alignments rather than in the intervening space. This argument has also been put forward by McFadgen (1980b, 2003) for the Wairarapa sites. This type of gardening regime is unlikely for a number of reasons, which have been discussed in section 5.1 of this report. A common feature of descriptions of Maori gardens by early European visitors was the presence of fencing or windbreaks around the garden areas (Best 1976). It is possible that the deeper topsoil may be the result of organic matter accumulating against the stone row or, in the case of earthen linear features, material possibly accumulating against a fence, or soil being heaped up to give greater stability to the fence. These possible explanations should be testable archaeologically.
The age of the gardens at Panau is unknown. Radiocarbon dates for the Panau village suggest a lengthy period of settlement in the area from the 14th century (Jacomb 2000: 98). The types and styles in the artefact assemblage suggest that the main occupation was in the 17th–18th century. Traditional accounts associate the pa with Ngai Tahu in the early 19th century (Brailsford 1981: 162).

The gardening evidence at Panau is amongst some of the southernmost evidence of Maori gardening in the South Island. Several bays, particularly on the northern and eastern sides of Banks Peninsula, also have recorded gardening-related evidence, and a recently recorded site at Flea Bay to the east of Akaroa has surface evidence of raised lines (although it is not known whether these are stone-based or earthen) and gravel-added soils on steep west-facing slopes. Collectively, these features demonstrate that gardening was able to be carried out on Banks Peninsula. Panau differs from other sites in the vicinity, e.g. Flea Bay and Okuora Farm near Birdlings Flat, in that modified soils are apparently absent. Since the Panau evidence is undated, it might equally well be from the historic period and associated with the pa. If so, then potato may have been grown here.

7.2 CLARENCE RIVER, MARLBOROUGH

7.2.1 Location

Situated on the eastern Marlborough coast to the north of Clarence River. The sites are located mostly on a Holocene coastal platform abutting the lower slopes of an older Pleistocene terrace. Between the coastal platform and the sea are a series of parallel Holocene beach ridges.

7.2.2 Condition

All sites are under a land management system of pastoral farming, predominantly being grazed by sheep. Significant damage to the site has occurred over a number of years. Ploughing, construction of State Highway 1 and the rail trunk line, and bulldozing of farm tracks have separated the main concentration of sites closest to Clarence River.

7.2.3 Description

There is a concentration of gardening evidence on this part of the Marlborough coast. The stone rows on the coastal platform were originally recorded in 1966. Site record P30/5 described stone rows extending intermittently for some 3 miles to the north. Further site recording was carried out by Tony Fomison, who described pa and terraces, followed by Barry Brailsford, and Michael Trotter and Beverley McCulloch. Recent evaluation of all the sites and their locations has reduced Duff’s estimate of distance to 3.5 km (Trotter & McCulloch 1999b).

The garden sites are concentrated between the ridge forming the north side of the Clarence River valley and Camp Stream to the north. Fourteen recorded sites, plus three unrecorded, are known (Fig. 38; Table 2). A relatively narrow coastal platform is present at the base of the hills, with Holocene coastal ridges.
extending to the sea. All but six of the sites are on the coastal platform, extending up onto the lower part of the slope behind. The remaining sites are on the coastal beach ridges or the river terrace close to the Clarence River. The site records are somewhat confusing (Trotter & McCulloch 1999b), and related evidence has, in at least one instance, been split into two site numbers (e.g. the source of the gravel for garden P30/6 is recorded as borrow pit P30/34).

Soils are identified as Omaka gravelly loams in the vicinity of P30/6 and P30/5 on the northern side of the mouth of the Clarence River, merging with Spring Creek heavy silt loam on the coastal platform further to the north. Shingle fans spill out of the hills and onto the coastal platform. The rows rarely extend onto the fans.
### Table 2. Recorded Maori Garden-related Sites on the North Side of the Clarence River Mouth.

<table>
<thead>
<tr>
<th>Site No.</th>
<th>Site Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>P30/5</td>
<td>Stone rows</td>
<td>Parallel stone rows on east-facing slope over a distance of 750m, extending from slopes to beach ridges. Some short cross-rows between the east-west oriented long rows form enclosures. Rectangular pit-like depressions, shallow terraces, low stone mounds or heaps and, reportedly, shell midden are present at the northern end of the site where Trotter and McCulloch carried out investigations. The northern boundary of the site is defined by a stream, which intersects the coastal platform. A map made by Trotter &amp; McCulloch (1979) shows the arrangement of stone rows. A very abrupt southern boundary to the rows suggests that the area at the base of the hill, between the end of the ridge and the state highway, may have been ploughed out some years ago—possibly when road or railway tracks were put through. The stone rows on the slopes are in good condition. Since the 1977 map was made, a fence has been erected along the 20-m contour (approx.), where the hill slope changes from steep to gentle. A farm track has been formed on the western side of this fence. There are now no stone or earthen rows present to the east of the fence, having apparently been ploughed out. This is seen clearly in Figs 39 and 40. The southern group of rows were c. 5–7m apart. Two distinct cross-rows were observed—one had a shallow trench adjacent to the row on two sides.</td>
</tr>
<tr>
<td>P30/6, P30/34</td>
<td>Gravel-added soil; borrow pit</td>
<td>No surface features. Adjacent borrow pit P30/34 is unchanged from previous site description. Recently ploughed. Borrow pit P30/34 is unchanged from previous site description.</td>
</tr>
<tr>
<td>P30/2</td>
<td>Pits, ?pa</td>
<td>Storage pits on river terrace. Southern end, near farmhouse, has had track cut through it to access lower area of beach ridges. Exposed profile shows gravel-added soil over loess, as described by McFadgen (1980a).</td>
</tr>
<tr>
<td>P30/9</td>
<td>Pits/terraces</td>
<td>Closely spaced and regularly arranged storage pits on coastal platform. Terraces also present. One pit investigated by Trotter &amp; McCulloch (1979). The site is illustrated in Brailsford (1981: 99, 101). A farm track, cut through the site since the late 1970s, has possibly damaged features at the rear of the platform.</td>
</tr>
</tbody>
</table>

