3 Sequence of barrier formation

Immediately prior to formation of Matakana Barrier, the Pleistocene cores of Matakana and Rangiwaea Islands lay offshore in a large bay with the volcanic outcrops at Bowentown and Mt Maunganui forming islands to the northwest and southeast respectively (Fig. 28a). Ocean waves eroded the northeast-facing coasts of Matakana and Rangiwaea Islands to form wave-cut cliffs, and to the northwest shelf sediment was being transported shoreward to eventually form a washover ridge (Fig. 28a).

The Holocene barrier began forming in at least three parts: a northwestern; a central; and a southeastern part. The three parts were separated by entrances at Blue Gum Bay and between Matakana and Rangiwaea Islands (Fig. 28b). The northwestern part consisted initially of the washover ridge. The heavy mineral content and size of the marine sediment beneath the innermost foredune ridge of the northwestern part indicates a high degree of reworking consistent with a washover origin. This ridge stabilised after about 6000 cal BP (NZA3878, Table 1), more than 1000 years after the end of the Postglacial Marine Transgression which ended about 7000 cal BP.

The central part of the barrier began forming against the low wave-cut cliff eroded into the Pleistocene deposits of Matakana Core, and the southeastern part against the wave-cut cliff cut into the Pleistocene deposits of the Rangiwaea Core. Spit extension enabled the northwestern part to grow southeastwards at the same time as it prograded seawards, deflecting the Blue Gum Bay entrance to the southeast (Fig. 28c). The Katikati entrance was more stable, enabling a recurved spit to develop into a large ridge by aeolian accretion (Fig. 17). There is clear evidence for at least one erosional episode (S1, Fig. 17) which truncated relict foredunes at the Northwestern End (Fig. 28c).

The Blue Gum Bay entrance was eventually closed off by, and the northwestern and central parts joined by, the prominent Long Ridge. The formation of Long Ridge is dated by radiocarbon samples of shells from harbourward and seaward of the ridge.

Samples from the harbour side of Long Ridge provide a maximum age for its formation and include NZ8236, NZ8235 (Table 1) and WK3207 (Munro 1994)(Fig. 16). The youngest maximum age (NZ8235) is from the recurved ridges and provides a maximum age for beginning of formation of 5435-5050 cal BP. The sample site, however, is separated from Long Ridge by more than six relict foredune ridges over a distance of c. 400 m and Long Ridge will therefore be considerably younger than the sample. Stent tephra is provisionally identified on the harbour side of Long Ridge at Hunter's Creek and in the Mill section, and provides a maximum possible age of 4520-4300 cal BP.

Samples from the seaward side of Long Ridge will provide maximum ages for the formation of the ridge provided they are from the beach deposits immediately seawards of the ridge. Only one sample, WK3208 (Munro 1994), meets this condition and it provides a maximum age of 4870-4605 cal BP. The sea-rafted Waimihia Pumice, located at a site (NZMS 260 U14 845960) which is *c.* 50 m seawards of Long Ridge, provides a minimum age for the ridge only if the pumice is a primary sea-rafted deposit. If this is the case, then Long Ridge would have stopped accreting by about 3500 cal BP. Considering the above ages we provisionally adopt an age for Long Ridge of 4000-3500 cal BP.

As with the Blue Gum Bay entrance, the entrance between Matakana and Rangiwaea islands was deflected to the southeast. It has, however, maintained a channel, Hunter's Creek, which separates the two islands and now connects with the harbour near the Tauranga Entrance. Hunter's Creek has eroded into the back of Matakana Barrier, removing the older foredune ridges.

The barrier appears to have grown more slowly after the Blue Gum Bay entrance was closed, suggested by the somewhat higher relict foredune ridges from Long Ridge seawards compared with those harbourwards from Long Ridge. There is clear evidence for at least one further erosional episode at the Northwestern End (S2, Fig. 17) which truncated relict foredunes shortly after the Taupo Pumice eruption 1750 cal BP (Fig. 28d). At the Southeastern End, a major period of erosion, which ended shortly after the Kaharoa Eruption 600 cal BP, resulted in the formation of the Purakau Shoreline which obliquely truncates relict foredunes (Fig. 28e).

