular depressions, particularly on the large level section of the spur immediately south of the summit. Due to the reduced accuracy of the hand held GPS used in this area and the dense vegetation cover, rua on the southern spur have not been surveyed.

At least two artificially steepened scarps divide the upper reaches of the southern spur and may have been the location of palisade lines defending populations on the summit from the relatively easy approach up the spur from the south. Further stone faced terraces are located mid way down the spur as well as terraces containing multiple crop storage pits and house floors.

Vegetation cover prevented access to some areas where further terraces are likely to be present. In addition ground cover vegetation probably obscured subtle surface features such as shell middens, however, several were noted in disturbed ground suggesting they are probably extensive.

Features on the southern spur remain in excellent condition with the exception of isolated tree root damage and old stock and pedestrian tracking. Vegetation is causing damage to archaeological features, however, in order to prevent informal pedestrian tracking to the summit shrub cover currently provides an effective barrier. Archaeological features on the lower reaches of the spur, currently in low regenerating scrub, would benefit from clearance before deep rooting trees become established. This may also reduce fire risk to the southern spur which could cause considerable damage to the archaeology. The removal of selected exotic trees from terrace features would also be advisable.

7.4 The Southern Slopes

Occupation terraces cover almost all of the lower slopes of the south eastern quarter of Mauao east of the Waipatukakahu Spring making this area one of the most populated parts of prehistoric Mauao. This activity area would have spilled out onto the Pilot Reserve spur and along the frontal dunes of the ocean and harbour beaches. Early 19th and 20th century accounts of the tombolo landscape indicate large shell midden mounds dotted the area now occupied by the Motor Camp and residential development to the east.

The size and complexity of the terrace complex on the southern slopes is unique in the Bay of Plenty and represents a high degree of spatial organisation. Many terraces

contain one or more storage pits as well as possible house floors and the presence or absence of midden below the terraces often indicating function. In several areas middens extend onto the tread of occupation terraces and larger middens may have completely buried and preserved earlier occupation terraces.

The intensity and complexity of the terrace complex on the southern slopes makes this area one of the most archaeologically significant on Mauao. The burial of earlier terraces by later midden deposits presents archaeology that may provide information relating to occupation phases on Mauao and the changing function of terrace features.

Unfortunately, some damage has occurred in this area from the construction of an early water reservoir and access roads as well as the loss of the eastern extension of this archaeological landscape due to the Motor Camp and residential development.

7.5 The Western Slopes

The lower western slopes have a unique archaeological feature distribution pattern with large areas left relatively free of earthwork or midden features. Terracing is confined to the edge of the coastal scarp leaving common ground above. It was initially thought that these open areas were used for the cultivation of crops, however, an examination of soil profiles revealed a relatively unmodified soil stratigraphy with no evidence of mixing of soil horizons typical of Maori cultivated soils in the Tauranga District.

It is equally likely that these open spaces functioned as communal gathering areas or Marae. Around the margins of the southern end of this open area are five or six of the largest terraces on Mauao, including one that is defended by a transverse ditch and bank. The latter terrace is considered by many to be the location of Kinonui's large meeting house said to have been above Stony Point (Te Kaawa) and capable of holding 150 or more people. It was within this meeting house that Kinonui and Kotorerua engaged for several hours in '*courtly urbanity and matchless dissimulation covering a substratum of deadly hate*'²⁸ before Kotorerua went outside and torched it incinerating Kinonui and his associates.²⁹

The open slopes to the north of the western pa (currently in pasture) are partially divided by large shell midden mounds several metres in depth. These mounds are quite different from middens found in association with the occupation terraces overlooking Waikorire to the east. They are not associated with occupation terraces and are neatly constructed with little or no scatter beyond the mound. Their association with the open ground may suggest they were processing areas for important occasions when large quantities of food were prepared.

The construction of the reservoir in the late 1950s as well as the more recent construction of the 4WD track has significantly damaged the upper reaches of this area. Damage to archaeological features from storm water directed off the 4WD track

²⁸ Wilson 1907:204

²⁹ The battle of Kakohai is variously dated to 1625 AD (THJS Vol 35;10) and 1700 - 1750 AD Wilson 1907.

continues and overflow from the reservoir has created a gulch at the head of the spring gully that passes on the south side of the western pa.

The lower south-western slopes were also used for camping in the 1930s and subsurface damage from camp privies and hearths may have occurred to archaeological features during this period. Vehicle access to the camping area was provided by a now disused road, sections of which can still be identified below the 4WD track east of the Reservoir.

7.6 The Eastern Slopes.

An apparent absence of archaeological features on the north eastern slopes may be somewhat deceiving. The dense sward of kaikuia currently covering this area prevented accurate archaeological inspection, however, the absence of clear earthwork features such as occupation terraces and pits on such favourable contour is intriguing.

One possible reason for the lack of occupation features is the high concentration of boulders and cobbles that litter the slopes. In addition the unstable nature of the rocky bluffs above this area may have presented a dangerous environment for permanent occupation.

The hazards of living below rock outcrops on Mauao are conveyed in a story about Tamapahore following the battle of Kakowai. Tamapahore is said to have selected a place to settle within Maunganui Pa, however, the other Ngaiterangi rolled great stones down the hill to his location; he took the hint and made a pa elsewhere at Maungatapu.³⁰



Figure 6. View of eastern slopes in pasture.

³⁰ Wilson 1907:208

Following the January 2003 fire on Mauao rocks became unstable due to the absence of supporting vegetation and soils, resulting in several large rocks ending up on the lower eastern slopes. Frequent fires during Maori occupation may have produced the same result.

While permanent occupation may have been too hazardous, cultivation of crops could have been the primary function of the eastern slopes. There are indistinct small narrow terrace-like features with sloping treads that may be interpreted as cultivation terraces, however, the key to understanding the function of this area is probably in the soil stratigraphy. Preliminary examination of exposed soil profiles indicates deep topsoil with possible mixing of soil horizons suggesting this area may indeed have been used for crop cultivation.

