

Pingao on Otago Peninsula:

Botanical Report

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Landcare Research Contract Report: LC 9293/29

PREPARED FOR:
Department of Conservation
PO Box 5244
Dunedin

January 1993

ISSN 1171-9834

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Reference to material in this report should be cited thus:

Johnson, P.N., 1993.
Pingao on Otago Peninsula : Botanical report.
Conservation Advisory Science Notes No. 9, Department of Conservation,
Wellington. 12p.

Location: NZMS

INTRODUCTION

Pingao is more than a sedge that decorates sand dunes with its colour. Once it did so in great sweeps of orange, today mostly in little patches. Its genus, *Desmoschoenus*, is endemic - found only in New Zealand - and it is monotypic, that is to say there is just the one species, *D. spiralis*. Nor is its colour fleeting, like that of flowers, so it was used, and is again being used by Maori for its permanent contribution of colour and toughness to woven creations. Pingao is a taonga.

This report is a contribution to efforts being made to conserve and replant pingao on the sand country of Otago, especially on Otago Peninsula. I summarise what is known of the present distribution of pingao on the peninsula. Two populations are described in more detail, to help in understanding how the plant is behaving here naturally. The locations of trial plantings at Sandfly Bay are outlined, and comments are made on specific questions sought by Brian Patrick, Conservancy Advisory Scientist, DOC, Dunedin.

PINGAO DISTRIBUTION ON OTAGO PENINSULA

This is a summary from my own observations over the last 20 years, and from the records of others, mostly more recent. Sites are listed north to south.

Te Rauone Beach

Graham Loh of DOC has reported one bit, above the beach, near McGrouther's farm.

Pipikatetu Beach

One vigorous young plant seen in 1991 in bare foredune sand among marram about a third of the way along from the north end. Presumably self-sown, this illustrates that sufficient seed is still available locally, to arrive presumably on the waves, and recolonise a beach where earlier surveys had not revealed any pingao.

Ryans Beach

A few pingao plants on most seaward dune (Geoff Aimers, DOC).

Victory Beach

Fig 1 contains information provided by Dean Nelson, DOC, in October 1991, arising from a Conservation Corps Survey. At least 97 plants were recorded; these numbers are an indication of abundance, it being noted that there was difficulty in picking individual plants. About half the plants had seed heads; about a quarter were c. 1m in diameter, i.e. relatively young.

"Wharekakahu Beach"

This beach, facing Wharekakahu Island, is unnamed on the maps. Although a tiny beach, with no dunes to speak of, it has wind-blown sand on the hill face behind, with pingao patches that are relatively large by peninsula standards. Fig 2 shows their location, from observations made on 27.12.1992. The sketch map is based on air photos, Survey 223, run 512/ 50-51, dated 15.10.42. These early photos, at a time when much Otago Peninsula sand country was less vegetated than it is now, clearly show the extent of sand that had been veneered across the lower hillsides at some earlier time.

There are roughly 8 discernible patches of pingao, from 6 to 30 m across. On average pingao covers 46% of the patches, with marram 15%, silver tussock 12%, sweet vernal 7%, white clover 4%, bare sand 4%, Yorkshire fog, cocksfoot, soft brome, barley grass, catsear, and thistles (Scotch, Californian, winged).

Pingao here illustrates its persistence, in a situation where sand movement and accumulation is insufficient to allow the marram to take over. The pingao is persisting also in the face of all the pasture grasses and weeds, though it is suffering some trampling and grazing damage (both cattle and sheep are present). But for how many more decades will it persist? The pingao is stunted, perhaps 30 cm tall which is about half the height it would achieve on a fresher sand surface, and no young plants were noted. Much of the pingao here was flowering, and this may be the most abundant source of seed locally.

Cicely Beach

This site (Fig 2) was also largely bare sand on the 1942 air photos, except for some vegetated dune hummocks. Today the sand that is piled over the lower hillslopes behind the beach is relatively stable and with a fairly even surface. The paucity of plant cover indicates a lack of fertility, in contrast to the situation on freshly deposited dunes. Thus 40% of the sand surface is bare, and the 25% marram cover is of wispy plants, evenly scattered throughout. The other main plants are typical of stable sand surfaces: knobby clubrush 10% cover, silver tussock 5%, sweet vernal 5%, catsear 5%, suckling clover 5%, sheep's sorrel, and mouse-eared chickweed.

