WESTERN AUSTRALIAN HERBARIUM RESEARCH NOTES

No. 3, 1980: 19-36

THE FLORAS OF 37 SOUTH-WESTERN AUSTRALIAN ISLANDS

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ABSTRACT

A list of plant species present on 37 islands, visited between 1975 and 1977, is provided. Most of the islands are small (less than 5 ha in area), and 21 of them are in Houtman Abrolhos, an archipelago 60 km from the mainland.

Seven of the nine plant species with the widest distribution on these islands are succulent-leaved. Closed-herbland, closed-heath, or open-heath are the dominant structural forms on most islands. Fifteen of the islands visited have previously been botanically investigated. On all but two of these islands at least one plant species had apparently become extinct. On only about half of these islands did apparent extinctions exceed apparent immigrations.

Data at hand demonstrate that regular use of various Abrolhos islands by fishermen increases the proportion of alien plant species present. For this reason shore-based facilities should not be permitted to expand to islands not already occupied.

INTRODUCTION

During 1975, 1976 and 1977 I had the opportunity to visit, and in some cases to camp on, about 200 islands near the south-western Australian coast. Extensive botanical collections were made on all but the three largest, namely Bernier, Dirk Hartog and Rottnest Islands. These three islands have been previously studied botanically (Burbidge and George 1978, Royce 1962, Storr 1962). Lists of plant species found on the other islands have been published or are in the course of publication (Abbott 1977, 1978, in press, Abbott and Black 1978, Abbott and Watson 1978). The present paper lists the floras of 37 islands, provides information on dominant plant species, dominant structural forms (Specht 1970), as well as relevant data such as latitude (S), longitude (E) (both to the nearest minute), island area, maximum elevation, distance from larger landmasses, date of visit and brief notes on rock type, geomorphology, and the use that seabirds made of the island during my visit. I estimated the area of small islands by pacing out the length and breadth. Elevation was estimated relative to my own height. The

area of larger islands was measured from large scale aerial photographs, and their elevations were taken from hydrographic charts or from maps published by National Mapping. Distance from larger landmasses was also taken from these sources. The common names used for seabirds are those of Serventy and Whittell (1976).

All except two of the larger islands (Escape and W. Doubtful) were traversed until I was satisfied that no more plant species were likely to be found. All habitat types present were searched. More time was spent on large islands than small ones. Large islands were usually camped on, giving ample time for me to search all parts many times. More time spent on Escape and W. Doubtful Islands may have slightly increased the totals.

One island, East Wallabi, is not included in the systematic list of plant species because Storr (1965) has provided a more comprehensive list of species, based on several lengthy visits at different times of the year from my visit. Nevertheless, those species found by Storr but not by me, and other species, apparently new to the island, are listed in a later section.

For more specific descriptions of the environment of some of the islands studied, the following may be consulted: Houtman Abrolhos (Anon n.d., O'Loughlin 1966, 1969, Storr 1965, Teichert 1946), Jurien Bay islands (Ford 1965) and Hamelin Island (Gillham (1963).

RELEVANT PHYSICAL AND BIOLOGICAL FEATURES OF ISLANDS

1. Meade I. 26°00', 113°12'. Area 0.08 ha; elevation 2 m; isolation, 200 m from Dirk Hartog I., to which it is joined at low tide; visited 27 June 1976; rock type, aeolianite; number of plant species recorded, 9; dominant plant species: *Nitraria schoberi* (to 2 m high), *Scaevola crassifolia*, *Spinifex longifolius;* dominant structural form: closed-heath. Usage by seabirds: eight species roost on the island.
2. Eagle I. 26°05', 113°35'. Area 0.1 ha; elevation 8 m; isolation, 200 m from Eagle Bluff, Peron Peninsula, Shark Bay; visited 23 June 1976; rock type, aeolianite; number of plant species recorded, 8; dominant plant species, *Nitraria schoberi* (to 1 m); dominant structural form: closed-heath. Usage by seabirds: 20 Silver Gull nests; Pied Cormorant roost (few birds).

3. SW Eagle 1. 26°05', 113°35'. Area 0.01 ha; elevation 5 m; isolation, 30 m from Eagle I.; visited 23 June 1976; rock type, aeolianite; number of plant species, 3; dominant plant species: *Nitraria schoberi*; dominant structural form: closed-heath. Usage by seabirds: a few Pied Cormorants rest on the islet.

4. Eagle Pt Islet. 28°27', 113°44'. Area 0.03 ha; elevation 2 m; isolation, 60 m from East Wallabi I.; visited 30 October 1975; rock type, aeolianite; number of plant species, 17; dominant plant species: *Diplolaena dampieri* (to < 1 m high), *Myoporum adscendens* and *Frankenia pauciflora*; dominant structural forms: closed-herbland/open-heath. Usage by seabirds: nil.

5. Barge Rk. 28°27', 113°44'. Area 0.08 ha; elevation 2 m; isolation, 300 m from East Wallabi I.; visited 30 October 1975; rock type, aeolianite; number of plant species, 17; dominant plant species: *Atriplex* sp. with *Arthrocnemum halocnemoides* near edges (to just over 1 m tall); dominant structural forms: closed-herbland/open-heath. Usage by seabirds: nil.