In similar rocky landscapes throughout New Zealand early Maori cultivation often involved the clearing of rocks and cobbles to create defined garden areas. This often resulted in distinct stone alignments or mounds surrounding these gardens. There is no evidence of rock clearance on the eastern slopes, however, there are areas close to the coastal scarp that are relatively free of surface boulders.

The archaeology of the eastern slopes remains poorly understood, however, given the large prehistoric population inhabiting the many occupation terraces to the west it is reasonable to assume that the favourable contour of the eastern slopes formed an integral part of the archaeological / cultural landscape on Mauao. Heavier grazing of the rank pasture that currently covers the area may provide an opportunity for more accurate archaeological survey.

7.7 Maunganui Pa – ‘the Super Pa’

Maunganui Pa essentially encompasses the entire archaeological landscape on Mauao although many features are not contemporaneous with the Maunganui Pa occupation phase.

Wilson’s description of the settlement on Mauao at the time of the battle of Kokowai (variously dated by secondary sources between 1625 and 1750) correlates well with the surviving archaeological landscape.

Wilson writes, ‘The pa of Maunganui ... covered about 100 acres. The fortifications crossed the top of the hill and ran down each side, then, circling round the base towards the south, they met.... The fortifications were so strong and the garrison so numerous that the pa seemed impregnable to Maori weapons....’³¹

Stafford writes that Maunganui Pa must have presented one of the most heavily defended positions in New Zealand.³²

That such a large area could be successfully defended seems quite remarkable, however, an inspection of the topography and archaeological feature distribution

³¹ Wilson 1907:203

³² Stafford 1967:129

provides evidence of the existence of this super pa. Visible archaeological features on the southern side of Mauao terminate relatively abruptly at two points on the eastern and western sides. The western boundary is defined by a gully extending from the rocky shore up the talus slopes to a section of near vertical slope angle. The defining archaeological features on the southern inner edge of this gully are a row of large shell mounds creating an elevated inner bank. Few archaeological features are found north of this gully where the gently sloping ground changes rapidly to steep terrain.



Figure 7. Probable location of the western defensive boundary of Maunganui Pa. Arrows point to large shell mounds on south side of gully.

On the eastern side a series of prominent gullies extend from the western end of Ocean Beach up to the Waikorere walking track above which the talus slopes present an extremely difficult climb, particularly when without vegetation cover. Archaeological features finish abruptly just south of the first gully with several platforms evident on either side of the most clearly defined central gully. The central gully extends up to a vertical rock face just below the Waikorere track.

The eastern and western gullies would have provided excellent natural barriers and with palisades would have presented a formidable barrier to would be attackers.

The defensive line probably employed a combination of earthwork and timber barriers on the lower slopes and naturally steep terrain and rocky bluffs on the upper reaches below the summit. The steep weathered coastal scarps around the southern shore also provided a natural barrier that when enhanced with palisades would have been an equally effective deterrent.



Figure 8. Aerial view of Mauao showing probable location of Maunganui Pa defensive lines.

The enormous scale of Maunganui pa would have required an exceptional degree of social and political organisation in its construction, maintenance and defence. The use of space within the pa, evidenced by the distribution and function of archaeological features, reflects this degree of organisation making Maunganui one of the most remarkable pa in New Zealand.



Figure 9. Probable location of the eastern defensive boundary of Maunganui Pa.

Figure 10. Plan drawing showing arbitrary divisions of the archaeological landscape.

8.0 HISTORIC ARCHAEOLOGY

The term Historic Archaeology generally refers to archaeology relating to the post contact or post European period when documentary history began. This includes archaeology relating to both European and Maori activity. The Maori occupation of Mauao in the historic period is often considered by secondary sources to have ended in the 1820s following the musket battles with Ngapuhi. These assumptions are based on contemporary observations of visitors to Mauao in the mid 1800s as well as Mission records that make no mention of Maori occupation on Mauao following the Ngapuhi incursion.

While the pa may have been abandoned Maori continued to erect whare and inhabit the lower western slopes after the Battle of Gate Pa and Te Ranga³³ and it is reasonable to assume that temporary occupation occurred before and after this period probably for the purposes of accessing kaimoana.

Archaeological evidence relating to post contact Maori occupation on Mauao will be difficult to identify from visible archaeological surface features. The archaeology is likely to be similar in morphology to pre contact features and have occurred in areas previously occupied prior to European arrival.

The arrival of predominantly European missionaries, scientists, soldiers and settlers to Mauao, from the mid 19th Century, has left several distinctly European archaeological features on Mauao. They form an integral part of the ongoing human history of Mauao and require considered management to ensure their continued protection and preservation.

The late 19th Century history of Mauao has been presented in numerous publications. Details regarding dates and events vary widely from source to source and few are referenced or contain bibliographies. Historical details for recorded historic archaeological sites on Mauao are derived from common threads within these sources.

8.1 Iron Jetty and Reservoir - U14/362

The Iron jetty was the first jetty to be built on the southwestern shore of Mauao near the coastal outlet of the Waipatukakahu spring. The iron jetty is thought to have been constructed in 1886 and was used by steam ships up until the mid 1920s. It comprised a stone faced landing stage and a platform extending out into the deep channel waters supported by iron posts. The stone faced landing survives in excellent condition (Figure 11) while several lengths of iron can still be seen in the surf below.

The jetty was used by steamers to replenish water supplies from the nearby Waipatukakahu Spring. Water from the spring was directed to a concrete cistern with a 4000 gallon capacity³⁴ and from there gravity fed onto the ships. A concrete tank cap is still visible on a low terrace above the stone faced landing (Figure 12). The jetty location and associated water supply features are a recorded archaeological site and protected under the provisions of the Historic Places Act.