Pingao clumps, mostly c. 2m across, are very scattered; I counted 9 clumps in each of the two main sand basins.

Waikarara

This is the small beach south-west of Hoopers Inlet mouth, at the foot of the hill slope of Sandymount Wildlife Refuge. The name Waikarara does not appear on modern maps, but is on the 1:25,000 map, S.164/5. Details of the pingao population as at 10.1 1.1992 are shown in Fig 3 and Table 1.

Pingao here has undergone a recent phase of vigorous colonisation. I counted 33 plants, the largest just 2m across. The measurements and distribution of each were noted to act as a baseline against which to assess growth rate, further recruitment, and fate of these plants in future. The site is not a stable one. A period of high seas and an erosion phase at this end of the beach could easily remove most of the pingao, and the marram too which is also at a colonising stage. This is not a site where one would choose to invest pingao planting effort. But it does emphasise that the ideal site for pingao establishment is on freshly deposited sand.

Sandfly Bay

Pingao distribution at the Sandymount end of the bay, as noted in Geoff Aimer's Draft Pingao Recovery Plan (DOC, 1992), is:

- Six scattered plants on edge of steep cliff in Sandfly Bay (DOC land).
- Two small patches on bulldozed road on west side of Sandymount.
- Six healthy plants on rough pasture on east side of Sandymount.
- Ten plus plants on rough pasture near Harakeke Point.

To this I can add a clump on dune east of creek at west end (1975 notes).

Smaills Beach

One plant was present in 1981 draped down a steep sand face. Small plants were then present also on the roadside by the concrete pill boxes on the headland above, but these were lost when the site was tidied up as a lookout spot.

Lawyers Head

A few plants occurred until 10 years ago on the clifftop facing the east end of St Kilda Beach. Three patches and one seedling, of total area c. 25 sq m, still grow on the distal end of the headland facing south-east, on a sloping veneer of sand, above the cliff, and just below the lower level of marram and hebe.

SANDFLY BAY PINGAO PLANTINGS

Pingao plants raised in root trainers were planted out, with due ceremony, on 10.11.92, by a party of southern iwi, DOC, and Conservation Corps people. Locations and plant numbers at the 5 specific sites are shown in Fig 4. The planting was supervised by Geoff Aimers, DOC, and sites chosen where there was fresh sand, though not in apparently overwhelming amounts, an absence of marram grass, and on a range of site types.

COMMENTS ON DOC QUESTIONS

1. Dune sites under DOC control in Otago Conservancy have been ranked for management for cultural harvest in Aimers, 1992, Pingao Recovery Plan (p. 10). I agree with the priorities listed there. For Otago Peninsula, Sandfly Bay offers the most potential, having a large area, much of it bare of marram, plenty moving sand, and a range of dune conditions. I have a few doubts as to how good the large hillside sand blow areas will be as pingao habitat, with the thought that much of this old quartz sand, blown both up and down slope for many years, might not be particularly fertile, compared with fresh sand coming ashore to form foredunes. But the initial plantings will help determine this. There is much to be learned on the ground, and these plantings should be seen as a valuable trial, however they succeed.
2. When should seed be collected? The Nga Puna Waihanga booklet on pingao (1991) makes the comment (p. 22) that in the Auckland region, seed is ripe from mid-November onwards, but that optimum seed collection times may be later further south. I believe this is the case. Plants cultivated in Dunedin and at Lawyers Head are still at flowering stage in early January. The instructions in that booklet, for detecting seed ripening time, should be followed by Otago DOC workers who are in the field in late summer to early autumn. The Lawyers Head population is the most easily accessible for periodic checking from Dunedin.
3. What time of year is ideal for planting? The above booklet suggests autumn through late winter (July) for the planting of 15-18 month old plants. For Otago Peninsula, I suggest that autumn should be avoided, for this is our most likely time of extended drought, but that winter and all of spring would be appropriate, when the sand is likely to hold most moisture.