Following truncation, the southeastern end of the barrier grew quickly as a series of low, ill-defined broad ridges and swales (Fig. 20) partially covered with hummocky dunes. In historical time a sequence of better-defined low relict foredunes has developed at Panepane Point.

Following its truncation, the northwestern end of the barrier has grown less than the southeastern end. The growth has formed a series of diverging and converging ridges enclosing lakes and swamps (Fig. 28f). The growth appears to have greatly accelerated during historical time (Fig. 19a).

Transgressive dunes formed throughout the history of the barrier and range from relatively minor blowouts of the relict foredunes to large parabolic dunes which extend across several relict foredunes. Whilst the larger parabolic dunes were initiated in discrete areas and migrated seaward in the direction of the prevailing winds, the more recent parabolic dunes form a continuous strip adjacent to the present ocean foredune and have blown inland from the coast.

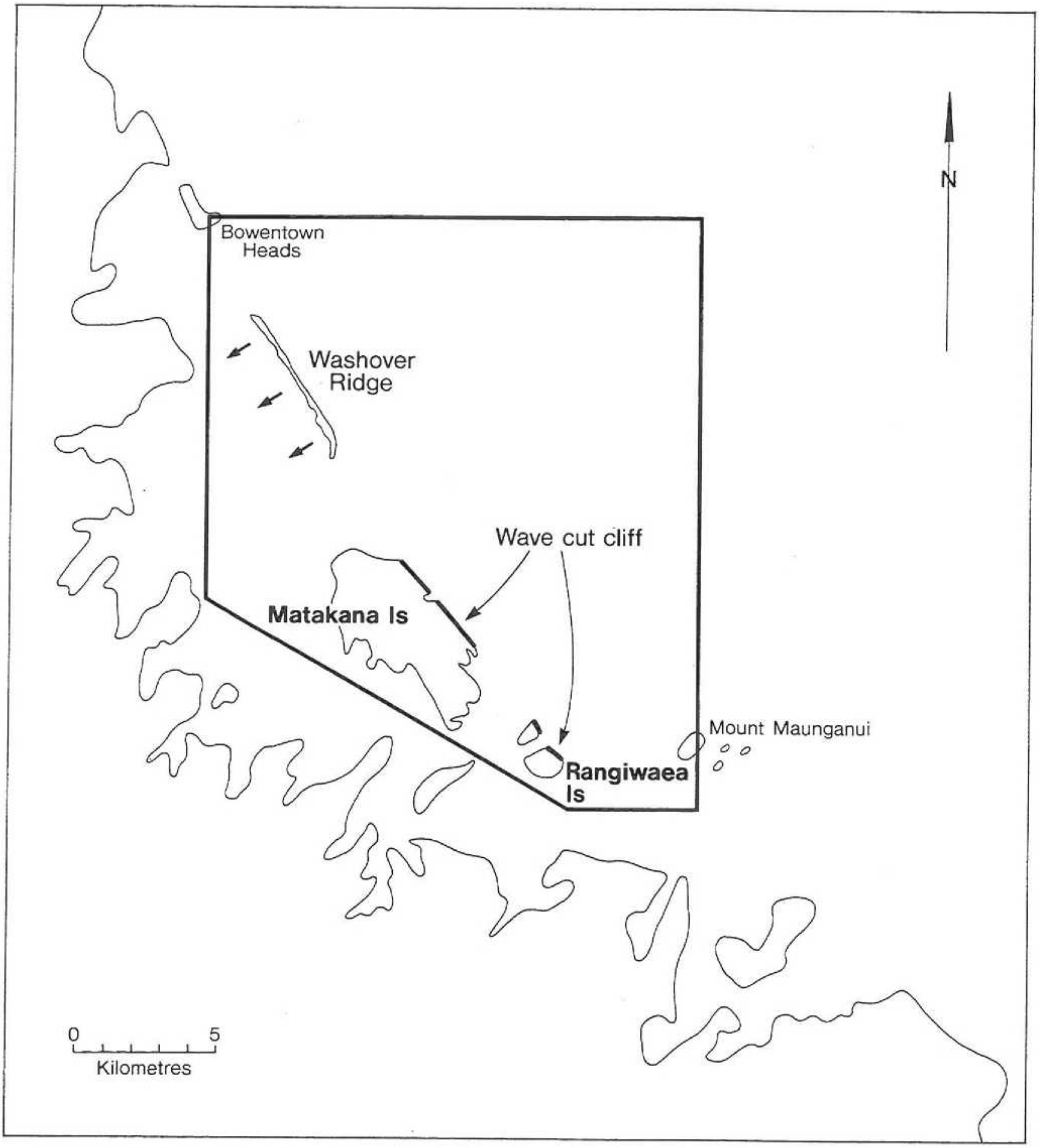

FIGURE 28. FIVE STAGES IN THE HOLOCENE DEVELOPMENT OF MATAKANA BARRIER (FIGS. a-e). INFILLING OF ESTUARINE EMBAYMENTS ADJACENT TO THE HOLOCENE BARRIER (FIGS. c-e) HAS BEEN ESTIMATED. INFILLING OF HOLOCENE EMBAYMENTS OF MATAKANA CORE NOT SHOWN.

a) c. 6500 CAL BP. COASTLINES ADAPTED FROM DAHM (1983) POSSIBLE WASHOVER RIDGE SHOWN MIGRATING LANDWARDS TOWARDS ITS FINAL POSITION AS SHOWN IN FIG. b. NOTE THE SMALLER SCALE COMPARED TO FIGS. b-f.