³³ Carmichael 1866-67 MS 2

³⁴ Cunningham et al 1989:17

Figure 11. Plan showing location of historic archaeological sites.



Figure 12. Stone faced landing platform for access to iron jetty.



Figure 13. Photo scale lying on concrete tank cap above iron jetty.

8.2 Stone Jetty - U14/361

The stone jetty was built by Mr G Gardiner, Mr A.W. Burrows and a team of volunteers between December 1888 and March 1889 and remained in use until the 1930s. The jetty was constructed for public use enabling Victorian picnickers to disembark without getting their voluminous skirts wet.

The jetty remains in sound condition with periodic repairs having been carried out on loose stones. Curiously, the sand cement mix used in some parts of its construction contain archaeological artifacts, including lithic flakes, indicating the jetty was constructed from locally sourced materials. When constructed the jetty had wooden breastwork to protect the hulls of moored vessels. No evidence of the breastwork remains.

An engraved marking at the proximal end of the jetty was one of the first permanent survey bench marks in Tauranga and is noted on many early survey and maritime maps.³⁵ Unfortunately recent damage has occurred to the original survey mark following the installation of a Land Information New Zealand Geodetic survey mark.³⁶

The stone jetty is recorded as an archaeological site and is protected under the provisions of the Historic Places Act. Any proposed maintenance or modification of the jetty will require an authority from the New Zealand Historic Places Trust.



Figure 14. The Stone Jetty.

³⁵ refer: various maps held at the Tauranga Library.

³⁶ Geodetic Code: AB4T

8.3 Whitmore's Camp ?

Several secondary sources refer to a site on Mauao where the militia are said to have camped immediately following the Battle of Gate Pa and Te Ranga.³⁷ Colonel Whitmore and his troupes are also said to have camped in the same location 5 years later. A terrace and pit feature and the stone steps have been attributed to these camps. One feature has even been interpreted as a rifle pit while a large terrace is variously interpreted as the site of the camp kitchen and a gun emplacement.³⁸

While research carried out for this report was by no means exhaustive no creditable archival reference to post Te Ranga military camp or 'Whitmore's Camp' was found in available archives. H T Clarke (Civil Commissioner) refers to a ship carrying Colonial Forces and the Arawa Contingent moored off Mauao on 13 April 1869. Whitmore arrived in Tauranga several days later. It is a reasonable suggestion that the troupes camped at Mount Maunganui' away from the hotels of Te Papa, prior to their departure along the beach to Matata. Ryan and Parham write that 'The force assembled at Mt Maunganui, and the nearby town of Tauranga was declared out of bounds'.³⁹ The probably location of a temporary camp would have been on the harbour side where two prolific springs would have provided drinking water. Whitmore and the troupes left Tauranga on 17th April with hardly enough time to construct stone steps.⁴⁰



Figure 15. Earthwork features (Terrace feature (left) and pit feature (right)) often attributed to a military camp on the eastern slopes of Mauao

³⁷ 1980 Mauao Management Plan, 1998 Mauao Management Plan.

³⁸ Fletcher – NZAA Site Record Form U14/250

³⁹ Ryan & Parham 1986. Statement is not referenced.

⁴⁰ H T Clark –Letter to his sister dated May 31st 1869. MS 57

The construction of the stone steps have perhaps been incorrectly attributed to the military activity on Mauao which may have influenced secondary sources as to the location of 'Whitmore's Camp'. Clearly further research is required to solve the mystery of the military camp/s on Mauao.

There was insufficient evidence at the completion of this report to justify recording the area above the stone steps as a 19th Century military camp, however the area is protected under the provisions of the Historic Places Act by virtue of its inclusion within the boundaries of Maunganui Pa.

8.4 Stone Steps - U14/250

The stone steps are thought to have been constructed from local rhyolite by militia camped in the area in the 1860s, however, there are many variations in the available accounts of the antiquity and function of the steps.

Fletcher writes that *'the steps are said to have been built so that the Pilot could get quickly up the bluff to signal to ships wanting to enter the harbour. The work of building the steps was done by the militia during their occupation in the area'*.⁴¹

Adams, an early resident at the Mount, believes the steps were built by the militia for their own purposes i.e. carrying stores from Pilot Bay up to their camp site⁴²,



Figure 16. The stone steps ascending a gully on the eastern side of Mauao.

⁴¹ NZAA Site Record Form U14/250 - 1976

⁴² Oram 1979:4

T.S. Carmichael's diaries of 1866 and 1867 make no mention of the stone steps although a track from the Pilot Station to the look out hill is mentioned.⁴³ Most sources support the theory that the steps were constructed for use by the Harbour Master and given the doubtful existence of the military camp this seems the most plausible explanation.

Exactly when the steps were built is unclear. Mr S. E. Chappell recalls seeing them during childhood excursions to the Mount between 1881 and 1897.⁴⁴ A number of other eyewitness accounts indicate the steps were present by the end of the 19th Century.

Further research is required to determine the antiquity and function of the stone steps, however, they were constructed prior to 1900 and are a recorded archaeological site. The New Zealand Historic Places Trust should first approve any maintenance work carried out on the steps.

8.5 Pilot house

The first Pilot house was constructed in 1866 - 1867 on a prominent spur extending east from the base of Mauao. According to the dairies of Carmichael it was poorly constructed from inferior materials. Notable features included shell paths and an encircling ditch.⁴⁵ The function of the ditch is unclear but may have either been for drainage or as a livestock barrier. The first cottage appears to have been replaced in the mid 1870s by another cottage Captain Marks. This cottage survived up until the late 1960s.



Figure 17. The second Pilot cottage as it was in the 1920s.

A third cottage was constructed on the Pilot Reserve for Captain Marks eldest son Hannibal in 1874 or 1879 in the general vicinity of the swimming Pool Complex on

⁴³ Carmichael – January 24th 1867.

⁴⁴ AA Official Bulletin August 1959.

⁴⁵ Carmicheal – Sept 21 1866, October 7 1866.