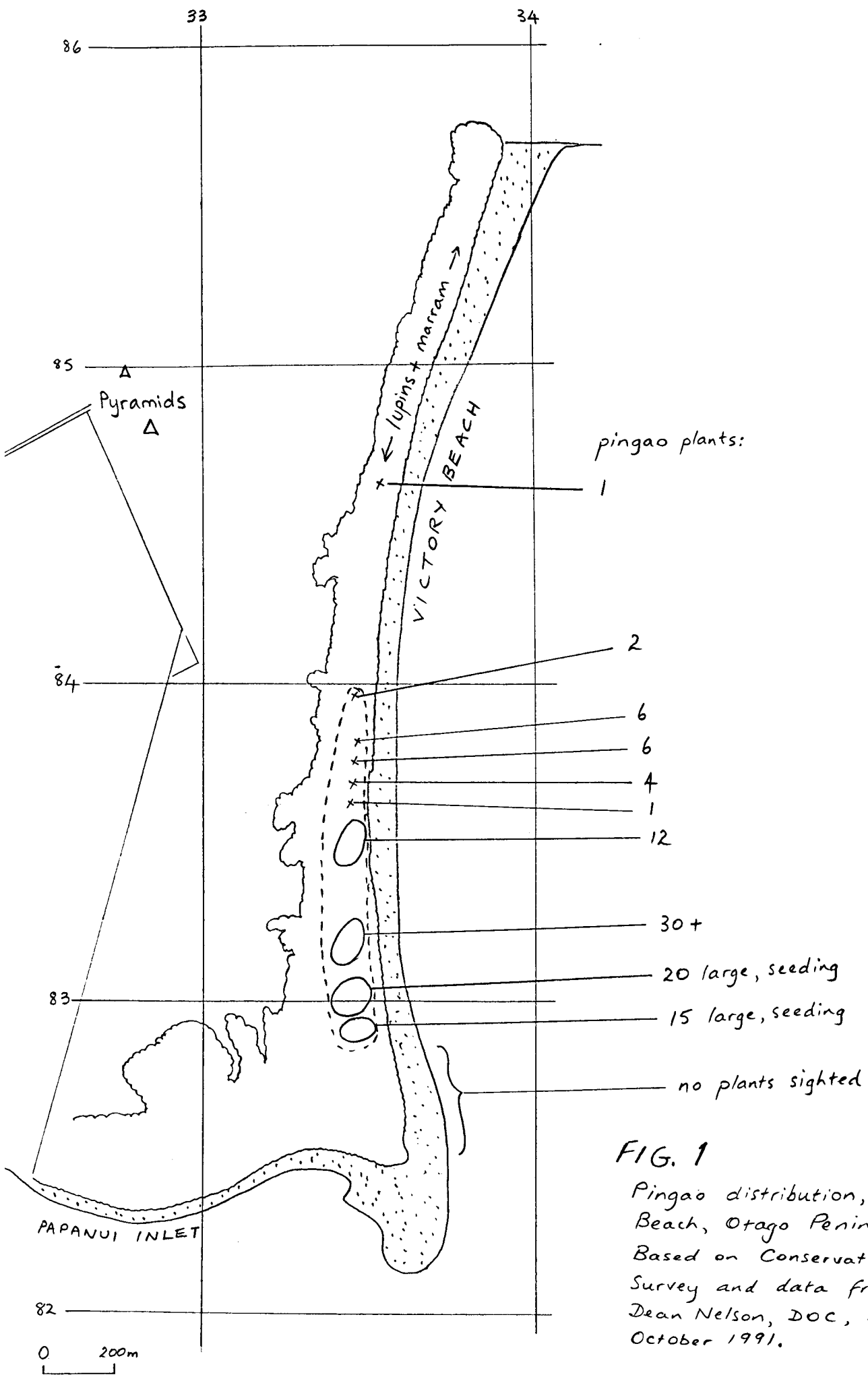