6. No published name ("No name No. 6" in Table 1 and Appendix) 28°27', 113°43'. Area, about 1 ha; elevation nearly 2 m; isolation, 500 m from East Wallabi I.; visited 30 October 1975; rock type, aeolianite with a sandy covering; number of plant species, 24; dominant plant species: *Atriplex* sp., *Nitraria schoberi*, *Stipa elegantissima* and *Bromus diandrus*; dominant structural forms: closed-herbland/closed-heath. Usage by seabirds: Wedge-tailed Shearwaters nest (in burrows).

7. N. Seagull I. 28°28', 113°43'. Area 6.7 ha; elevation nearly 2 m; isolation, 650 m from East Wallabi I.; visited 30 October 1975; rock type, aeolianite (pavement type of Storr 1965) with sand and shellgrit at northern end; number of plant species, 40; dominant plant species: *Atriplex* sp., *Ehrharta longiflora*, *Myoporum adscendens* (to 0.8 m high), *Rhagodia baccata* and *Threlkeldia diffusa*; dominant structural forms: closed-herbland/open-heath. Usage by seabirds: nil.

8. Middle Seagull I. 28°28', 113°43'. Area 3.6 ha; elevation 2 m; isolation, 15 m south of N. Seagull I.; visited 30 October 1975; rock type, wholly pavement aeolianite; number of plant species, 35; dominant plant species: *Atriplex* sp., *Diplolaena dampieri*, *Grevillea argyrophylla*, *Myoporum adscendens* and *Olearia axillaris*; dominant structural forms: closed-herbland/open-heath. Usage by seabirds: nil.

9. S. Seagull I. 28°28', 113°43'. Area about 0.15 ha; elevation just over 2 m; isolation, 300 m south of Middle Seagull I.; visited 30 October 1975; rock type, aeolianite; number of plant species, 6; dominant plant species: *Gasoul crystallinum* with much lesser extent of *Atriplex* sp. and *Nitraria schoberi*. There is much bare rock. Dominant structural form: herbland. Usage by seabirds: Pied Cormorants roost on the island.

10. Shag Rk. 28°29', 113°43'. Area 0.03 ha; elevation 2.7 m; isolation, 700 m south of S. Seagull I.; visited 4 November 1975; rock type, aeolianite; number of plant species, 4; dominant plant species: *Gasoul crystallinum*, *Nitraria schoberi* and *Atriplex* sp.; dominant structural forms: herbland/closed-heath. Usage by seabirds: Pied Cormorants roost. Bridled Terns were present, probably nesting.

11. Tattler I. 28°28', 113°43'. Area 0.6 ha; elevation 2.3 m; isolation, 200 m from W. Wallabi I.; visited 30 October 1975; rock type, aeolianite; number of plant species, 26; dominant plant species: *Atriplex* sp., *Avicennia marina* (3 m high, fringing most of NW side), *Rhagodia baccata*, *Frankenia pauciflora* and *Nitraria schoberi*; dominant structural forms; closed-herbland/closed-scrub. Usage by seabirds: Wedge-tailed Shearwaters nest in burrows in soil, and Bridled Terns are present.

12. W. Mangrove I. 28°29', 113°42'. Area 0.8 ha; elevation 2 m; isolation, 60 m from W. Wallabi I.; visited 31 October 1975; rock type, aeolianite; number of plant species, 24; dominant plant species: *Atriplex* sp., *Nitraria schoberi* and *Avicennia marina*; dominant structural forms: closed-herbland/closed-heath and -scrub. Usage by seabirds: Wedge-tailed Shearwaters nest in burrows in soil. Bridled Terns present.

13. Middle Mangrove I. 28°29', 113°42'. Area 0.04 ha; elevation 2 m; isolation, 16 m east of W. Mangrove I.; visited 31 October 1975; rock type, aeolianite; number of plant species, 14; dominant plant species: *Nitraria schoberi* (to 1 m high), *Atriplex* sp., *Gasoul crystallinum*; dominant structural forms: closed-heath/closed-herbland. Usage by seabirds: Wedge-tailed Shearwaters nest on the island (in burrows in soil). Bridled Terns present.

14. E. Mangrove I. 28°29', 113°42'. Area 0.025 ha; elevation 2.3 m; isolation, 30 m east of Middle Mangrove I.; visited 31 October 1975; rock type, aeolianite; number of plant species, 8; dominant plant species: *Nitraria schoberi*, *Gasoul crystallinum* and *Atriplex* sp.; dominant structural forms: closed-heath/closed-herbland. Usage by seabirds: Bridled Terns present.

15. Pigeon I. 28°27', 113°44'. Area 3.4 ha; elevation 3 m; isolation, 750 m from E. Wallabi I.; visited 3 November 1975; rock type, pavement aeolianite; number of plant species, 51; species restricted to gardens are omitted. Dominant plant species: Introduced species, including *Nicotiana glauca*, *Avena barbata* and *Sonchus* spp. Dominant structural forms: Herbland and open-heath. Usage by seabirds: nil.

16. Little Pigeon I. 28°28', 113°44'. Area 1.3 ha; elevation 2.7 m; isolation, 500 m from Pigeon I.; visited 3 November 1975; rock type, pavement aeolianite; number of plant species, 32; dominant plant species: *Myoporum adscendens* (1 m high) and *Atriplex* sp.; dominant structural forms: closed-herbland and open-heath. Usage by seabirds: Bridled Terns present.

17 Lumley I. 28°28', 113°44'. Area 0.03 ha; elevation 2 m; isolation, 30 m from Little Pigeon I.; visited 3 November 1975; rock type, aeolianite; number of plant species, 14; dominant plant species: *Gasoul crystallinum*; dominant structural form: herbland. Usage by seabirds: Bridled Tern.