Adams Avenue. The house was demolished in 1964 and the area has subsequently been completely modified by earthwork and it is highly unlikely that any archaeological evidence relating to it survives.

While no visible archaeological features are evident in the probable location of the first and second Pilot House's, buried subsurface features may survive on the spur. It is also probable that the spur was a significant component of the earlier Maori occupation on Mauao and subsurface archaeological evidence relating to the pre European period may also survive on the spur.

9.0 SIGNIFICANCE OF THE ARCHAEOLOGICAL RESOURCE

The significance of the archaeological resource on Mauao cannot be over emphasised. It is unique for its size, antiquity and spatial complexity and constitutes one of the most important archaeological landscapes in New Zealand.

The archaeological significance is derived not from any specific pa or terrace complex but from the relation of collective components and intervening spaces that constitute the archaeological cultural landscape. The spatial organisation of archaeological features on Mauao suggests a high level of social and political organisation over a long period of time.

Mauao is comparable with other outstanding archaeological landscapes such as Pouerua in Northland, Maungakiekei in Auckland, the Papamoa pa complex and Otatara Pa in Napier. Mauao has added significance due to associated archaic archaeological deposits at Pilot Bay.

It should be noted that an assessment of archaeological significance might not necessarily correlate with an assessment of cultural significance. An assessment of the cultural significance of an area can only be competently made by tangata whenua.

PART II IDENTIFICATION OF THREATS

10.0 THREATS

The previous section has presented the results of a preliminary survey of the archaeological landscape on Mauao. This section identifies current threats to the continued protection and preservation of that landscape and provides general recommendations for consideration in future Conservation Plans for the Reserve.

The archaeology on Mauao has been incrementally damaged over the last 100 years due to existing land-use and natural forces. Archaeological features continue to be damaged by ill-advised management practices.

The 1980 and 1998 Management Plans for Mauao included recommendations for the management of archaeological sites provided by non-experts in the field of archaeological site conservation. Many of these recommendations were poorly conceived; so consequently, their implementation has resulted in damage to archaeological features. Recommendations have focused on individual archaeological features and segregation of perceived incompatible activities within the Reserve. There has been a failure to recognise the significance of the relationship between archaeological features and intervening spaces that provide coherence and meaning to the archaeological / cultural landscape.

It should be recognised that the establishment of a Conservation Plan for complex archaeological landscapes such as Mauao is a specialised field. Only suitably qualified archaeologists with a record of accomplishment in developing Conservation Plans for such landscapes should be engaged in this work.

10.1 Legal Requirements

The international organization, which develops cultural heritage conservation policies is ICOMOS, the International Council on Monuments and Sites. All conservation work on Mauao should be guided by a plan consistent with the principles of the ICOMOS New Zealand Charter (1993).

All reserve management and conservation work carried out on Mauao must comply with the requirements of the Historic Places Act (1993). The archaeological features in the reserve are protected under the provisions of sections 10 – 20 of the Historic Places Act (1993). It is unlawful to modify, damage or destroy any archaeological sites without prior authority from the New Zealand Historic Places Trust.

11.0 VEGETATION

The past 100 years has seen planting programs introduce both native and exotic tree species onto Mauao many of which are now causing significant damage to archaeological features. Vegetation, particularly large trees, can damage both surface and subsurface archaeological features destroying information about the site.⁴⁶

Damage from deep rooting trees can be seen on the summit where large cavities from the rotted roots of old pines have caused considerable subsurface damage on terrace features worsened by rabbit burrowing. Large pines on the lower slopes are currently causing extensive subsurface damage from root growth and wind throws where large quantities of archaeological material have been uprooted.

Isolated trees planted in exposed areas on the grazed southern slopes have not only caused damage to subsurface features from root growth but also attract sheltering sheep that in turn cause extensive damage to underlying features by trampling.

The current vegetation cover is damaging many archaeological features on the southern spur. The extensive and significant archaeological features on the southern spur would present an impressive sight if they were returned to pasture, unfortunately, vegetation clearance would create a desire line to the summit for more adventurous tourists potentially creating more extensive damage than the current vegetation cover.



Figure 18. Trees recently planted on occupation terraces.

⁴⁶ Bowers 1998



Figure 19. Archaeological deposits exposed in the roots of wind-throw tree.

11.1 Management Recommendations

Appropriate vegetation management on Mauao is critical for the continued protection and preservation of the archaeological landscape. Over the past 30 years best practice guidelines for vegetation management on archaeological sites have been established by archaeologists. Published vegetation management guidelines provide information on such matters as species suitable for planting on archaeological sites, methods for the removal of trees from archaeological sites and on going management of vegetation cover in archaeological landscapes.⁴⁷

An appropriate management plan for vegetation on archaeological sites should be established by a suitably qualified conservation archaeologist in conjunction with tangata whenua and reserve management staff.

The management plan should consider:

- A program for the removal of aging exotic trees on the southern slopes.
- Removal of trees planted on archaeological features within the last ten years.
- Removal of selected trees damaging archaeological features on the southern spur.
- Planting of stock shelter trees in paddocks away from archaeological sites.
- Extending the grazed area part way up the southern spur.

⁴⁷ e.g. Hamel & Jones 1982; Jones et al 1995; Harlow 1997; Jones et al 2002; Bowers et al 2002.