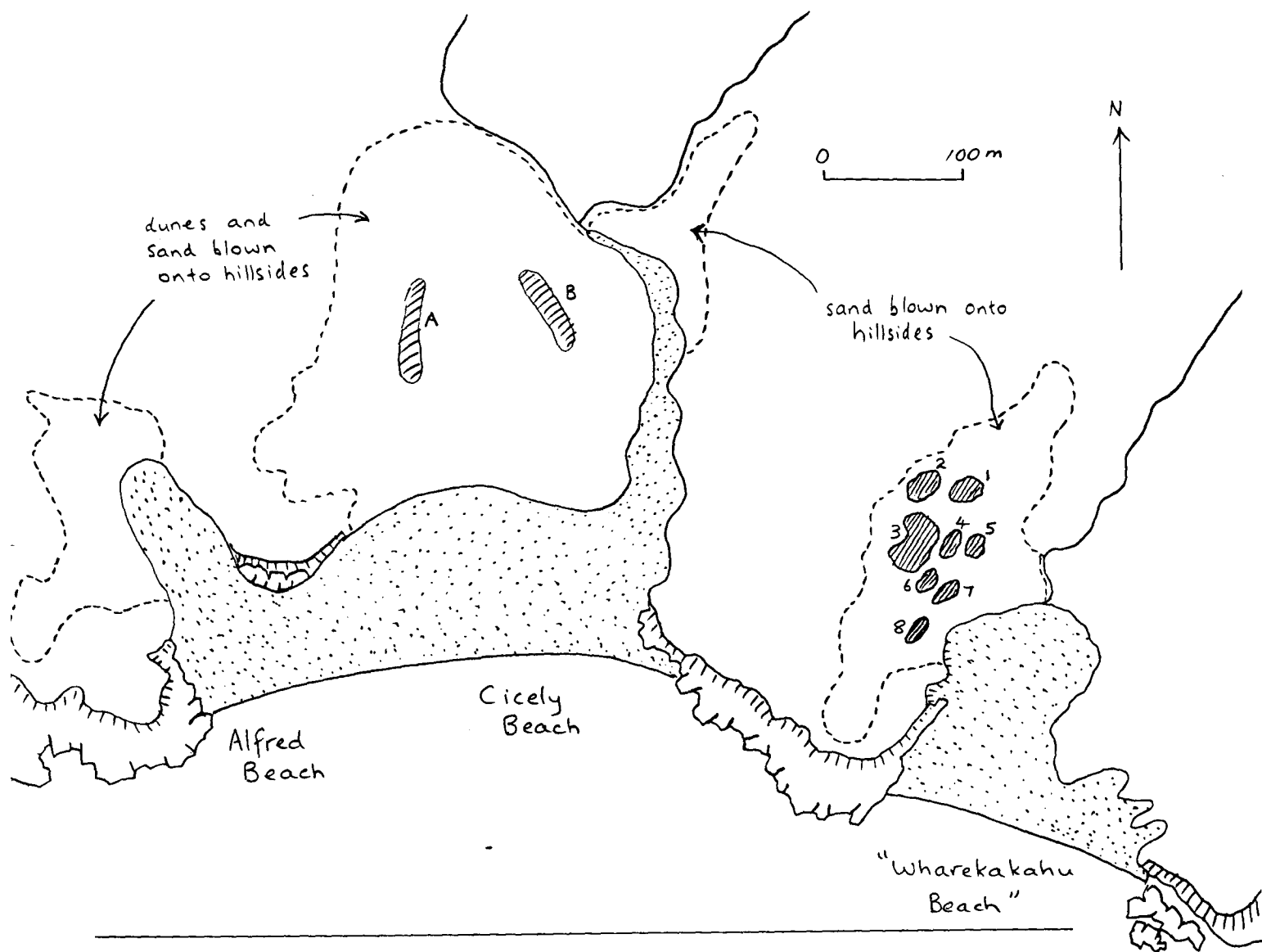