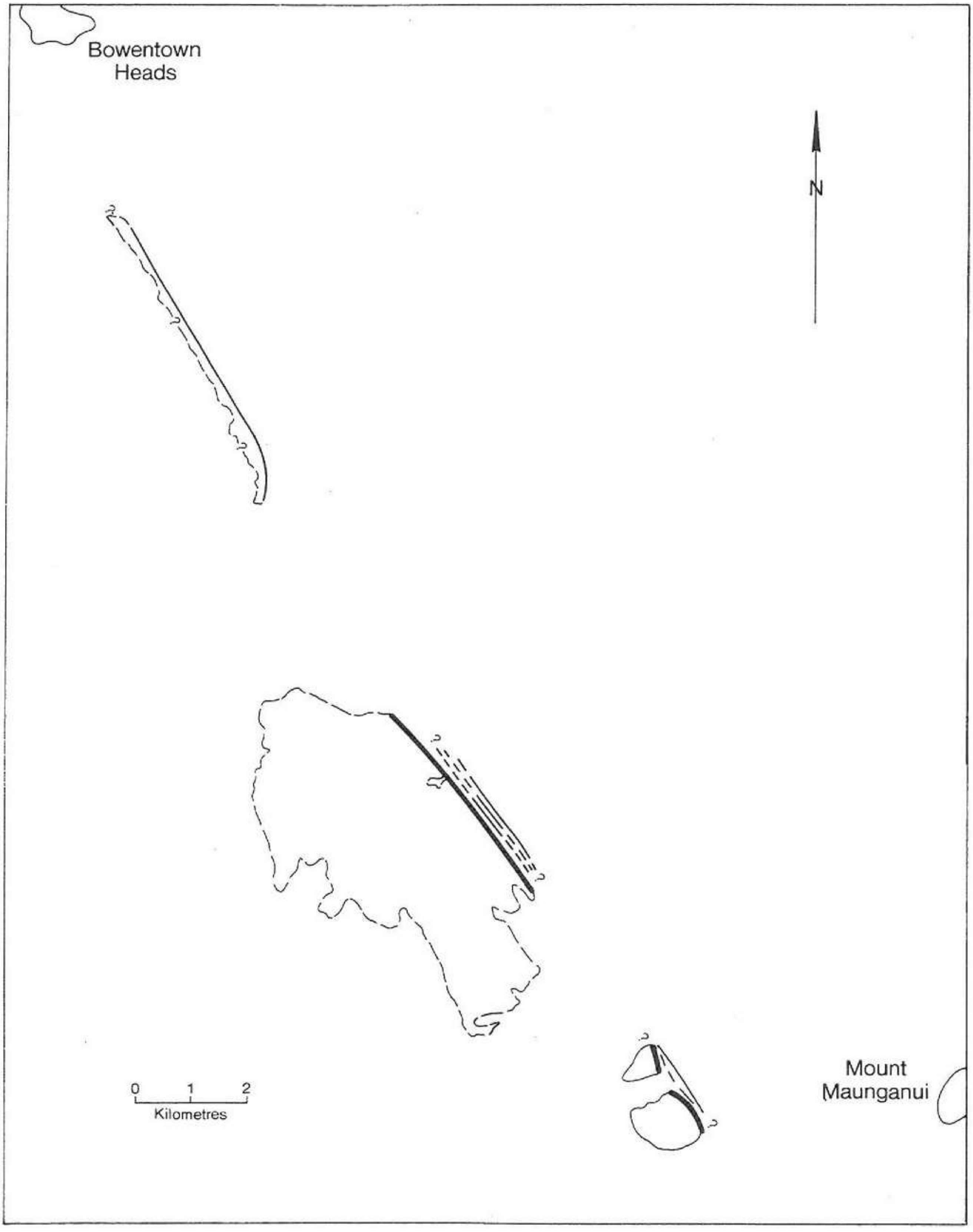

FIGURE 28b. *c*. 6000 GAL BP.