#### 7.2.4 Archaeological investigation

Only two sites have received more than cursory archaeological attention. Excavations were carried out at P30/5, the largest of the stone row systems, in 1977 (Trotter & McCulloch 1979). Sections were cut through three rows, but the location of only one investigated row is known (site record P30/9). The site, which was mapped from aerial photographs, extended down the slope from about the 40-m contour line to the beach ridges—a distance of c. 270m (Figs 39 and 40). The site area was originally c. 10ha, but by 1977 some of the features on land of lesser slope had been ploughed out. The rows were briefly described as being composed variously of large or small stones, or earth, depending on what was available nearby. On the lower, stone-free parts of the slope, earth or sand was formed up into linear ridges of similar appearance to the stone rows. No radiocarbon dates were obtained from the stone row excavations, but shell from the northern end of the site gave dates of 511 ± 30BP (NZ4500) and 586 ± 28BP (NZ4501). While acknowledging that there was no evidence for association between the gardens and the shell midden, Trotter & McCulloch (1979: 14) nonetheless considered that they were contemporary.
The same site was investigated twice by McFadgen (1980a; site record P30/5). A stone row (identified on Fig. 39) was sectioned. Above a dark brown natural layer, described variously as both silty sand and sandy loam, there was a modified soil containing sand and gravel (Layer 2; L2). In the published profile, the modified soil is described as 24 cm deep, but is also referred to as being 30-50 cm thick (McFadgen 1980a: 9, 18). McFadgen (1980a) considered that the area of modified soil exceeded 40 m², but did not discuss the source of the gravel. There was a distinct horizon between the modified soil containing sand and gravel and the natural sandy loam. The stone row was placed on top of the L2 modified soil and a brown sand, 40 cm deep, was built up around the row. No gravel was present in this layer. There was a concentration of charcoal on the surface of L2 (the modified soil) under the stone row, but very little was found within the layer. A radiocarbon date of 382 ± 59 BP (NZ3113) was obtained from charcoal under the row, giving a maximum age for row construction overlying the earlier modified soil. Subsequently, another excavation was conducted at P30/5 by McFadgen and Peter Addis (T. Walton, DOC, pers. comm.). There is no information available on this later work.

If the interpretation of formation of a modified soil followed by row construction and the build-up of another soil is correct, there must have been two phases of gardening at this site. From the described section, the initial activity involved adding gravel to the original soil on the slope, followed by a second period of gardening, where stones were formed into parallel rows and a second garden layer without gravels then built up. Presumably, the stones in the row were derived from the adjacent soil, but the underlying natural Layer 1 (L1) was a sandy loam with no stones, and Layer 2 (L2), the modified soil, consisted of gravelly loamy sand. However, the 1.8-m section through the row could hardly be called representative of the garden area as a whole. The boundaries between L1 (natural) and L2 (modified soil), and L2 and L3 (sand) were distinct, whereas the boundary between L3 and the topsoil was indistinct, suggesting that it was built up in situ. It was estimated that the L2 modified soil contained 15%-20% gravel additive, in which case the natural soil must have been mixed up with the gravels and sand. This would be unlikely to produce a distinct horizon. Another possibility, which was not considered by McFadgen (1980a), is that the L2 material had slipped downslope after vegetation removal or an event causing some instability, as the rounded gravels do occur naturally in the soil. In addition, the described soil profile has gravels reaching a maximum size of 3 cm, yet the illustrated profile shows large stones, of similar size or larger than those incorporated into the stone row. If McFadgen’s modified soil is one gardening episode, followed by another with a different technique, this would be unique amongst investigated gardening sites. However, the question of whether Layer 2 is in fact a modified soil needs further investigation.
Figure 39. Plan of P30/5, Clarence River, showing parallel stone rows on the slope inland of the earliest beach ridge and the location of small excavations carried out by Trotter and McFadgen. The area of stone rows on the flat adjacent to the beach ridge has now been ploughed out (see Fig. 40 for comparison). Based on plan in Trotter & McCulloch 1979.
A second site (P30/6) investigated is situated on the river terrace abutting the Holocene beach ridges, and some 600 m south-east of P30/5 (McFadgen 1980a). Below the 4-m-high scarp between the river terrace and the westernmost beach ridge is an irregularly shaped borrow pit, 280 m long, 40 m wide and up to 3 m deep. Large stones are scattered around the edge of the pit. The river terrace has a silty loess, over which there is a slightly stony and gravelly coarse sandy loam to a depth of 260 mm. Like the previous site (P30/5), there was a distinct boundary between the modified soil and the underlying natural soil. The modified soil originally covered c. 4.5 ha. Gravel was carried no further than 160 m from the borrow pit (McFadgen 1980a: 11–12). An age estimate of 355 ± 41 BP (NZ3397) was obtained from a buried soil at the base of the borrow pit, giving a minimum age for the use of the pit.