18. Beacon I. 28°29', 113°47'. Area 3.6 ha; elevation 2 m; isolation, 6 km from E. Wallabi I., visited 3 November 1975; rock type: coral fragments with sand and shellgrit in centre; number of plant species, 24; dominant plant species: *Nitraria schoberi* (nearly 2 m high), *Atriplex* sp. and *Myoporum adscendens*; dominant structural forms: closed-heath and closed-herbland. Usage by seabirds: Several hundred Roseate Terns nest on bare coral shingle on the edge of the island, and Wedge-tailed Shearwaters nest in burrows in sand.

19. Long I. 28°29', 113°47'. Area 7.4 ha; elevation 3 m; isolation, 4.5 km from E. Wallabi I.; visited 3 November 1975; rock type: mostly coral-shingle with sand on highest parts; number of plant species, 24; dominant plant species: *Olearia axillaris*, *Spinifex longifolius* and *Atriplex* sp. Dominant structural forms: herbland and open-heath. Usage by seabirds: sand is burrowed by Wedge-tailed Shearwaters. One Caspian Tern nest was found.

20. Pelsart I. 28°55', 114°00'. Area 120 ha; elevation 3 m; isolation, 60 km from mainland; visited 9-21 October 1975; rock type, aeolianite with coral shingle on weather side of island (Teichert 1946 gives a very full description); number of plant species, 42; dominant plant species: *Atriplex* sp., *Frankenia pauciflora*, *Nitraria schoberi*, *Avicennia marina* (to 4 m), *Ehrharta longiflora*, *Carpobrotus virescens*, *Senecio lautus*, *Threlkeldia diffusa* and *Spinifex longifolius*. An area typical of the ridges of coral fragments was intensively studied by distributing fifty 1 m^2 quadrats. *Atriplex* sp. had a frequency of 50%, over twice as high as the next most frequent species, *Ehrharta longiflora* (20%). Dominant structural form: open-herbland over the great length of island, with closed-heath dominating the southern sixth of the island and closed-scrub (mangrove) present in patches along most of the western coast of the northern two-thirds of the island. Usage by seabirds: Seven species were noted. The Common Noddy and Sooty Tern nest in vast numbers at the southern end of the island; Wedge-tailed Shearwaters nest in sand near the old jetty; Lesser Noddy Terns

nest in mangroves. Caspian, Bridled and Crested Terns and Pacific Gulls were present in small numbers, but no evidence of nesting by the first two species was found.

21. Jon Jim I. (Alternative name, Little I.). 28°59', 113°58'. Area 0.16 ha; elevation 3 m; isolation, 40 m south of Pelsart I.; visited 16 October 1975; rock type, entirely aeolianite; number of plant species, 7; dominant plant species: *Atriplex* sp. and *Nitraria schoberi;* dominant structural forms: closed-herbland and closed-heath. Usage by seabirds: nil.

22. Favourite I. 30°16', 115°00'. Area 3 ha; elevation 15 m; isolation, 4 km from mainland; visited 7 May 1976; rock type, aeolianite with high sand dune on eastern half; number of plant species, 17; dominant plant species: *Olearia axillaris, Atriplex isatidea* (over 2 m tall), *Threlkeldia diffusa, Nitraria schoberi* and *Atriplex cinerea.* Dominant structural forms: closed-herbland and closed-heath. Usage by seabirds: parts of sand dune are burrowed by Wedge-tailed Shearwaters.

23. N. Boullanger I. 30°19', 115°00'. Area 2.5 ha; elevation 10 m; isolation, 60 m north of Boullanger I. to which it is joined by a tombolo during winter; visited 4 May 1976; rock type, aeolianite with a small amount of sand on southern side; number of plant species, 41; dominant plant species: *Nitraria schoberi* (nearly 2 m high), *Atriplex* sp., *Rhagodia baccata, Zygophyllum billardieri* and *Acanthocarpus preissii.* Dominant structural forms: closed-herbland and closed-heath. Usage by seabirds: Wedge-tailed Shearwaters make burrows in sandier parts.

24. Boullanger I. 30°19', 115°00'. Area 34 ha; elevation 7 m; isolation, 1.2 km from mainland; visited 3-7 May 1976; rock type, none. The island is wholly sand. Number of plant species, 27; dominant plant species: *Tetragonia decumbens, Cakile maritima, Scaevola crassifolia* and *Myoporum adscendens.* A 4 ha plot, typical of the interior of the island, was chosen for detailed study involving the random distribution of 50 1 m^2 quadrats. The percentage frequency of the five most frequent species was 84 (*Acanthocarpus preissii),* 60 (*Clematis microphylla*), 58 (*Scaevola crassifolia*), 50 (*Poa poiformis*) and 22 (*Tetragonia amplexicoma*). Dominant structural forms: closed-herbland and open-heath. Usage by seabirds: nil, although six species were seen resting on beaches round the island.

25. Tern I. 30°19', 115°00'. Area 0.2 ha; elevation 4 m; isolation, 400 m north of Whitlock I.; visited 7 May 1976; rock type, aeolianite; number of plant species, 10; dominant plant species: *Nitraria schoberi* and *Atriplex* sp. Dominant structural form: closed-heath. Usage by seabirds: four Silver Gull nests and about 50 Pied Cormorant nests were present.