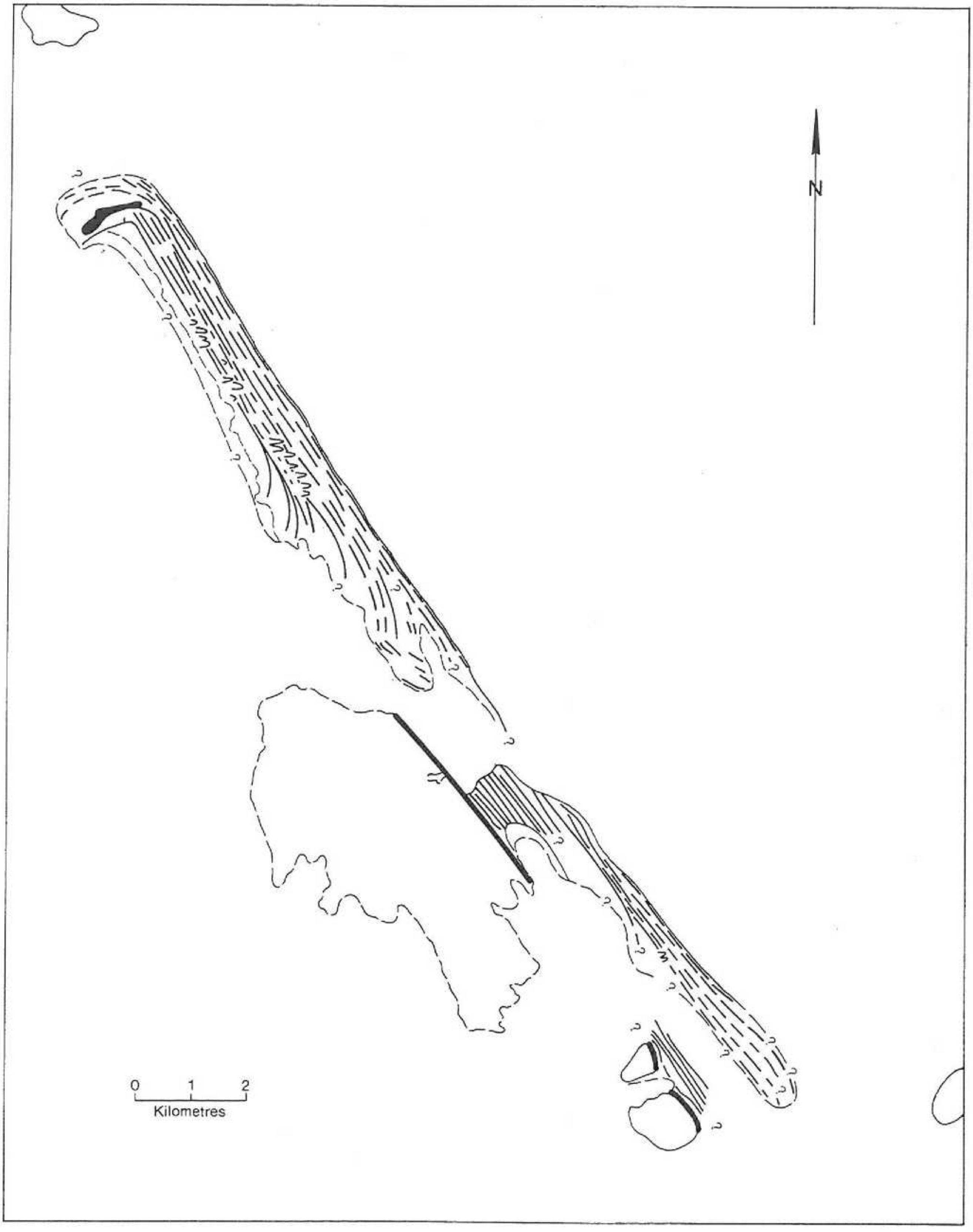

FIGURE 28c. *c*. 4000 CAL BP.

