

Figure 16. Distribution of recorded archaeological sites with kumara storage pits, Northland Conservancy region, Department of Conservation. *Map: C. Edkins, DOC.*

enhance soil fertility by using animal waste). Ironically, petrel burrows are likely to have a major destructive effect on the survival of garden sites on the northern islands. Gardening evidence is a feature of all islands down the east coast of the upper North Island. Whether this is due to the survival of sites on land not subsequently altered, in combination with the presence of stone structures, or reflects a significant advantage of the island climates, as suggested by Edson (1973), can only be speculated on.

Major concentrations of stone structures are to be found in the inland Bay of Islands, where the volcanic cones of Ahuahu, Pouerua, Putahi, Maungaturoto and Puketona produced fertile red-brown volcanic loams ideal for gardening. Remnants of the Maori garden landscape are present around Ahuahu and Puketona, but they largely consist of isolated groups of stone mounds and heaps in a landscape damaged by farming and quarrying (Sutton 1982: 187). Pouerua is the only garden landscape in the inland Bay of Islands to have suffered little damage. Stone rows, heaps, mounds, alignments and enclosures are present on the stonier soils. Shallow boundary trenches, which extend for some distance over undulations in the landscape, together with shorter cross-trenches are present on soils with a greater depth of ash (Phillips 1980). The garden evidence covers an area of c. 550 ha around the volcanic cone, which is a terraced pa with defensive ditches on the rim. Many of the garden features and the associated settlements situated within the garden areas have been mapped. The survey carried out in 1982–83 was, at that time, an innovative exercise that aimed to produce an analysis of the garden systems (Sutton 1983). However, the site map has still not been produced in its final form. Some areas around the margin of the volcanic soils at Pouerua were not included in the intensive mapping exercise, but these have since been examined and their features recorded (Challis & Walton 1993). Differences in the density of recorded sites around Pouerua can be accounted for by different methods of recording. The Sutton-directed work was map-based rather than site record-based, so there are few site records for the garden-related stone evidence and few written descriptions, but relationships between features can be readily seen (part of the site map is reproduced in Sutton 1984: frontispiece). On the other hand, the later recording exercise on the outer margins of the volcanic soil zone by Challis & Walton (1993) was based on descriptions of concentrations of features and topographic changes, and resulted in 133 additional site records being added to the Northland site file. This latter approach, while adding significantly more detail about individual groups of features, lacks the integrated landscape view of the former, but the need to identify the extent of the cultural landscape prior to registration under the Historic Places Act dictated the different approach. Both approaches—mapping and site records—have merit, but an integration of both maps and written descriptions of features and groups of features would be the ideal.

Isolated garden areas based on the use of stone occur at Mt Camel, Kerikeri, around the coast of the Bay of Islands and on the coastline north to Whangaroa Harbour. These sites tend to be small in size and are on coastal platforms or hillslopes. Further south, remnants of stone rows and mounds are present at McLeod's Bay near Whangarei Heads, and at Maungatapere and Maungakaramea, west of Whangarei Harbour, where volcanic soils also occur (Nevin 1983).

Stone structures are present on terraces in a riverine valley system, and on clay loams, rather than volcanic-derived soils, in Waipoua Valley and other locations

between Waimamaku River and Waipoua. Although some imaginative theories have been put forward to explain the origin of these sites, they are undoubtedly of Maori construction. Stone heaps, without any obvious soil component, are the most commonly occurring feature, with a density of up to 172 heaps/ha (Papworth 1980: 5–6). Stone rows and stone-faced terraces form only a small percentage of the sites at Waipoua. Some shallow ditch features are also present.

The large complexes of parallel and intersecting ditches on flat, poorly drained soils, such as at Oruru, Awanui, Motutangi and Taumatawhana, are uncommon elsewhere in the country. Similar systems are reported from the Dargaville area and possibly at Waipu. The system at Motutangi covered 47 ha, and that at Awanui c. 125 ha, representing many kilometres of ditch length (Barber 1982, 1989a). The latter has been largely destroyed.

Shallow parallel trenches on slopes, which are different from the ditch complexes discussed above, are widely distributed through Northland. Well-known examples include those at Tupou Bay, Moturua Island, Pouerua, Limestone Island in Whangarei Harbour and Marsden Cross on the Purerua Peninsula. This site type is particularly difficult to detect—often only visible in certain low-angle light or under particular vegetation conditions—and may be more widespread than the current known distribution indicates. A survey of this site type in Tai Tokerau was conducted by Barber (1982). Similar sites are present on coastal Whangaroa, Cavalli Islands, coastal Bay of Islands, the south side of Whangarei Harbour and Kaipara. The rendzina soils present at Whangarei and Kaipara, which are based on limestone parent rock, are sticky clay soils high in nutrients (Gibbs 1980) and have abundant evidence of horticulture, including the site that covers 14 ha on Limestone Island.