26. Osprey I. 30°19', 115°00'. Area 0.12 ha; elevation 4 m; isolation, 400 m NE of Tern I.; visited 7 May 1976; rock type, aeolianite; number of plant species, 4; dominant plant species; *Nitraria schoberi.* Dominant structural form: closed-heath. Usage by seabirds: nil.

27. Whitlock I. 30°19', 115°00'. Area 5.4 ha; elevation 10 m; isolation, 400 m west of Boullanger I.; visited 6 May 1976; rock type: aeolianite with sand dune and much shell grit on western side; number of plant species, 32; dominant plant species: *Atriplex* sp., *Threlkeldia diffusa, Nitraria schoberi* (to 2 m high) and *Frankenia pauciflora.* Dominant structural forms: closed-herbland and closed-heath. Usage by seabirds: Wedge-tailed Shearwaters burrow in the deeper parts of sand.

28. Escape I. 30°20', 114°59'. Area 10.5 ha; elevation 12 m; isolation, 3.3 km from mainland and 1 km SW of Whitlock I.; visited 7 May 1976; rock type, pavement aeolianite mostly except for a sandy capping at the western end; number of plant species, 39; dominant plant species: *Frankenia pauciflora* (cliff edges), *Nitraria schoberi* (cliffs), *Olearia axillaris* (to 1 m high), *Scaevola crassifolia* and *Acanthocarpus preissii* elsewhere. Dominant structural forms: closed-herbland and open-heath. Usage by seabirds: Wedge-tailed Shearwaters nest on the island.

29. N. Essex Rk. 30°21', 115°00'. Area 0.40 ha; elevation 5 m; isolation, 2 km SE of Escape I.; visited 7 May 1976; rock type, aeolianite; number of plant species, 8; dominant plant species: *Nitraria schoberi* (to 1.3 m in height). Dominant structural form: closed-heath. Usage by seabirds: Wedge-tailed Shearwaters nest.

30. Middle Essex Rk. 30°21', 115°00'. Area 0.3 ha; elevation 5 m; isolation, 1,200 m south of North Essex Rk; visited 7 May 1976; rock type, aeolianite; number of plant species, 7; dominant plant species: *Carpobrotus virescens* and *Nitraria schoberi*. Dominant structural form: herbland and closed-heath. Usage by seabirds: Wedge-tailed Shearwaters nest on the island.

31. S. Essex Rk. 30°21', 115°00'. Area 0.12 ha; elevation 5 m; isolation, 100 m south of Middle Essex Rk.; visited 7 May 1976; rock type, aeolianite; number of plant species, 3; dominant plant species: *Nitraria schoberi*. Dominant structural form: closed-heath. Usage by seabirds: Wedge-tailed Shearwaters nest, and Pied Cormorants roost, on the island.

32. Lancelin I. 31°00', 115°19'. Area 8 ha; elevation 17 m; isolation, 500 m from mainland; visited 6-8 December 1976; rock type, aeolianite mostly covered by sand dune; number of plant species, 40; dominant plant species: on deep sand these are *Carpobrotus virescens, Zygophyllum aurantiacum, Threlkeldia diffusa, Atriplex* sp. and *Rhagodia baccata;* on aeolianite pavement near the edge of the island these are *Gasoul crystallinum, Lavatera plebeia, Frankenia pauciflora* and *Nitraria schoberi* (cliffs and talus only). A typical 4 ha plot on deep sand was intensively studied. Fifty 1 m^2 quadrats were randomly distributed in this plot. The percentage frequency of the five most frequent plant species was 58% (*Zygophyllum aurantiacum*), 52% (*Carpobrotus virescens*), 50% (*Avena barbata*), 48% (*Rhagodia baccata*), 40% (*Threlkeldia diffusa*). Dominant structural forms: open-heath on dune sand and closed-herbland on aeolianite pavement. Usage by seabirds: six species breed on the island; details of their distribution and abundance may be found in Abbott (1978).

33. Edward I. 31°02', 115°19'. Area 0.15 ha; elevation 6 m; isolation, 100 m from mainland; visited 8 December 1976; rock type, aeolianite; number of plant species, 7; dominant plant species: *Carpobrotus virescens* and *Frankenia pauciflora*. Dominant structural form: closed-herbland. Usage by seabirds: Bridled Terns nest on the island.

34. Hamelin I. 34°13', 115°00'. Area 10 ha; elevation 32 m; isolation, 700 m from mainland; visited 31 January-5 February 1977; rock type, aeolinate with dune sand over most of the island; number of plant species, 44; dominant plant species: around the edge of the island and most of the weather side *Carpobrotus virescens, Acacia littorea, A. cyclops, Boronia alata, Acrotriche cordata, Scaevola crassifolia* and *Pimelea ferruginea* are dominant; in the centre of the island *Agonis flexuosa* (to 4 m), *Spyridium globulosum* (to 2 m) and *Leucopogon parviflorus* (to 2 m) make up dense thickets. *Lepidosperma gladiatum, L. angustatum, Acanthocarpus preissii*

and *Poa poiformis* constitute the ground cover. The interior of the island was studied intensively. Fifty 1 m^2 quadrats were randomly distributed in a 4 ha plot. Those plant species with a percentage frequency of 30% or more were: *Lepidosperma gladiatum* (52%), *Spyridium globulosum* (46%), *Dodonaea aptera* (44%), *Poa poiformis* (44%), *Clematis pubescens* (36%), *Leucopogon parviflorus* (36%), *Lepidosperma angustatum* (36%), *Acanthocarpus preissii* (34%). Dominant structural forms: closed-scrub over most of the island except near the margins where open-heath and herbland dominate. Usage by seabirds: Bridled Terns nest on the island (Abbott 1978).