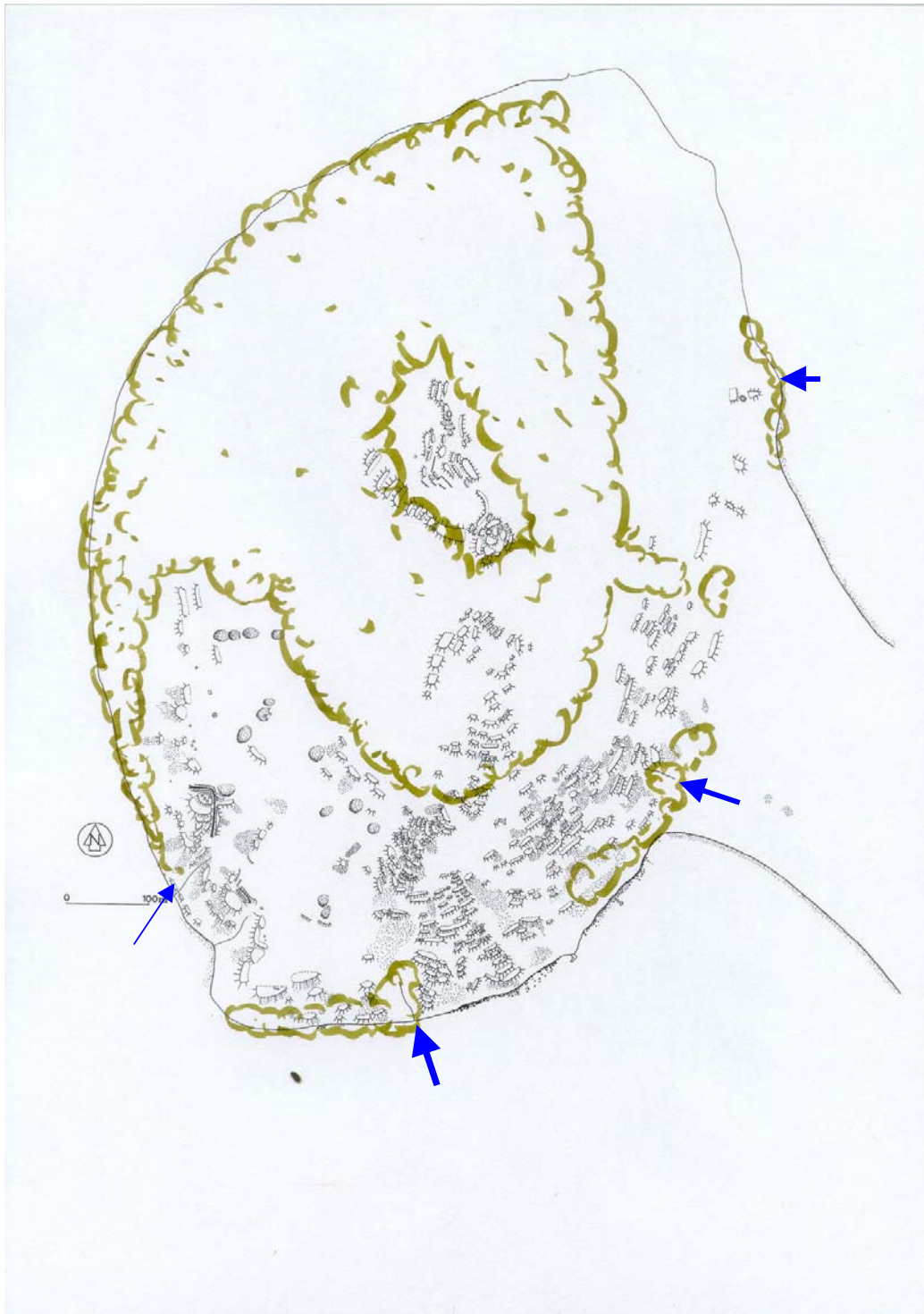


Figure 20. Plan showing archaeological sites in relation to vegetation cover. Significant springs arrowed.

12.0 GRAZING

Pastoral areas on Mauao have been continuously grazed for over 70 years. Grazing is currently being used as a tool to maintain the reserve in a vegetation cover that offers the best protection to archaeological features while also providing for public viewing and appreciation of the surface features. Grazing also has the potential to seriously damage archaeological features through trampling and tracking. The risk to archaeological features posed by livestock grazing must be carefully balanced against the risk to archaeological features caused by a change in the existing vegetation cover.⁴⁸

Previous management plans have presumed that the purpose of grazing has been to provide for public recreational use and this philosophy has dictated stock management often to the detriment of archaeological features. Stock grazing must be considered a strategy primarily for the management of archaeological features and stock management plans should be devised to provide the greatest protection to those features.



Figure 21. Stock tracking onto archaeological feature caused by gate location.

It is important that the shepherd has a clear understanding of the role of grazing in the management of the archaeological resource, but equally the animal health and welfare must be considered. Stock management for maintenance of an archaeological landscape may not necessarily conform with accepted commercial practices of farming.

⁴⁸ Bowers & Gosling 2002

12.1 Stock Numbers

The maintenance of a suitably protective pasture sward will dictate stock numbers and stock rotation between paddocks.

12.2 Paddock Fencing

Integral to effective stock management on archaeological landscapes is an appropriate fencing system. Design of paddock divisions should carefully consider potential impacts on archaeological features from fence construction, stock movement within paddocks as well as between paddocks. Paddock structures that invariably cause significant ground disturbance such as gates, troughs and stock shelters should be positioned away from archaeological features.

12.3 Fencing of archaeological features

The most recent damage to archaeological features on Mauao has resulted from the construction of post and wire fences around several of the large shell mounds on the southern slopes. While the intention was to keep stock off the eroding shell the new fences have simply moved the problem off the midden and onto more archaeologically sensitive features. Consequently sheep tracking along the fence perimeter has caused significant damage to archaeological features in several areas.⁴⁹



Figure 22. Stock damage to archaeological features caused by fenced off middens.

⁴⁹ Despite clear guidelines in the 1998 Management Plan ref: 3.2.2j no archaeological assessment was carried out prior to the erection of the post and wire fences.

Less robust fences erected around midden mounds several years ago comprising waratahs and wire provided more effective protection to eroding middens as sheep are still able to enter the fenced area (although with some difficulty) thus limiting grazing and maintaining a suitable protective pasture sward cover over the midden.