There are no borrow pits in Northland and records of garden soils are rare: there are only 17 instances of soils incorporating shell, charcoal or water-rolled pebbles, including Moturua Island (Johnson 1997). Some recorded examples may not be modified garden soils.

Taro sites are plentiful in Northland. The distribution of taro is a reflection of where taro was grown historically (adjacent to settlements) and the extent of its tolerance to the local environmental conditions.

Although East Polynesian-type settlement sites are well known from Northland, there is no evidence for an association with horticulture. This is no doubt due to the ephemeral nature of the evidence or a sampling problem, rather than a lack of gardening by the first settlers. Reinterpretation of the garden soils on Moturua Island, which were excavated by Groube (1966) and Peters (1975), has raised some doubts about whether these slope gardens and trenches do actually represent early gardening. Forest clearance in the inland Bay of Islands at Pouerua, in an area of fertile volcanic soils, was underway in the first decades after AD 1400 (Sutton et al. 2003). It can, therefore, be said with some confidence that horticulture has been practised in the north of the North Island for more than 600 years.

Land administered by the Crown contains many Maori garden-related sites, but these are not representative of the full range of garden evidence in Northland. The sites tend to be small, possibly historic in the case of Ranfurly Scenic Reserve, and do not encompass the wetland systems or sites on volcanic soils on the mainland. The Waipoua sites are extensive, but they are not representative in either form or landscape type of gardening evidence in Northland.

6.2 AUCKLAND

There is a diverse range of environmental conditions and gardening sites in the wider Auckland region (Fig. 17). The evidence does, however, tend to be dominated by the gardens on the volcanic soils of the Tamaki Isthmus.

Islands such as Hauturu/Little Barrier, Rakitu (Arid) and Great Barrier (Aotea) have stonework reminiscent of that on other smaller islands in Northland and the Waikato/Coromandel regions; however, Great Barrier (Aotea) Island also has larger sites with stone row complexes and slope trenches on the eastern coast. Motutapu, Motuihe, Waiheke and Ponui Islands are generally free of surface stone, and although some modified soils have been recorded, the direct evidence of gardening is lacking. There are, however, many storage pits on these islands (Fig. 18). Browns Island (Motukorea), being volcanic, has stone rows, heaps and mounds on the basaltic lava fields surrounding the cone. The area involved is a relatively small 4 ha.