35. Sandy I. 34°52', 116°02'. Area 25 ha; elevation 9 m; isolation, 2.5 km from mainland; visited 26 March-3 April 1976; rock type: the basement rock is granite-gneiss but this is only exposed on the southern side. The western quarter of the island is covered by dunes and aeolianite ridges. The remainder is flat (3 m high) and sandy. Number of plant species, 46; dominant plant species: on aeolianite, *Rhagodia radiata;* on dune, *Spinifex hirsutus, Olearia axillaris* and *Acanthocarpus preissii;* on flat, sandy part, *Poa poiformis, Carpobrotus virescens* and *Lobelia alata;* on sand near shore, *Arctotheca populifolia, Spinifex hirsutus* and *Cakile maritima;* on rocky southern shore, *Sporobolus virginicus* and *Samolus repens.* Dominant structural forms: closed-tussock grassland, open-heath, and herbland. Usage by seabirds: the island is riddled with the burrows of Flesh-footed Shearwaters.

36. Middle Doubtful I. 34°22', 119°36'. Area 55 ha; elevation 75 m; isolation, 1 km from W. Doubtful I. and 3 km from mainland; visited 6-16 March 1977; rock type: granite-gneiss; number of plant species, 58; dominant plant species: *Disphyma blackii, Threlkeldia diffusa, Senecio lautus* and *Nitraria schoberi*. Two 4 ha plots were intensively studied by distributing at random 50 1 m^2 quadrats within them. The percentage frequency of the five most frequent species was as follows.
Disphyma plot: *Disphyma blackii* (100%), *Senecio lautus* (32%), *Polycarpon tetraphyllum* (28%), *Sonchus oleraceus* (24%), *Threlkeldia diffusa* (14%).
Nitraria/Rhagodia plot: *Threlkeldia diffusa* (56%), *Disphyma blackii* (50%), *Tetragonia amplexicoma* (46%), *Nitraria schoberi* (42%), *Rhagodia crassifolia* (38%). Dominant structural forms: closed-herbland with quite small areas of closed-heath. Usage by seabirds: Flesh-footed Shearwaters burrow in soil over much of the island.

37. W. Doubtful I. 34°22', 119°35'. Innermost of the three Doubtful Islands. Area 40 ha; elevation 73 m; isolation, 200 m from mainland. This island is almost divided in two by a bare rocky saddle over which the sea washes during gales; visited 16 March 1977 for 90 minutes; rock type: granite-gneiss; number of plant species, 49; dominant plant species: *Disphyma blackii* and *Scirpus nodosus* on exposed parts; *Eutaxia obovata* (to 2 m), *Leucopogon revolutus* (1 m), *Acacia cyclops* (to 2 m), *Avena barbata* and *Conyza bonariensis* (nearly to 2 m) elsewhere. Dominant structural forms: closed-heath on sheltered parts, elsewhere closed-herbland and open-heath. This island is more sheltered than Middle Doubtful I. from the full force of the SW swell because of its position in relation to Point Hood. Usage by seabirds: Flesh-footed Shearwater burrows were found mainly near the saddle.

Several islets visited were devoid of vegetation. I wish to place these islets on record so that future visitors have a botanical baseline.

A. Two rock (aeolianite) stacks close to Fish Point, E. Wallabi I. in Houtman Abrolhos. Respective areas and elevations are 10 m^2, 2.7 m; 7 m^2,

2.7 m.

B. Four islets south of Osprey I., Jurien Bay. Respective areas and elevations are: most northerly islet 4 m^2, 4 m; 40 m^2, 4 m; 20 m^2, 4 m; most southerly islet 4 m^2, 2 m.

C. Islet between Middle and South Essex Rocks. Area 180 m^2, elevation 5 m.

D. Islets between Lancelin and Edward Is. North islet 50 m^2, 2.7 m; South islet 35 m^2, 2 m. Pied Cormorants rest on both islets.

E. Four granite-gneiss rocks near Hamelin I. These were not visited but were viewed through binoculars. The highest elevation appeared to be about 6 m. As all appeared black, it is doubtful that a land flora could establish.

F. Ledge I. near mouth of Gardner River, east of Windy Harbour. Nearly 4 m high, quite smooth granite-gneiss, apparently covered with a black agla.

G. White-topped Rocks, two rocks locally known as Cow and Calf, lie in deep water 25 km SE of Sandy I. They are composed of granite-gneiss. I flew over them at low altitude. The smaller rock is 12 m high and has a black appearance, indicating that waves break over it regularly. The other rock is 33 m high and appears greyish-white.

WIDELY DISTRIBUTED PLANT SPECIES AND STRUCTURAL FORMS

Nine plant species occurred on more than half of the 37 islands studied (Appendix). These were *Nitraria schoberi* (37 islands), *Threlkeldia diffusa* (28), prostrate *Atriplex* sp., possibly comprising two species (27), *Sonchus oleraceus* (26), *Carpobrotus virescens* (25), *Myoporum adscendens* (24), *Enchylaena tomentosa* (23), *Gasoul crystallinum* (20) and *Senecio lautus* (19). All but two of these species are succulent-leaved.

The most widespread dominant structural forms were closed-herbland/closed-heath (10 islands), closed-herbland/open-heath (9 islands) and closed-heath alone (7 islands). The tallest vegetation, closed-scrub, was present as codominant on only two islands.