FIG. 1

Pingao distribution, Victory Beach, Otago Peninsula. Based on Conservation Corps Survey and data from Dean Nelson, DOC, Dunedin, October 1991.



Pingao at Cicely Beach:

- A. 9 plants } mostly patches c. 2m across, very scattered among
 B. 9 plants } bare sand with sparse marram, other grasses and weeds.

Pingao at "Wharekakahu Beach":

	patch size (m)	% cover pingao	principal other plants
1.	15 x 10	5	marram, silver tussock
2.	25 x 12	45	silver tussock, vernal, fog, clover
3.	30 x 30	30	marram, silver tussock, thistles
4.	15 x 10	60	marram
5.	10 x 15	70	marram
6.	8 x 6	60	silver tussock
7.	6 x 6	50	vernal, clover, silver tussock
8.	4 x 8	50	" " " " , clover

FIG. 2 Pingao at Cicely and "Wharekakahu" Beaches, Otago Peninsula, 27.12.92.

Table 1 . Pingao at Waikarara Beach, Otago Peninsula, 10.1 1.1992.

Individual pingao plants are numbered in order as they occur from the south end of the beach. Location of each is indicated by approximate distance (m) from the fence which terminates at this end of the beach, and distance out from the hill base. Clump size was measured on the axis perpendicular to the dune front, i.e. facing Cape Saunders, and represents the diameter reached by the outermost extent of foliage. Number of inflorescences is noted on flowering plants. Notes on most plants indicate whether they were growing alone, near, or among marram grass.

#	location		diam (cm)	infl no.	notes
	m from south	m from hill			
1	10	5	130	12	on dune, alone
2	14	12	70		0.5 m from eroded scarp, alone
3	15	10	55		on dune, 1 tuft, alone
4	30	6	95	8	in lupin bush
5	30	12	100		low dune, with marram
6	30	15	100		low dune with marram
7	30	19	210		beach head, long runner to sea
8	38	20	145		beach head, alone
9	40	12	95		dune
10	46	15	60		dune flat, almost alone
11	47	19	55		dune flat, almost alone
12	47	25	60		beach head, alone
13	48	25	45		beach head, marram nearby
14	49	25	60		beach head, marram nearby
15	50	20	75		front of low marram dune
16	52	15	200		dune hollow, almost alone
17	55	15	125		front of dune with marram
18	59	18	40		in hollow, sea-washed, half dead
19	59	24	40		tall tuft in marram clump
20	60	24	30		nearby
21	61	25	45	4	in marram
22	61	26	35		in marram
23	63	29	45		front of marram clump
24	65	9	75		clump alone on dune front
25	75	8	150	37	big clump, upper dune face
26	76	8	210	21	ditto, alongside
27	92	24	85	12	front of marram clump
28	94	24	140		half buried by dune

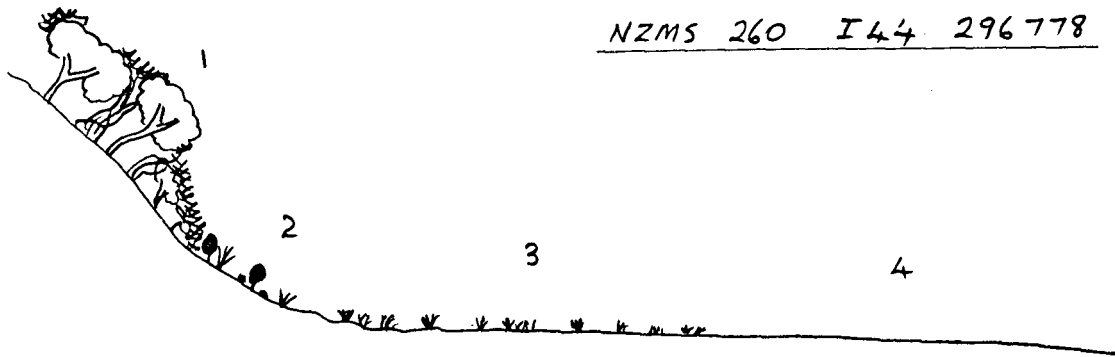
Table 1 Continued

29	94	22	145		ditto
30	95	21	75	1	half buried, rear very low dune
31	96	20	100		ditto
32	96	25	75		dune flat, +- alone, 70% buried
33	108	10	25		young tuft, beside marram clump