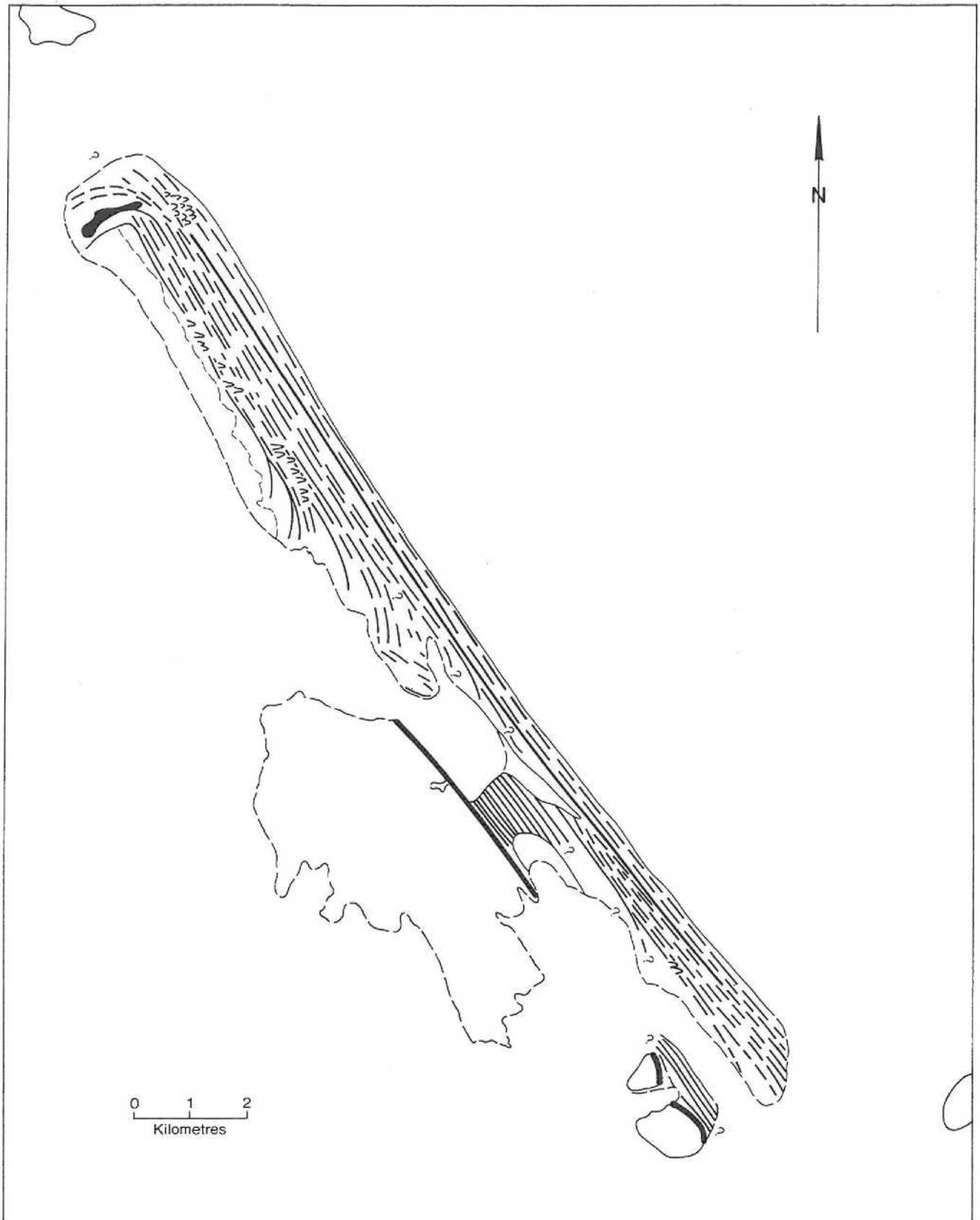

FIGURE 28d. *c*. 1750 CAL BP.

