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FORESTRY SITE PREPARATION AND ARCHAEOLOGICAL EVIDENCE

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In 1991 archaeologists resumed work on Matakana Island in the western Bay of Plenty after a ten year hiatus following the initial survey by Bruce McFadgen and Tony Walton (1981). A brief visit showed that a very considerable amount of damage had been done to archaeological evidence of the sandy part of the island (Figure 1) by the form of site preparation used by foresters after clear-felling and prior to replanting (Sutton and McCracken 1991). The scale of this surface disturbance is clear from the contemporaneous aerial photographs. It was caused in large part by a tractor-driven v-blader; simply a broad pointed blade which heaped waste timber, humus and detritus into long heaped rows, some 4-5 metres apart. These were typically aligned at right-angles to the arterial road, named Hume Highway, which runs along the centre of the island (Figure 1).

The rationale for the use of the v-blader (Bragg, pers. comm., 1991-2) was purely economic. It concentrated humus and tree debris, known as 'slash', which aided tree growth and provided access between trees rows for purposes of weed control, thinning and production. It was also held to be the cheapest method of site preparation per unit area available. However, it was very damaging to archaeological evidence on Matakana where shell middens and associated evidence occurs on dunes paralleling the ocean and harbourside shorelines (Felgate *et al.*, 1992; Marshall *et al.*, 1993; Sutton 1993a,b).

V-blading is still widely used in forestry operations (Stuart, I., pers. comm., 1993). However, its use has ceased on Matakana. Site preparation underway there in 1993 used an alternative method which was at once much less damaging to the archaeological evidence and cheaper to the forestry operators. This brief paper describes this clearly preferable method and recommends that archaeologists and those interested in other conservation and historical values, could usefully recommend its use.

The alternative windrowing method involves the use of a Hitachi EX 200-2, 99kw (135 H.P.), or an equivalent machine. The Hitachi has an operating weight of 18,500 Kg, a track width of 600 mm, and a ground pressure of 41.2 Kpa. The excavator arm reach is rated at 9.75 m.

With the introduction of genetically improved tree stocks and reductions in initial stockings to around 600 stems/ha emphasis in commercial forestry operation is increasingly being placed on keeping soil disturbance to a minimum

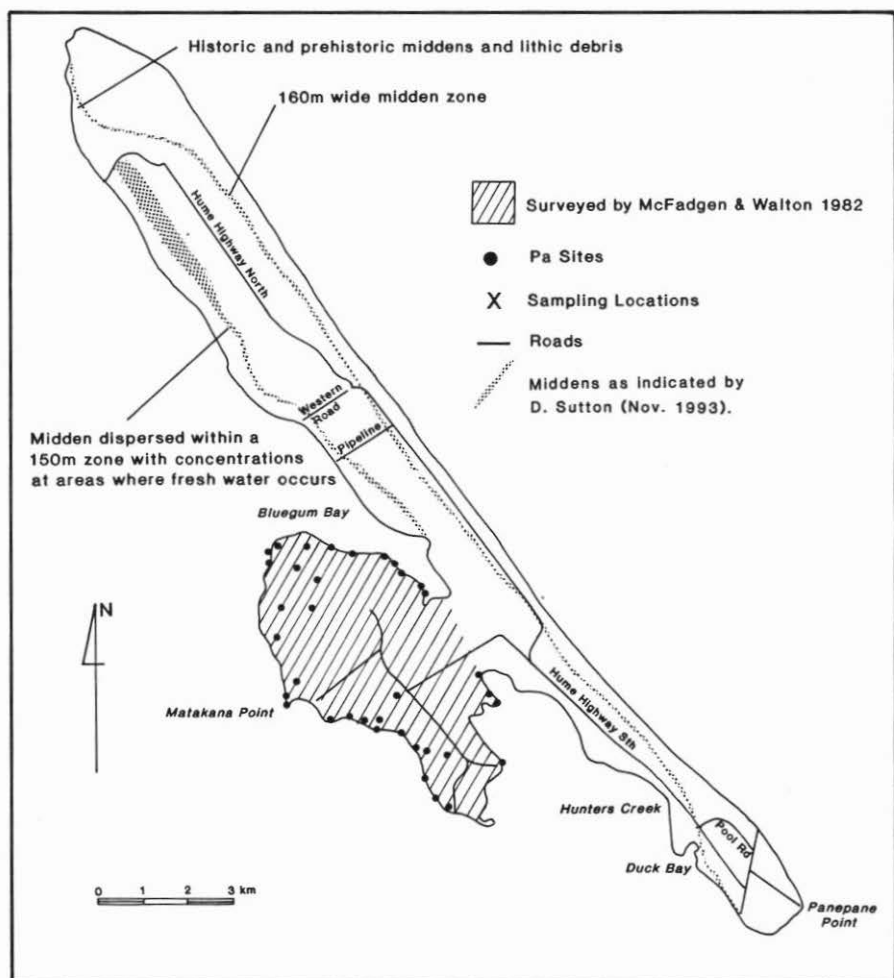


Figure 1. Matakana Island.

and ensuring that restocking operations are carefully controlled to produce high survivals after planting and sustained growth throughout the plantation cycle.

When blocks were v-bladed this pushed topsoil and duff into windrows and the movement of the bulldozer, back and forth, compacted the ground. As a result these blocks became heavily infested with gorse and other weeds and tree growth was unsatisfactory. To reduce these problems and cut costs of site preparation an Hitachi excavator was modified for windrowing by replacing the bucket with a two meter section of a bulldozer root rake. The equipment was

trialled near Geraldine, in south Canterbury (Anon 1991), and proved able to handle slopes up to 30 degrees, and steeper under good conditions, by using the rake boom to assist manoeuvres when necessary.

The excavator travels up and down the slope sweeping slash into windrows to either side. The width of the windrowed area is approximately 14 metres and provides space for the planting of three rows of seedlings 6 metres apart. Windrows are very neat as the boom extended the same distance either side of the machine which maintained a straight course, up/down slope. During the Geraldine trial on steep areas where the ground was wet and traction poor the Hitachi had difficulty climbing and the operator took the machine up hill on an adjacent logging tack and only cleared on downhill passes (Anon 1991).

At trial, the average cost of windrowing rolling to steep land, was given as approximately \$260/ha. Approximately three hectares were cleared in a normal nine hour working day. As the excavator arm, with root rake attachment, lifts rather than pushes slash into windrows top-soil and duff are left relatively undisturbed. Further, because the excavator arm does most of the moving, the machine travelling centrally down cleared lanes, ground compaction is restricted to a relatively small area (Anon 1991).

CONCLUSION

In the words of the foresters who reported the Geraldine trial,

'When comparing the quality of site preparation (slash clearing/line raking) with other bulldozer windrowing or v-blading operations, which push large quantities of top soil into windrows of mounds, the excavator appears vastly superior.' (Anon 1991:4).

The method causes little site disturbance and leaves most duff and top soil in-situ. In many areas under exotic forest, or intended for this purpose, retention of duff is essential for soil moisture conservation during dry spells. The archaeological benefits of this method are obvious and its use should be advocated wherever appropriate.

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