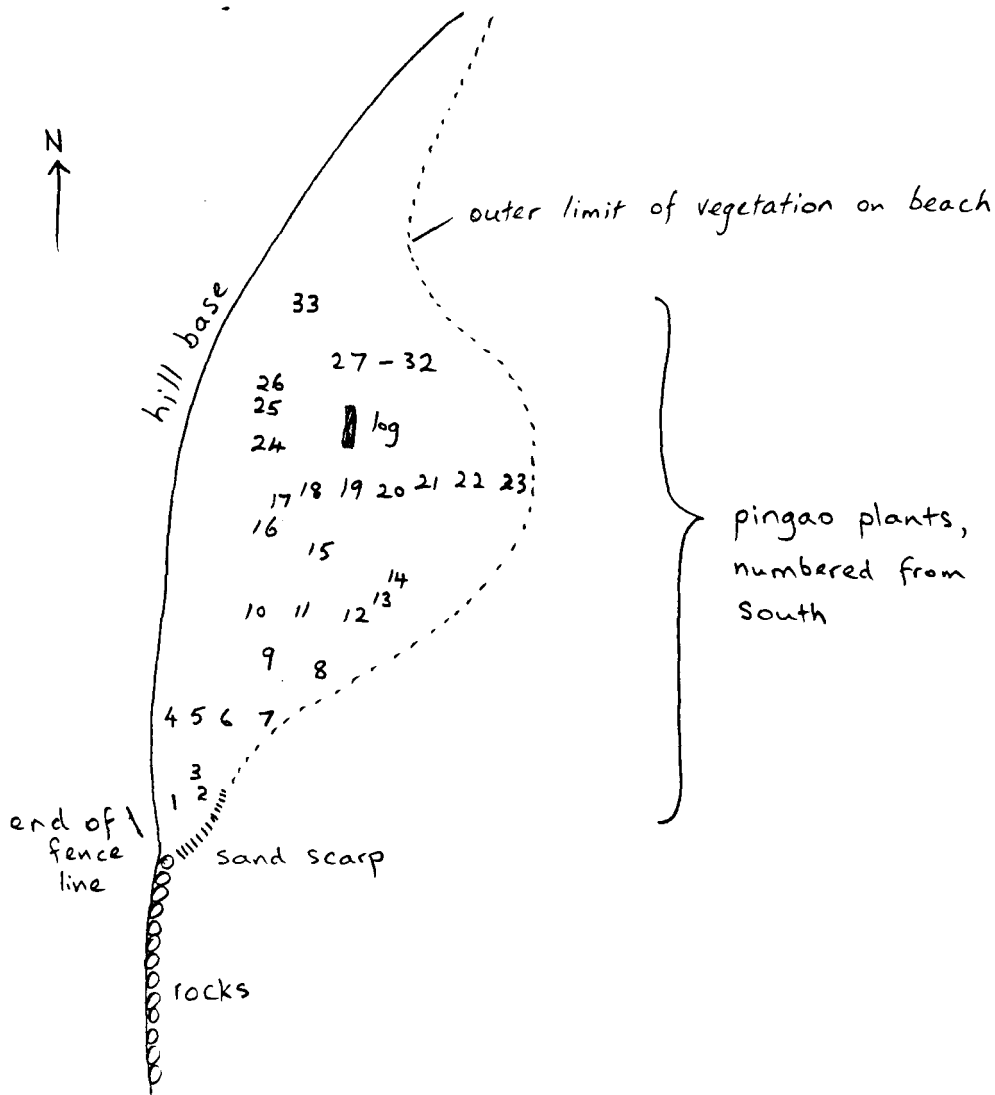
FIG. 3

WAIKARARA BEACH, OTAGO PENINSULA, PINGAO LOCATION

NZMS 260 I44 296778



1. Hillslope with sand veneer: ngaio, muehlenbeckia, tree nettle
2. Sand slope 6m high: marram 15% cover, Senecio elegans 15%, tree lupin 5%
3. Slight dunes and sand flat, 20-30 (-60)m wide: young marram 20% cover, pingao c. 2%.
4. Unvegetated gentle beach.