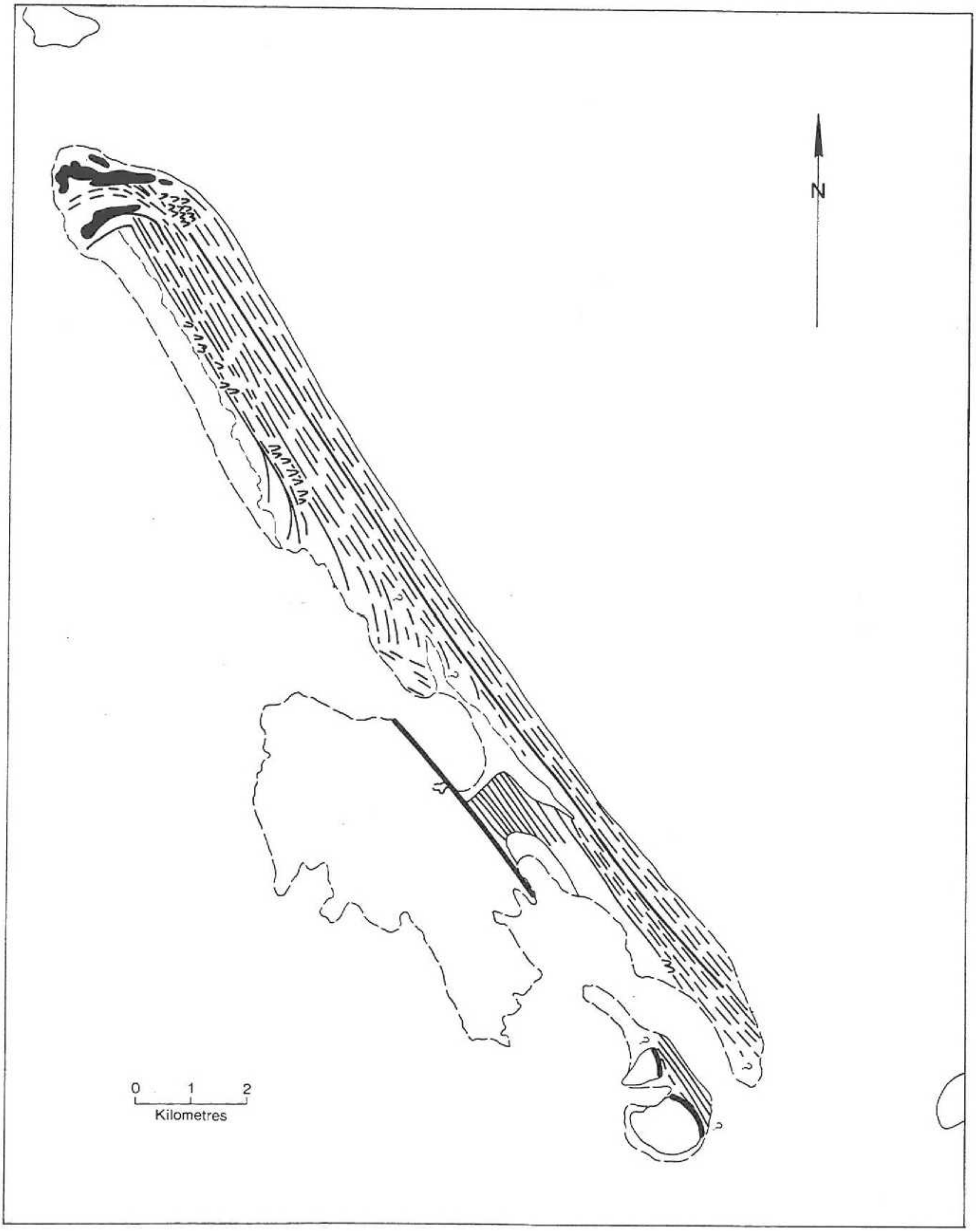

FIGURE 28e. c. 600 CAL. BP.