CHANGES IN SPECIES COMPOSITION OF 15 ISLANDS WITH TIME

Fifteen of the islands reported on here have been studied botanically before. Comparisons of my lists (Appendix) with these other lists, some of which are unpublished, does indicate that there have been changes in the composition of these insular floras. Below I list the plant species found by earlier visitors but not by me (termed 'missing'), and those species not found by previous visitors but collected by me (termed 'new'). I am reluctant to attribute all of these differences to extinctions and immigrations as it is unknown how thorough these earlier collectors were. However it can be assumed reasonably that earlier collections on small islands are likely to be more complete than collections on large islands. In the list below, authorities for names of species are supplied only if the species is not listed in the Appendix.

Tattler I. Storr (1965) lists 17 species whereas I found 26 species. Missing: *Sueda australis*. New: *Acanthocarpus preissii, Apium prostratum, Diplolaena dampieri, Ehrharta longiflora, Enchylaena tomentosa, Myoporum adscendens, Nicotiana rotundifolia, Senecio lautus, Setaria dielsii, Spergularia rubra*.

Pigeon I. Storr (1965) lists 23 species; I found 51. Missing: *Thysanotus patersonii*. New: *Anagallis arvensis, Arthrocnemum halocnemoides, Avena barbata, Bromus diandrus, B. hordeaceus, Bulbinopsis semibarbata, Conyza bonariensis, Cotyledon orbiculata, Cynodon dactylon, Diplolaena dampieri, Ehrharta longiflora, Eragrostis dielsii, Euphorbia tannensis, E. terracina, Exocarpos aphylla, Hordeum leporinum, Lactuca saligna, Lavatera plebeia, Lophochloa cristata, Malva parviflora, Medicago polymorpha, Nicotiana glauca, Polycarpon tetraphyllum, Raphanus raphanistrum, Setaria dielsii, Solanum nigrum, Sonchus megalocarpus, Sporobolus virginicus, Vulpia myuros*.

Long I. Anon. (n.d.) lists 19 species in contrast to my 24. Missing: *Bromus diandrus, Erodium cicutarium, Exocarpos aphylla, Lavatera plebeia, Polypogon monspeliensis* (L.) Desf. New: *Atriplex* sp., *Bromus hordeaceus, Crassula colorata, Enchylaena tomentosa, Hymenolobus procumbens, Nicotiana rotundifolia, Setaria dielsii, Sonchus oleraceus, Stipa elegantissima, Zygophyllum apiculatum*.

East Wallabi I. Storr (1965) lists 95 species, whereas I found 81 between 22 October and 3 November 1975. Missing: *Arthrocnemum arbuscula* R.Br., *Beyeria viscosa* (Labill.) Miq., *Brachycome* sp. (1 of 2 species listed), *Bossiaea rufa* R.Br., *Bromus arenarius, Calocephalus aeruoides* (F. Muell.) Benth., *Chenopodium* - 3 species, *Cynoglossum australe* R.Br., *Haloragis trigonocarpa* F. Muell., *Hydrocotyle diantha* DC., *Juncus bufonius* L., *Malva parviflora, Microtis unifolia, Parietaria debilis, Pelargonium littorale* Huegel, *Picris hieracoides* L., *Plantago varia* R.Br., *Polypogon tenellus* R.Br., *Ptilotus eriotrichum* W.V. Fitzg., *Ranunculus parviflorus* L., *Senecio brachyglossus* F. Muell., *Triglochin muelleri* Buch. New: *Actinobole uliginosum, Cynodon dactylon, Ehrharta brevifolia, Epilobium billardieri, Eragrostis dielsii, Gasoul crystallinum, Salsola kali, Sarcocornia* sp., *Solanum symonii, Urtica urens*.

Pelsart I. O'Loughlin (1969) lists 23 species in contrast to my 42 species. Missing: *Atriplex rhagodioides* F. Muell., *Lepidium pseudoruderale*. New: *Avena barbata, Bromus diandrus, Bulbinopsis semibarbata, Centaurium spicatum, Crassula colorata, Ehrharta brevifolia, E. longiflora, Eragrostis dielsii, Erodium cicutarium, Hymenolobus procumbens, Lolium loliaceum, Medicago polymorpha, Melilotus indica, Nicotiana rotundifolia, Raphanus raphanistrum, Sarcocornia quinqueflora, Sonchus megalocarpus, Spergularia rubra, Triglochin mucronata, T. trichophora*.

Jon Jim I. O'Loughlin (1969) lists 4 species; I found 7. New: *Carpobrotus virescens, Parietaria debilis, Threlkeldia diffusa*.

Favourite I. Gillham visited this island in November 1959 but did not publish a full list of plant species. However eleven species collected by her were identified at the Western Australian Herbarium, of which the following seven species (mostly annuals) were not recorded by me: *Calandrinia calyptrata, Cotula cotuloides, Dischisma arenarium, Ehrharta brevifolia, Lepidium linifolium, Lopochloa cristata, Podosperma angustifolium* Labill. As five of these species were collected on nearby islands (Appendix) at the same time of year, their absence from Favourite I. is unlikely to be

related to the timing of my visit.