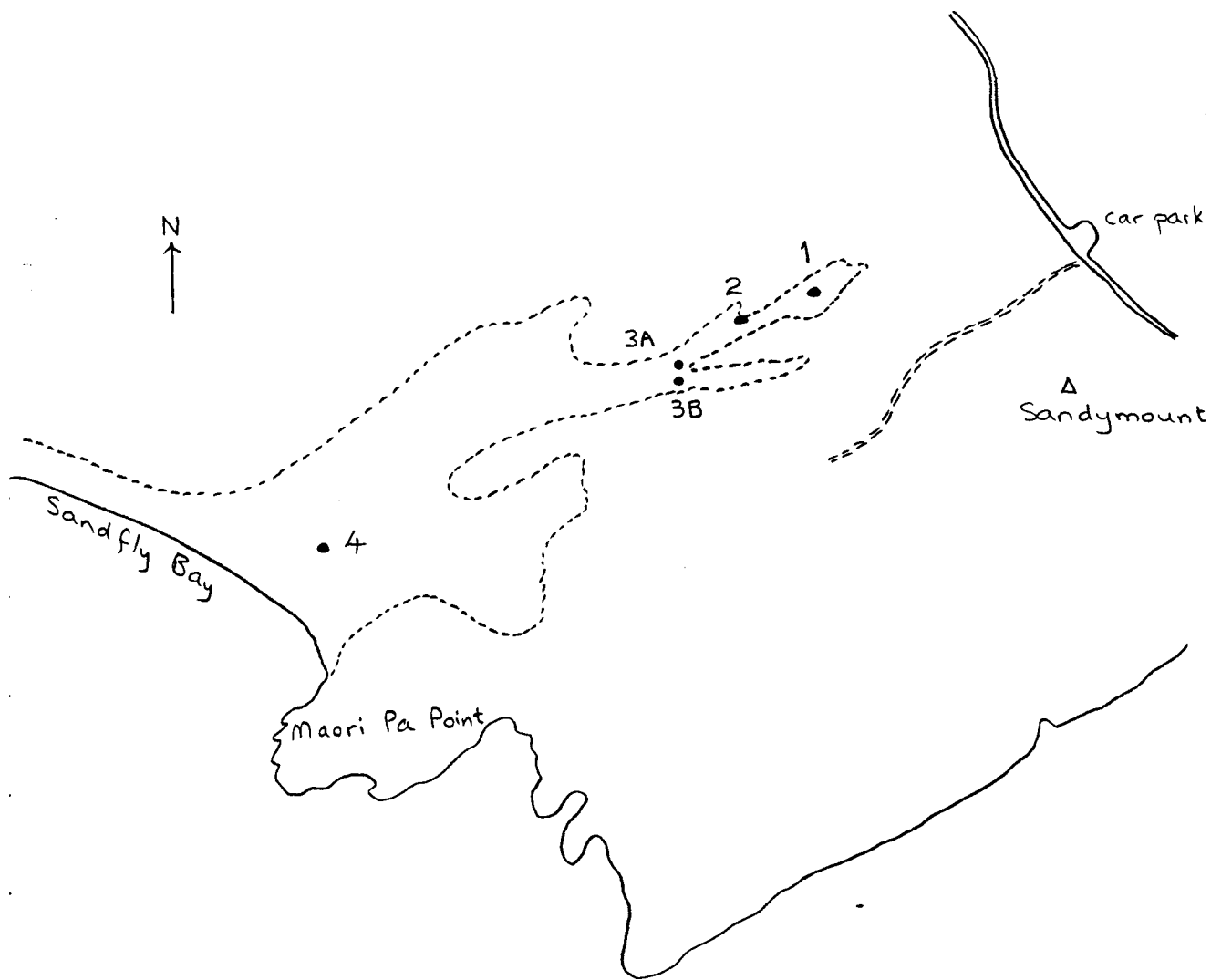


FIG. 4 Sandfly Bay, Otago Peninsula, sketch map showing sites of pingao plantings 10.11.1992

- Site 1. on spur crest with bare sand below reserve fence: 30 plants in two clumps
- Site 2. on small sand spur north of main sand gully: 30 plants
- Site 3A. on spur of damp sand: 10 plants
- Site 3B. in bed of sand gully: 24 plants
- Site 4. behind mass of foredunes, at toe of large bare sand slope, in moist sand close to water table: 20 plants.

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