Stock erosion to shell middens is often influenced by the location of stock shelters such as mature trees. The design of paddocks and careful stock management is the most effective tool in reducing erosion to vulnerable archaeological features.

12.4 Management Recommendations

A fencing strategy for pastoral areas on Mauao should be established between the shepherd and an archaeologist suitably qualified in the field of archaeological site conservation and management.

Once a fencing system has been established a grazing program should be formulated and carefully monitored to determine best practice guidelines for future stock management.

Close liaison with the shepherd is essential if damage to archaeological features is to be avoided.

Post and wire fences recently erected around eroding middens should be removed immediately. The location of all post holes should be surveyed and holes infilled with an archaeologically visible material to be selected by a suitably qualified conservation archaeologist.

13.0 FIRE

Uncontrolled scrub and bush fires have occurred regularly on Mauao for the past 600 years. At least seven significant uncontrolled fires have occurred within the last 50 years.

Threats to the archaeological resource from fire include both direct impact from vegetation removal causing soil loss and erosion and indirect effects from fire fighting machinery and provisions made for fire crew access to parts of the reserve.

Post fire impacts include destabilised rock outcrops and resultant rock falls that can damage and obscure archaeological features as well as inappropriate replanting programs on archaeological features creating replenished fuel loads.

13.1 Management Recommendations

Vegetation fire risk on Mauao is influenced by a combination of climate, steep topography, vegetation and ignition sources.

Reducing the fuel loading of vegetation on archaeological features can significantly reduce the intensity of a fire and the impact on surface stability. This can best be

achieved by maintaining a short pasture sward or low shrub cover on archaeological features.

Pre planning of fire control can help reduce the risk of damage to archaeological features during fire fighting operations through the development of tactics that reduce or eliminate the need to use heavy machinery or to construct fire lines through archaeological features.

Future strategies for fire control on Mauao should be assessed by the New Zealand Historic Places Trust in order to determine if archaeological resources are potentially affected.

14.0 EROSION

Erosion within the reserve includes minor hill creep in pastoral areas, sheet and gully erosion on the edge of the lower pyroclastic terraces and rock falls from the exposed rhyolite faces.

Major areas of erosion affecting archaeological features have occurred from past track and reservoir construction. The most visible landslide occurs on the lower southern slope above the western jetty where the construction of a now disused vehicle track has destabilized the volcanic loam overlying loose talus.

Equally extensive is the gulch at the head of a spring gully on the western slopes caused by overflow from the western reservoir.



Figure 23 Erosion caused by base track construction threatening to damage archaeological features above.

In addition to the more obvious erosion scars there are many small slumps occurring along the edge of the western coastal scarp that are beginning to damage archaeological features.

14.1 Management Recommendations

The judicious management of tracks, vegetation, fire, grazing, and visitors should limit erosion potential.

15.0 HUMAN ACTIVITY

It is estimated that there are up to 25,000 visitors a month on Mauao making it one of the most visited reserves in New Zealand. While the summer months see the highest usage visitor numbers have increased in off peak times due to the intensification of the residential population in Mt. Maunganui and increasing interest from organised tourism.

While it is important to formalize and direct the majority of this traffic it is equally important that visitors are not segregated from the archaeological cultural / landscape. Public access to the landscape should not be seen as incompatible with its preservation.



Figure 24. Damage to occupation terraces from foot traffic and subsequent storm water run off.

The importance of preserving and making the archaeological / cultural landscape accessible is to provide ‘a tangible reminder to today’s inhabitants that once the entire country was owned and used by Maori, a society based upon different premises of Life.’⁵⁰

⁵⁰ Allen 1998:58

Visitor activity has and will continue to cause damage to archaeological features on Mauao. Damage from pedestrian traffic is most evident within the existing track corridors where desire lines diverging from formal tracks are well established and continue to cause erosion problems. Informal tracking across grasslands and archaeological sites appears to be minimal.

Desire lines are preferred pedestrian routes or short cuts diverging from the formalized track network. They are generally formed to access particular objects such as reserve furniture or geographical features such as the summit or a look out point. Careful design of walking tracks can considerably reduce the potential for erosion and damage to archaeological sites from the formation of desire lines. Modifications to existing tracks on Mauao may be required in order to remedy existing desire lines currently causing damage to archaeological features.



Figure 25. An example of a child's desire line above the base track.

15.1 Management Recommendations

That a management plan for the maintenance and restoration of walking tracks, vehicle tracks and reserve furniture is established by a suitably qualified archaeologist and a landscape architect experienced in the management and maintenance of archaeological landscapes.

A management plan should consider:

- Retirement and stabilization of walking tracks routed through archaeological features particularly on, and immediately below, the summit.
- Removal of reserve furniture from archaeological features.
- Stabilization of surface erosion on the summit.



Figure 26. Damage to archaeological feature on the summit pa caused by foot traffic accessing reserve furniture



Figure 27. Installation of stiles encourages concentrated informal tracking and consequent damage to archaeological features.

16.0 TRACK AND ROAD MAINTENANCE

The current management and maintenance of the existing track and road network on Mauao is responsible for incremental damage to archaeological features. The seemingly innocuous maintenance activities such as storm water drain clearance and track aggregate replenishment are in fact causing extensive damage to archaeological features.

The design of storm water drains along the 4WD summit track has resulted in archaeological deposits being mobilized from one feature to another via the drains resulting in the mixing of the archaeological material and subsequent reduction of archaeological and scientific integrity.

The clearance of open drains by spade or machine has also contributed to this archaeological pollution as material is physically removed from the drain and redeposited above or below the track onto archaeological features.



Figure 28. Material removed from storm water drains on 4WD track and deposited onto archaeological features.

During the initial formalisation of the base track adjacent shell middens were quarried for track aggregate. More recently shell has been imported from beyond Mauao. The destruction and redistribution of insitu middens and the use of imported shell as aggregate on the base track has caused considerable damage to the integrity of all archaeological features below and immediately above the track. The imported shell has polluted archaeological deposits with foreign matter, effectively reducing or negating completely the ability to accurately date, analysis and interpret affected archaeological features.