Boullanger I. Storr (unpublished ms. 'The flora of the Jurien Bay islands', based on visits on 21-22 October 1961) lumped together what I call N. Boullanger and Boullanger Is. in this paper. Hence I cannot determine from his list all cases of 'missing' and 'new' species. Those determinable are, missing: *Avena barbata, Spinifex hirsutus;* new: *Scaevola crassifolia.*

Tern I. Storr (ms.) recorded 12 species in contrast to my 10 species. Missing: *Bromus arenarius, Nicotiana rotundifolia, Scirpus nodosus.* New: *Carpobrotus virescens.*

Whitlock I. Storr (ms.) lists 27 species, whereas I found 32. Missing: *Hymenolobus procumbens, Phyllanthus calycinus, Poa poiformis.* New: *Atriplex isatidea, Carex preissii, Crassula colorata, Nicotiana rotundifolia, Olearia axillaris, Oxalis corniculata, Senecio lautus, Tetragonia decumbens.*

Escape I. J.R. Ford collected 13 species and had 12 of these determined at the W.A. Herbarium. I failed to record two of these: *Avena barbata* and *Spergularia rubra.*

N. Essex Rk. Storr (ms.) lists 12 species, whereas I found only 8. Missing: *Hymenolobus procumbens, Nicotiana rotundifolia, Senecio lautus, Sonchus oleraceus.*

Middle Essex Rk. Storr (ms.) records 12 species; I found 7. Missing: *Bromus arenarius, Calandrinia calyptrata, Cotula australis* (Sieb. ex Spreng.) Hook.f., *Nicotiana rotundifolia, Senecio lautus, Sonchus oleraceus.* New: *Threlkeldia diffusa.*

S. Essex Rk. Storr (ms.) records 2 species. I found these and one additional species, *Carpobrotus virescens.*

Lancelin I. Lindren (1973: 164) visited this island on one day each month over one year, not specified, in the 1960s. He recorded 51 species whereas I found 40 species. Gillham visited the island in November 1959 and had 15 species determined at the Western Australian Herbarium. In the following list of 'missing' species those recorded by Lindgren or Gillham are indicated by (L) or (G).
Missing: *Anthocercis littorea* Labill. (L), *Arthrocnemum* sp. (L), *Calandrinia calyptrata* (G), *Calocephalus brownii* (LG), *Cotula coronopifolia* L. (L), *Crassula colorata* (LG), *Daucus glochidiatus* (Labill.) Fisch. *et al.* (L), *Exocarpos sparteus* (L), *Helichrysum cordatum* (LG), *Hymenolobus procumbens* (L), *Polycarpon tetraphyllum* (L), *Scirpus antarcticus* Labill. (L), *S. nodosus* (L), *Sonchus megalocarpus* (L), *Stellaria media* (L.) Vill. (L), *Triglochin mucronata* R.Br. (L), *Vulpia membranacea* (L), *V. myuros* (L), *Wilsonia backhousei* (G). New: *Bromus diandrus, Chenopodium murale, Parapholis incurva, Sisymbrium irio, S. orientale.*

Hamelin I. Gillham (1963) listed 53 species; I found 44 species. Missing: *Alyxia buxifolia* R.Br., *Avena barbata, Calandrinia polypetala* Fenzl., *Dichondra repens* R. & G. Forst., *Hymenolobus procumbens, Isotoma scapigera* (R.Br.) G. Don, *Parapholia incurva, Phyllanthus calycinus, Poa poiformis* (*P. australis* was also listed but I assume that this was *P. poiformis*), *Polycarpon tetraphyllum, Poranthera microphylla* Brongn., *Sollya heterophylla* Lindl., *Stipa flavescens, Stylidium adnatum* R.Br., *Thomasia triphylla* (Labill.) J. Gay, *Trymalium spathulatum* (Labill.) Ostenf. New: *Atriplex isatidea,*

Carex preissii, Diplolaena dampieri, Hardenbergia comptoniana, Lepidium foliosum, Muehlenbeckia adpressa, Nitraria schoberi, Scaevola nitida.

Probably the only islands for which these changes can be assumed to reflect genuine extinctions and immigrations are several of the small islands, in particular Jon Jim, Tern, Whitlock, the three Essex Rocks, Lancelin and Hamelin Is. The number of apparent extinctions exceeds the number of apparent immigrations on about half of the islands, namely East Wallabi, Tern, N. Essex Rk, Middle Essex Rk, Lancelin and Hamelin Is.

HUMAN USE OF THE ISLANDS: EFFECTS ON PLANT ECOLOGY

The most striking human impact is on islands in Houtman Abrolhos. Pigeon, Little Pigeon, Lumley and Beacon Islands all have huts on them. Fishermen and their families live on the islands during the crayfishing season. Pelsart, as well as Pigeon and Little Pigeon Islands (already mentioned), were dug over 70-100 years ago for guano. This involved stacking the rock into piles and then sweeping up the guano (Green 1972). Unfortunately, no attempt was made to re-create the original topography of these islands.

Escape and Hamelin Islands each have a navigation light structure on them, but apart from a track, over which supplies are conveyed, there has been little disturbance to both islands. Both lights have always been automatic; the one on Hamelin I. has been discontinued. Rabbits and goats were introduced to Middle and West Doubtful Islands respectively (P. Spurr pers. comm.), but the dates of introduction are unknown. Both are no longer present.

The apparent effect of human use of islands close together in Houtman Abrolhos on the proportion of alien plant species present is shown in Table 1. For this reason the activities of fishermen on other islands in the Abrolhos needs constant monitoring. Islands at present without huts should be kept so.