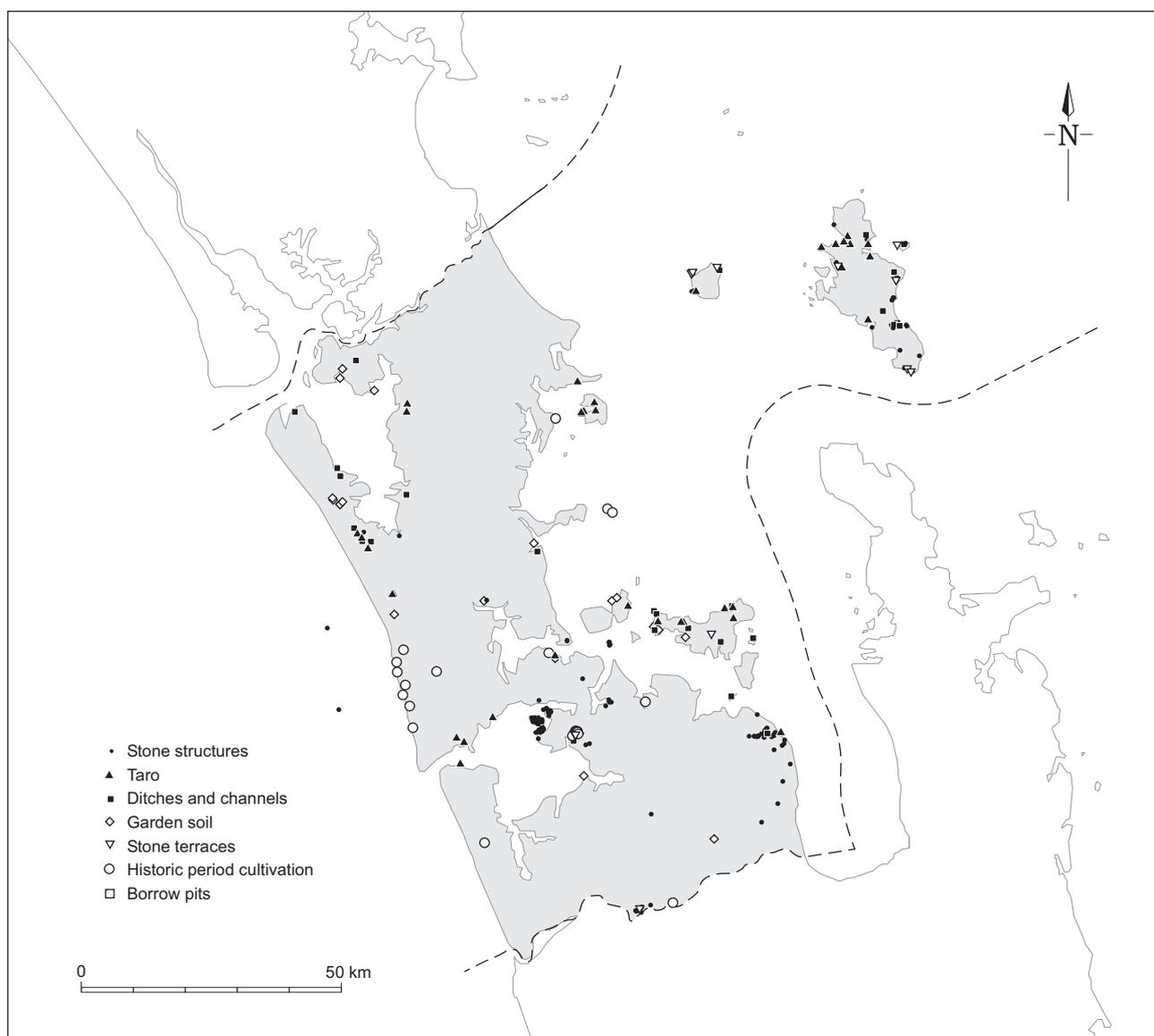


Figure 17. Distribution of recorded Maori horticulture-related archaeological sites, Auckland Conservancy region, Department of Conservation. *Map: C. Edkins, DOC.*

A distinctive feature of Maori gardening in the Auckland region is the use of stone on the basaltic lava fields surrounding the volcanic cones to construct rows, alignments, mounds, heaps and stone-faced terraces within and around the gardens. Prior to urban development, there were 30 separate effusive cones in the Auckland region, and 18 explosive cones and craters (Searle 1981: 47), with an estimated 8000 ha of red and brown loam soils (Bulmer 1989: 692). The individual lava fields are separated by heavy clays of low to average fertility (Sullivan 1972). The explosion craters and tuff rings lack the characteristic lava sheet and rock-strewn landscape surrounding the volcanic cones, but have fertile, deep volcanic loam soils. Evidence of former gardening is not so apparent at these places, such as Onepoto and Tank Farm on the North Shore, St Heliers, Pukaki Lagoon, Papatoetoe Crater and Ash Hill (Sullivan 1972: 150).

The majority of the field systems around Auckland's volcanic cones have been destroyed by urban development over the last 150 years. Extensive stone row-based garden areas were formerly present at Maungakiekie/One Tree Hill, Maungarei/Mt Wellington and Maungawhau/Mt Eden. Smaller systems were



Figure 18. Distribution of recorded archaeological sites with kumara storage pits, Auckland Conservancy region, Department of Conservation. *Map: C. Edkins, DOC.*

present around other cones (Sullivan 1972). The lava fields surrounding Green Mt-Otara were destroyed in the 1980s. Reasonably intact garden areas survive at Matukutururu/Wiri and the adjacent Matukuturua/McLaughlins, where there are 60 ha of stone features, and at Otuataua, where there are 100 ha of gardens. Small areas exist around some other cones, such as Puketutu, Mangere, Maungarei/Mt Wellington, Maungataketake/Ellett's Mt, Ohuirangi/Pigeon Mt, Crater Hill, and Motukorea/Brown's Island (Clough & Plowman 1996).

Volcanic areas and gardening evidence are also present to the south of the Auckland Isthmus. There is a small concentration of evidence at Ramarama near Bombay, where stone heaps and rows, and stone-faced terraces are present, and although there is no direct horticultural evidence in the form of stone structures present at Bald Hill on the Manukau lowland, the isolated pocket of basaltic tuff sandy loam coincides with a cluster of storage pit sites and pa (Walton 1985b). Isolated instances of the use of stone are to be found as far south as the Waikato River.

Stone heaps are a distinctive feature of the landscape at Orere and Tapapakanga on the Firth of Thames, but these have not been constructed into stone rows, mounds or other evidence. Instead, the evidence seems to suggest the unsystematic clearance of stones from soil on the valley flats rather than an attempt to impose on the landscape a structured garden boundary system based on stone.

Storage pit sites are numerous on Motutapu and Waiheke Islands, but gardening-related site records are few in number (Figs 17 and 18). Modified soils have been identified in a few places on Waiheke, and their presence suggests that there is likely to be more widespread evidence of gardening; however, this has not, so far, been identified. Similarly, on Motutapu Island, disturbance to ash lenses after the Rangitoto eruption has been interpreted as evidence of gardening at the Sunde site (Nichol 1988). Ash-based soils on Motutapu may have been one of the attractions of the island (Davidson 1987).