Figure 29. Storm water pipe directing mobilized archaeological deposits onto archaeological features.

16.1 Management Recommendations

The track and road maintenance program should be reviewed by a suitably qualified archaeologist in order to identify the potential impact on archaeological resources and provide recommendations for the mitigation of effects.

An archaeological assessment of the Maintenance program should consider:

- Rerouting storm water pipes on the 4WD track away from archaeological features.
- Provide procedural guidelines for the cleaning and maintenance of storm water drains.
- Identify alternative aggregates for use on the base track.



Figure 30. Plan of archaeological landscape with walking tracks, roads and areas of significant disturbance shown in red.

17.0 MACHINERY USE

Machinery used in association with livestock management, fire control, summit access and track maintenance have caused damage to archaeological features. Tracked machinery has recently been used to clear storm water drains causing damage to adjacent archaeological features.

17.1 Management Recommendations

The use of machinery within the archaeological landscape on Mauao should be subject to approval by the Historic Places Trust.

18.0 PESTS

Grazing creates a favorable habitat for rabbits. Observations carried out between January and July 2003 has indicated that rabbits are currently the most significant threat to the stability of archaeological features on Mauao. Burrows on shell midden mounds and terrace risers are extensive and the initial ‘wound’ is often made worse by subsequent stock activity.



Figure 31. Erosion to midden mound caused by rabbit burrowing.

18.1 Management Recommendations

Implementation of an effective pest control strategy should be an urgent priority.⁵¹ This should be followed by the establishment of an ongoing monitoring program of pest induced erosion scars on archaeological features.

⁵¹ Pest control program had begun at time of writing – pers.com.

19.0 DISCUSSION / CONCLUSION

The archaeological survey has highlighted the extent and significance of the archaeological resource and provides an interpretation of the archaeological landscape that concurs with and complements the traditional history of Mauao.

The archaeology of Mauao is of local, national and international significance and constitutes the primary non-renewable resource within the Mauao Historic Reserve.

The archaeological data compiled during the survey provides the basis for future archaeological studies on Mauao. However, the most urgent research requirement for Mauao is not further archaeological survey or interpretation but rather developing a strategy for the stabilization, protection and preservation of the archaeological resource.

Archaeological sites cannot be repaired, restored, reconstructed or relocated. Future management decisions regarding land-use and reserve development should be made with the primary consideration being the potential long-term impact of those decisions on the archaeological resource.

ACKNOWLEDGEMENTS

I gratefully acknowledge the assistance of the following people during the preparation of this report.

§ 7(2)(f)(ii) (Tauranga District Council) initiated the project and provided logistical support.

Environment B.O.P. for funding the project through the Environmental Enhancement Fund.

§ 7(2)(a) - Privacy (Archaeologist) assisted with fieldwork and provided constructive discussion regarding archaeological landscape interpretation.

§ 7(2)(f)(ii) (Tauranga District Council) provided initial training and assistance with GPS data capture.

§ 7(2)(f)(ii) (Tauranga District Council) assisted with GPS data processing.

§ 7(2)(f)(ii) (Tauranga District Council) processed GPS data and provided maps and aerial photos.

§ 7(2)(a) - Privacy assisted with data collection during field work.

§ 7(2)(a) - Privacy (Archaeologist) and § 7(2)(a) - Privacy assisted with field work on the southern spur.

§ 7(2)(a) - Privacy (Historian) provided assistance with research associated with historic sites on Mauao.

§ 7(2)(a) - Privacy (Archaeologist) for assistance with power point presentation to the Mauao Advisory Committee.

BIBLIOGRAPHY

History

- Bellamy, A.C. (ed) 1982 *Tauranga 1882 – 1982*. Publicity Printing Ltd, Tauranga.
- Bidwell, J.C. 1839 *Rambles in New Zealand*.
- Crosby, R.D. 1999 *The Musket Wars: A History of inter-iwi conflict 1806 – 45*. Reed Publishers, Hong Kong.
- Cunningham, B. & K. Musgrave 1989 *A History of Mount Maunganui*. Printcorp Services Ltd, Tauranga.
- Gifford, W.H. & H.B. Williams 1940 *A Centennial History of Tauranga*. Reed Publishers, Dunedin.
- Gudgeon, W.D 1916 *Tribal Warfare in Tauranga 1600 – 1850*. Manuscript written in 1916 and published in 1973 as Memoir No. 6 Whakatane & District Historical Society.
- Mair, G. 1937 *The Story of Gate Pa: April 29th, 1864*. Bay of Plenty Times, Tauranga.
- Oram, B. 1979 Oral History Research Project: Mount Maunganui. Unpublished Research paper, University of Auckland.
- Ryan, T. & B. Parham 1986 *The Colonial New Zealand Wars*. Wellington.
- Stafford, D.M. 1967 *Te Arawa: A history of the Arawa People*. Reed, Wellington.
- Stokes, E. 1980 *A History of Tauranga County*. Dunmore Press, Palmerston North.
- Stokes, E. 1990 *Te Raupatu O Tauranga Moana Vol 1: the confiscation of Tauranga lands*. A report prepared for the Waitangi Tribunal Hamilton.
- Stokes, E. 1992 *Te Raupatu O Tauranga Moana Vol 2: Documents relating to Tribal History, the Confiscation and Reallocation of Tauranga Lands*. Hamilton.
- Tapsell, E. 1940 *Historic Maketu*. Rotorua Morning Post Printing House: Rotorua.
- Wilson, J.A. 1907 *The Story of Te Waharo: A Chapter in Early New Zealand History*. Whitcombe and Tombs Ltd Christchurch.