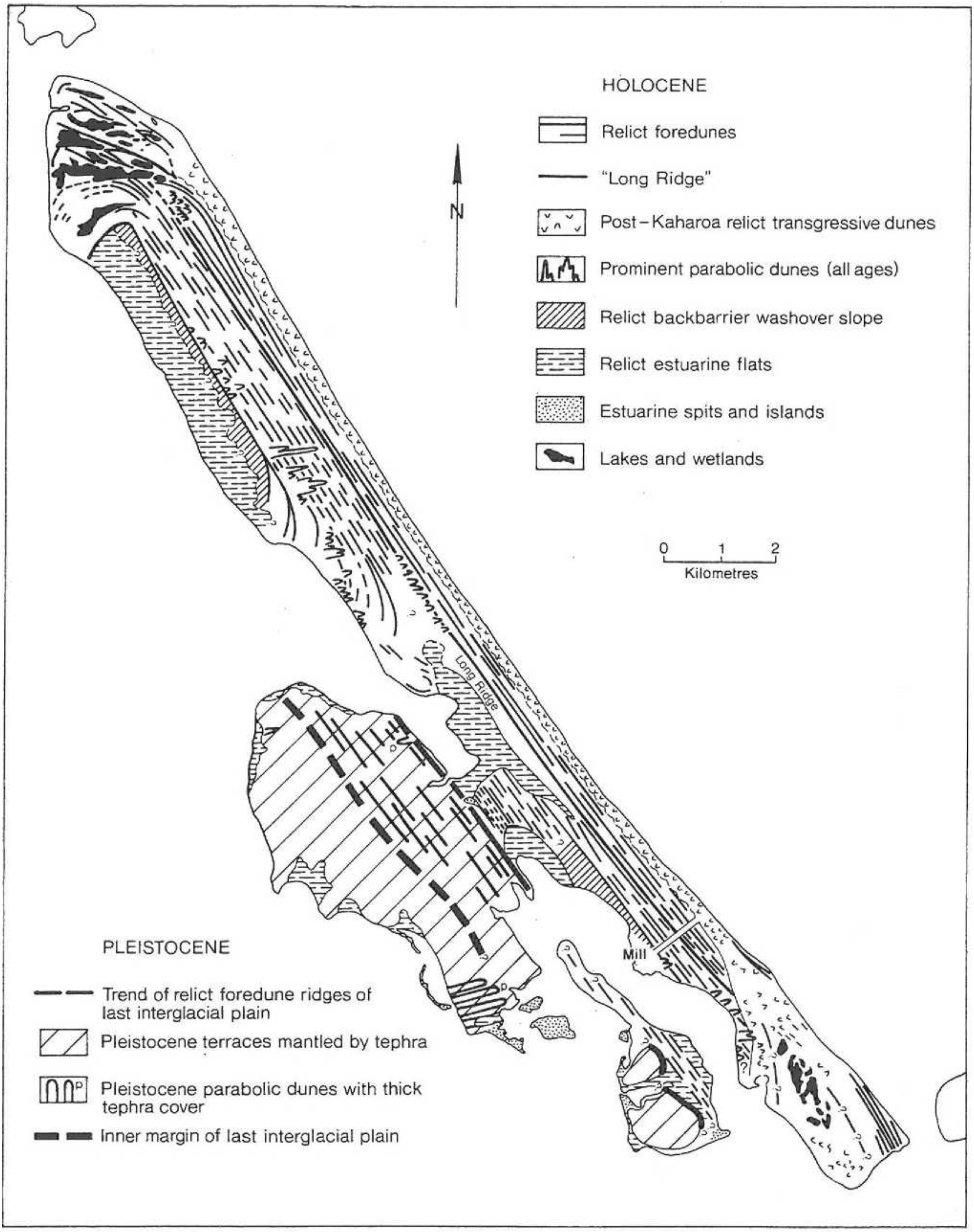

FIGURE 28f. PRESENT DAY.