Areas with sandy loam soils on the west coast at Awhitu, and at South Kaipara and Muriwai have numerous storage pits (Fig. 18), yet little actual evidence of gardens. This demonstrates the difficulty of identifying garden areas from surface evidence alone.

As with the evidence from other regions, there is no tight chronological control over when gardening commenced in the Auckland region. Age estimates of the 12th–13th centuries from the lower slopes of Wiri (Sullivan 1975a) are likely to be too old, on the basis that unidentified charcoal (possibly heartwood from a large tree) was dated. Age estimates for the use of the adjacent Puhinui garden system are 15th century or later, although stream-side occupation may have been earlier (Lawlor 1981c). Other field systems in Auckland volcanic areas are not well dated.

Some gardening sites are on protected land under the administration of DOC, and territorial and regional local authorities. The Auckland Regional Council manages sites at Tapapakanga (stone heaps on riverine terraces) and Ambury Park (mounds, heaps and short sections of stone rows on volcanic soil). Auckland City Council has responsibility for Browns Island (mounds, heaps and stone rows), and Manukau City Council and DOC manage Otuataua (an extensive garden area with rows, heaps, mounds and enclosures; Foster & Veart 1985). A further reserve area is to be set up at Wiri (I. Lawlor, Auckland Regional Council, pers. comm.). DOC administers Motutapu Island.

6.3 WAIKATO

The Waikato Conservancy, DOC, incorporates diverse landscapes, including interior riverine valley systems, weathered dunes on the west coast, and the coastal Coromandel Peninsula area, which is similar to areas in Northland and Auckland. The range of gardening sites is also diverse, with those in the Waikato river valley being predominantly modified soils and borrow pits, and the islands off the Coromandel Peninsula having stonework (stone-faced terraces, heaps and rows), while on the adjacent mainland there are slope trenches, modified soils and taro sites (Fig. 19).

Gardening was an important activity on the islands off the eastern Coromandel coast. Stonework is reported from Korapuki, Red Mercury Island (Whakau), Double Island and the Aldermen Islands. Ohinau is known traditionally and historically to be a place where gardens were planted in early spring, but there are no recorded sites (Furey 2000). On Great Mercury Island (Ahuahu) there is a high proportion of garden sites (20 of a total of 99) with stone rows and mounds, and parallel slope trenches leading into swampy areas. The largest field system is reputed to cover up to 100 ha. The majority of garden areas are concentrated in the northern half of the island, which has a different underlying geology and more fertile soils than the southern half.

On the Coromandel Peninsula, stonework in the form of rows and heaps has been reported from Papa Aroha, Moehau, Port Charles, Tuatēawa, Kennedy Bay, Whangapoua and Wharekaho. Slope trenches at Opito are reminiscent of those on Great Mercury Island (Ahuahu), a short distance offshore. None of the recorded sites on the peninsula are large.

Stonework is present at Te Toto on Mt Karioi (R14/261, 1259), south of Raglan, although the evidence there is a complex mix of constructed features and natural geological formations. The age of these features is also uncertain, with some having been constructed quite recently and for purposes not related to gardening. Stone lines, heaps and a dry-stone wall are, however, likely to be related to Maori gardening on the volcanic soils (Wilkes 1998). Stone rows and heaps are also present at Waikaretu (R13/120), south of Port Waikato, in a similar geological situation.

Within the King Country, numerous storage pits have been recorded (Fig. 20), but few garden soils (Fig. 19). The soils are stone-free, so there is no obvious evidence of gardening. Borrow pits are rare, even though this area is sandwiched between the Waikato and Taranaki, where they are distinctive features of the cultural landscape. The reported borrow pits at Te Maika and in the Marokopa Valley are on the crest of relict sand dunes, as in Aotea to the north. Gardens have been identified by low earthen ridges, and may be more numerous than the recorded distribution (late O. Wilkes, pers. comm.). Little is known of gardening evidence in the inland King Country from Te Awamutu south, although storage pit sites are present and soils are volcanic in origin.

In the Waikato basin, borrow pits are found near the Waikato and Waipa Rivers, and are either dug into the scarps between the river terrace levels or into the ridges on the terraces. The main concentration is between Hamilton and Ngaruawahia. A density of c. 10 borrow pits/ha has been recorded at Horotiu, where pits are up to 30 m in diameter and may be 4–5 m deep (Gumbley & Higham 2000).



Figure 19. Distribution of recorded Maori horticulture-related archaeological sites, Waikato Conservancy region, Department of Conservation. Map: C. Edkins, DOC.

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