Archaeology

- Allen, H. 1998 Protecting Historic Places in New Zealand. Department of Anthropology, University of Auckland.
- Best, E. 1927 The Pa Maori.
- Bowers, L. & D. Gosling 2002 Otatara Pa Historic Reserve Napier: Conservation Plan. Unpublished report prepared for Department of Conservation, East Coast – Hawkes Bay Conservancy.
- Coffin, A. 1999 Research Report of Taonga Maori and Maori Material from Waihi Beach to Maketu, Kaimai to Offshore Islands, Bay of Plenty. Unpublished report
- Coffin, A. 1999 Register of Taonga Maori and Maori Material from Waihi Beach to Maketu, Kaimai to Offshore Islands, Bay of Plenty. Unpublished inventory.
- Gardner, P. 1993 A Summary of the Tauranga County Archaeological Material located in the Auckland Institute and Museum. M.A. Thesis, University of Auckland.
- Hamel, G. & K.L. Jones 1982 Vegetation Management on Archaeological Sites. New Zealand Historic Places Trust, Wellington.
- Harlow, D. 1997 The Conservation of Archaeological Sites through the use of Vegetation. Unpublished MA thesis, Anthropology Department, University of Auckland.
- Jones u.d. A New Experimental Study of Erosion on U.S. Civil and Revolutionary War Earthworks. Unpublished report.
- Jones, K.L. & P.G. Simpson 1995 Archaeological Site Stabilization and Vegetation Management, Case Studies I: Coromandel, Bay of Plenty and Hawke's Bay, Central Volcanic Plateau and Taranaki. Department of Conservation Science and Research Series 84.
- Jones, K.L., Harlow, D. & G. Gosling 2002 Caring for Archaeological Sites: New Zealand guidelines. Department of Conservation, Wellington.
- Walton, T. (ed) 1999 Archaeological Site Recording in New Zealand. New Zealand Archaeological Association Monograph 23.

Geology / Soils

- Beadel, S.M. 1995 Vegetation and Flora of Mt Drury, Moturiki, Ocean Beach and Pilot Bay, Mount Maunganui. Unpublished report by Wildland Consultants.
- Giles, T.M.; Newnham, R.M.; Lowe, D.J.; Munro, A.J. 1999 Impact of Tephra Fall and Environmental Change: A 1000 Year Record from Matakana Island, Bay of Plenty, North Island, New Zealand. From: Firth, C.R. & McGuire, W.J. (eds) 1999. Volcanoes in the Quarternary, Geological Society, London, Special Publications, 161, 11-26.
- Hall, G.J. 1994 Volcanic Geology of the Southeastern Tauranga Basin, New Zealand. Unpublished MSc thesis, University of Waikato.
- Healey, T.R. 1977 Progradation at the Entrance, Tauranga Harbour, Bay of Plenty. New Zealand Geographer, Vol. 33, No. 2, pp 90-92.
- Hogg, A.G.; Higham, T.F.G.; Lowe, D.J.; Palmer, J.G.; Reimer, P.J.; Newnham, R.M. 2003. A Wiggle-match Date for Polynesian Settlement of New Zealand, *Antiquity* 77, 116-125.
- Hughes, G.R. 1993 Volcanic Geology of the Eastern Tauranga Basin and Papamoa Range. Unpublished MSc thesis, University of Waikato.
- Moore, P. 1994 Tauranga Harbour. Institute of Geological and Nuclear Sciences Ltd.
- Pullar, W.A. & J.D.Cowie 1967 Morphology of Subfulvic and Related Soils on Dunelands at Mt Maunganui, Bay of Plenty. *New Zealand Journal of Science*, Vol. 10, No.1.
- Rijkse, W.C. & W.E. Cotching 1995 Soils and Land Use of Part Tauranga County, North Island, New Zealand. Landcare Research New Zealand Ltd, Hamilton.

Management Plans

- 1980 The Mount: Management Plan. Prepared by the Department of Lands and Survey and the Mount Maunganui Borough Council.
- 1998 Mauao – Mount Maunganui, Main Beach, Moturiki – Leisure Island, Hopukiore – Mount Drury, Waikorire – Pilot Bay Reserves: Management Plans. Strategic Planning Department, Tauranga District Council.

- 1998 Mauao – Mount Maunganui, Main Beach, Moturiki – Leisure Island, Hopukiore – Mount Drury, Waikorire – Pilot Bay Reserves: Management Plans – Appendices. Strategic Planning Department, Tauranga District Council.
- 2003 Minutes: Mount Maunganui (Mauao) Fire 22 January 2003 Debrief.
- 2003 Tender document – Preparation of Conservation Plan for Mauao. Tauranga District Council.

Archives / Manuscripts

Vertical files Tauranga Library - NZ Room. Miscellaneous articles, newspaper clipping etc

Carmicheal T.S.	MS 2	Tauranga Library
Clarke H.T.	MS 57	Whakatane Museum
Fletcher, K.	MS 55	Whakatane Museum
Fletcher, K.	MS 105	Tauranga Library NZ Room.

Journal of the Tauranga Historical Society (JTHS)

JTHS Volume 18		Boyhood at the Mount
JTHS Volume 27	1966	
JTHS Volume 28	1966	
JTHS Volume 32	1967	The Maori Returns to Mauao
JTHS Volume 35	1968	Investigations on the Mount (Mauao)
JTHS Volume 40	1970	Mauao (“The Mount”)
JTHS Volume 51	1974	
JTHS Volume 59	1977	The Story of Mangatawa and Mauao
JTHS Volume 67	1982	From Legend to the Tainui Tradition

Survey Plans

ML 1463b
ML 5000 – 5004
ML 4862

Various maps and plans held at Tauranga Library and Whakatane Museum.

Aerial Photos

Recent Aerial photos supplied by Tauranga District Council

Airmaps N.Z. Ltd	Neg. 158154	Flown 10-12-1985
Airmaps N.Z. Ltd	Neg. 161251	Flown 22-10-1988
NZ Aerial Mapping		Flown 1940s