



Fig. 2 First two axes of DCA results for 29 sites. Bolded letters represent site groupings assigned in the TWINSPLAN classification.

Site groups	Plant communities
A	(2) <i>Apodasmia similis</i> and <i>Juncus kraussii</i> sea rush (3) <i>Sarcocornia quinqueflora</i> sea matt
B	(4) <i>Apodasmia similis</i> and <i>Baumea juncea</i> meadow
C	(5) <i>Baumea juncea</i> meadow (3) <i>Sarcocornia quinqueflora</i> sea mat
D	(9) <i>Plagianthus</i> coastal scrub
E	(5) <i>Baumea juncea</i> meadow
F	(6) Dead <i>Leptospermum</i> and <i>Baumea juncea</i> swamp forest
G	(8) <i>Typha</i> swamp
H	(7) Live <i>Leptospermum</i> swamp forest
I	(10) <i>Cordyline australis</i> swamp forest

Table 1. The relationships between plant communities and sites

3. Further work

I will be continuing my research on the vegetation succession of Whangapoua wetland for my further study. This work fits into large body of studies of vegetation succession of Great Barrier Island. We now have a Research Permit from the Department of Conservation for coring using a vibra-core at Whangapoua. In November 2000, three to five sediment cores will be taken from major plant

communities on a transect line from the seaward to the landward edge of system. Because of the location this work is expensive. I shall continue working at Whangapoua for my doctoral research on "The temporal and spatial features of vegetation in the transition from estuary to fresh water swamp in Whangapoua Estuary". I am grateful for the Lucy Cranwell grant which supported my field work.



Harry Carse's Botanical Observations at Karioitahi

Steve Benham

Having resided at Clarks Beach on the southern shores of the Manukau six years ago now, I have become engrossed in the botany of Karioitahi. This west coast beach is within half an hour's drive of Clarks Beach and was botanised between 1899 and 1902 by Harry Carse, teacher, farmer and botanist; during this time he lived and taught at Mauku, just west of Pukekohe.

I first became aware of this self-taught botanist whilst requesting a search at the AK Herbarium in 1996 for *Gunnera dentata* s.lat. voucher specimens after locating extant populations at Karioitahi. The earliest AK voucher specimen of this taxon was collected by H. Carse in 1899 at "Karioitahi" (sic). Later, I became more familiar with Carse after

reading Eric Godley's biographical notes on him (Godley 1998).

Whilst co-leading an Auckland Botanical Society (ABS) field trip with Bec Stanley at Karioitahi on 18 March this year, an ABS member Jan Butcher of Tuakau, knowing my interest in Harry Carse, handed me copy of Carse's paper. He had read this before the Auckland Institute on the 2 September 1901 entitled "On the Flora of the Mauku District" (Carse 1901). It is from this paper that I wish to quote an excerpt of his field visits to Karioitahi.

"We now enter Karioitahi Gap. These "gaps" of which there are several between the Manukau and Waikato Heads, are the only means of access to the beach. Through each of these flows a small creek, which probably assists in some measure in keeping these passes open. When well in the gap the scenery, to my mind, is suggestive of a desert. The sand is generally of a dark hue, owing to the presence of considerable quantities of ironsand. The monotony of the scene is broken by a view of the ocean at the lower end of the gap, and by a few arenaceous plants such as *Coprosma acerosa*, *Scirpus frondosus* [*Desmoschoenus spiralis*], and *Arundo conspicua* [*Cortaderia splendens*]. The latter is always a most conspicuous plant on the sand-dunes and in the inland swamps. In a swampy place at the edge of the gap I found *Mentha cunninghamii*, *Epilobium billardierianum*, *Haloragis depressa* [*Gonocarpus ? incana*] and *Juncus caespiticus*. The lower part of the gap narrows to a mere track, which reaches the beach at the mouth of the creek mentioned above. Here a grassy flat affords a good place to allow our horses to have a rest and feed before proceeding along the beach, and a good water and an abundant supply of watercress suggest the advisability of boiling the "billy" for lunch.

I regret that I have not been able to devote as much time as I could wish to this interesting part of the district: but still I have explored to some extent. On the drier parts of the cliffs, and not unfrequently on blown sand, *Mesembryanthemum australe* [*Disphyma australe*] is plentiful. Where water drips I noted *Sonchus asper* var. *littoralis* [*S. kirki*] in great

abundance, and here and there *Cotula dioica* [*Leptinella dioica*] occurs. Such plants as *Apium australe* [*Apium prostratum s.str.*], *Samolus repens*, *Selliera radicans*, *Lobelia anceps*, and *Triglochin triandrum* [*T. striata*] are abundant. In wet sand, usually at the tops of the cliffs, are large matted patches of *Gunnera arenaria* [*G. dentata s.lat.*]. In drier sandy spots *Coprosma acerosa*, *Linum monogynum*, *Tillaea sieberiana* [*Crassula sieberiana*], *Muehlenbeckia complexa*, *Cassinia retorta* [*Ozothamnus leptophyllus*], *Zoysia pungens* [*Zoysia ? pauciflora*], and *Senecio lautus* are common, as also are *Pimelea arenaria* and *P. laevigata* [*P. aff. urvilleana*]. In rather damp places between the cliffs and the beach stunted forms of *Corynocarpus laevigatus* are of frequent occurrence, intermixed with *Pseudopanax lessonii*, *Coprosma baueriana* [*Coprosma repens*], and often as an undergrowth large patches of *Pteris comans*. In some places *Tetragonia trigyna* climbs 6 ft or 7 ft up the shrubs, and *Tetragonia expansa* [*T. tetragonioides*] is often met with. *Parietaria debilis* also occurs in shady places. In sandy spots *Carex pumila*, *Carex testacea*, and *Spinifex hirsutus* [*S. sericeus*] are of frequent occurrence. In a few damp spots I noted *Poa australis* var. *laevis* [*P. cita*], and on the lower cliffs the beautiful renga lily (*Arthropodium cirrhatum*) is of frequent occurrence."

Ninety-nine years later, many of the species familiar to Carse along this stretch of coast are still present, albeit somewhat depleted, so much so that four species appear on the Auckland Threatened Plant List. This stretch of coast is of significant regional importance and priority should be given to controlling some of the National Surveillance Plant Pests such as *Cortaderia selloana* and *Chrysanthemoides monilifera*. Possums and ferrets also occur in abundance on these cliffs (Jan Butcher *pers comm.*).

Interesting to note that *Gunnera arenaria* was found by Carse in wet sand at the tops of the cliffs. These cliff top habitats are now colonised by aggressive weeds and the gunneras now occur at the base of the cliffs. Where to from here?

References:

- Carse, H. 1901: On the Flora of the Mauku District. *Transactions of New Zealand Institute* 34: 362-368.
Godley, E. J. 1998: Biographical Notes (29): Harry Carse (1857-1930) *New Zealand Botanical Society Newsletter* 51: 13-16.

Acknowledgement

Ewen Cameron for providing the most likely name changes, given in square brackets.