Other borrow pits are known from the vicinity. With the exception of P30/5 and P30/6, the remaining sites are small and consist of a few short parallel rows.
7.3 **OKOROPUNGA, WAIRARAPA**

Several sites on the southern Wairarapa coast were either inspected by walking over, or noted while driving past. Gardens are concentrated on the narrow coastal platform backed by steep hills. The gardens are found on uplifted beach ridges or on old shingle fans spreading out from drainage systems. These sandy loam soils were stony yet free-draining.

A number of stone row sites on the Wairarapa coast are recorded, and several in Palliser Bay have been mapped and investigated. Less well known are the rows between Cape Palliser and Pahaoa. These include those at Tora, investigated by Mitcalfe (McFadgen 2003), Okoropunga (McFadgen 1980b), and the Pukaroro Maori Reserve. Further north are the garden sites at Waieckino and Flat Point. The sites are usually present at the rear of the coastal platforms and near streams, probably to take advantage of mature soils on the older ridges and on shingle fans.

### 7.3.1 Location

Okoropunga is on the south Wairarapa coast to the north of Te Awaiti, between the Oterei and Pahaoa Rivers. The rows are on the narrow coastal platform, and continue up the lower slopes of the steep hills behind (Fig. 41).

![Figure 41. View to the south along the coastal platform at Okoropunga, Wairarapa coast. The stone rows (T28/47) are at the far end of the platform. Photo: L. Furey.](image-url)
7.3.2 Condition

The surface features are in good condition, although they are not as distinctive or pronounced as they appear in the photograph in McFadgen (1980b). A deer enclosure, subdivided into a number of paddocks, is situated over the entire site. Although there is no evidence of pugging in gateways or around water troughs, or on tracks along fence lines, the high density of stock numbers may be having a detrimental impact on the site features and intervening ground.

7.3.3 Description

A large complex of rows, borrow pits and gravel-added soils are present on and across uplifted beach ridges on the coastal platform. The rows run across the beach ridges, but there are also rows at right angles (Figs 42 and 43). The site, known as T28/47, appears to be in two groups. The northernmost is situated on beach ridges C and D, while the southern group is on beach ridges E and F and continues to the foot of the hillslope, with some rows extending some distance up the slope. Each group is c. 4 ha in size, giving a total site size of 8 ha. The southern group is described as having parallel stone ridges 2-3 m wide and 0.2-1 m high (McFadgen 1980a: 7).

The uplifted beach ridges are composed of sand, gravel and boulders, which were deposited during storm events and then uplifted during earthquakes. After uplift, each ridge was covered with sand blowing inland; therefore, the soils formed on older ridges further inland have progressively less gravel and boulders and more sand. Present-day topsoil is a gravelly sandy loam. Gravel-added soils identified by McFadgen (1980a) cover 0.7 ha, and are adjacent to beach ridges E and F, and to borrow pits on the seaward edge of ridge E (Fig. 43).

7.3.4 Archaeological Investigation

Okoropunga has been mapped by McFadgen (1980b), and a small excavation has been conducted across a stone row on beach ridge E towards the southern end of the site. The stones in the row were most likely derived from the borrow pit on the seaward side of beach ridge E (McFadgen 1980b: 192). The soil around, within and under the row was sandy, and it was inferred that the sandy topsoil was deliberately placed in the row, as any wind-blown material would be expected to be of smaller particle size. Charcoal from around the stones, and also from the soil under the stones, was radiocarbon dated. Results are shown in Appendix 2. These indicate that the gardens were in use in the mid- to late 15th century. Geomorphological evidence suggests that beach ridge C was uplifted in the late 15th century (McFadgen 2003: 35).

Soils between the rows were also investigated. McFadgen (1980b) concluded that the soils between the rows were not gardened. This interpretation was based on the absence of additional gravel in the topsoil between the rows and the fact that the soil was no thicker than a relatively recently formed topsoil on younger beach ridges, which had not been gardened, and that the ground surface was smooth. It was also based on the assumption that all garden soils were modified by additional gravel (McFadgen’s plaggen soil). However, as experience elsewhere has demonstrated, this is not a valid assumption. There is considerable variability in the extent of modified soils within and between sites. It follows that if no additional gravel was added, then the soil would not

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