Nevertheless, these data do not necessarily imply that a high proportion of alien plant species on an island is always caused by human activities. Other islands studied in this paper, and which apparently are little disturbed by man, have high proportions of alien plant species in their floras, e.g. Lancelin 38%, Sandy 28%, West Doubtful 25%. The probable explanation is that weedy species, most of which disperse widely, can survive on islands where soils have a high fertility due to seabirds (Gillham 1961).

Table 1. Proportion of alien plant species present on islands in the Wallabi Group, Houtman Abrolhos, with and without huts (reflecting usage by man). Only islands with 10 or more plant species are considered.

Type of island	Name	Area (ha)	Presence of huts	Number of plant species	% alien plant species
Coral-shingle aeolianite	Beacon	3.6	Yes	24	42
"	Long	7.4	No	24	17
"	Pigeon	3.4	Yes	51	43
"	Little Pigeon	1.3	Yes	32	44
"	Lumley	0.03	Yes	14	29
"	N. Seagull	6.7	No	40	15
"	M. Seagull	3.6	No	35	9
"	No name (No. 6)	1.0	No	24	21
"	W. Mangrove	0.8	No	24	8
"	Tattler	0.6	No	26	12
"	Barge Rk	0.08	No	17	29
"	M. Mangrove	0.04	No	14	14
"	Eagle Pt It	0.03	No	17	12

ACKNOWLEDGEMENTS

The staff of the Western Australian Herbarium determined all of the material collected from Houtman Abrolhos. I also wish to thank P.G. Wilson for determining various chenopods and composites from other islands. G.M. Storr kindly allowed me to consult his ms. in the preparation of this paper. Transport costs were met from funds provided by the Australian Research Grants Committee and the Zoology Department, University of Western Australia. Mr. H. Shugg, Conservator of Wildlife, permitted me to travel by Government boat to islands in Jurien Bay and Houtman Abrolhos. Permission to camp on islands was granted by the W.A. Wildlife Authority. I am grateful to N.G. Marchant for his comments on the manuscript.

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APPENDIX

List of plant species present on the islands studied.
* = naturalized alien species.

Acacia cyclops A. Cunn. ex G. Don, Mimosaceae: N. Boullanger, Hamelin,M. Doubtful, W. Doubtful.

A. littorea B.R. Maslin, Mimosaceae: Hamelin.

A. rostellifera Benth., Mimosaceae: N. Boullanger, Escape.

Acanthocarpus preissii Lehm., Xanthorrhoeaceae: Eagle Pt, N. Seagull, M. Seagull, Tattler, Pigeon, N. Boullanger, Boullanger, Whitlock, Escape, Lancelin, Hamelin, Sandy.

Acrotriche cordata (Labill.) R.Br., Epacridaceae: Hamelin

Actites megalocarpa (Hook.f.) N.S. Lander, Asteraceae: N. Seagull, M. Seagull, Pigeon, Little Pigeon, Long, Pelsart, Hamelin.
Agonis flexuosa (Spreng.) Schau., Myrtaceae: Hamelin.
Ammophila arenaria (L.) Link, Poaceae: Sandy.
Anagallis arvensis L., Primulaceae: Pigeon, Pelsart, Hamelin, Sandy.
Angianthus cunninghamii (DC.) Benth., Asteraceae: Whitlock.
Apium prostratum Vent., Apiaceae: Tattler, Sandy, M. Doubtful, W. Doubtful.
Arctotheca populifolia (Berg.) T. Norl., Asteraceae: Boullanger, Lancelin, Sandy.
Arthrocnemum bidens Nees, Chenopodiaceae: W. Mangrove, Pelsart, N. Boullanger.
A. halocnemoides Nees, Chenopodiaceae: Barge Rk, W. Mangrove, Shag Rk, Pigeon, Lumley, Pelsart, Favourite.
Athrixia nivea (Steetz.) Druce, Asteraceae: W. Doubtful.
Atriplex sp., Chenopodiaceae: Eagle Pt, Bark Rk, No Name (No. 6), N. Seagull, M. Seagull, S. Seagull, Shag Rk, Tattler, W. Mangrove, M. Mangrove, E. Mangrove, Pigeon, Little Pigeon, Lumley, Beacon, Long, Pelsart, Jon Jim, Favourite, N. Boullanger, Boullanger, Tern, Whitlock, Escape (2 spp.), Lancelin, Sandy, M. Doubtful (this last det. as *cinerea* Poir).
A. isatidea Moq., Chenopodiaceae: Favourite, Boullanger, Whitlock, Lancelin, Hamelin.
A. prostrata DC., Chenopodiaceae: M. Doubtful.
Avena barbata Brot., Poaceae: Pigeon, Pelsart, Lancelin, Sandy, W. Doubtful.
Avicennia marina (Forsk.) Vierh., Verbenaceae: No name (No. 6), N. Seagull, M. Seagull, Tattler, W. Mangrove, Pelsart.
Boronia alata Sm., Rutaceae: Hamelin.
B. albiflora (R.Br.) Benth., Rutaceae: W. Doubtful.
Bossiaea dentata (R.Br.) Benth., Fabaceae: M. Doubtful.
Brachycome ciliaris (Labill.) Less., Asteraceae: Escape.
Brassica rapa L., Brassicaceae: Beacon.
B. tournefortii Gouan, Brassicaceae: Lancelin.
Briza maxima L., Poaceae: Hamelin.
Bromus arenarius Labill., Poaceae: Favourite, N. Boullanger, Boullanger, Whitlock, Escape, N. Essex Rk, Lancelin, Sandy, M. Doubtful.
Bromus diandrus Roth., Poaceae: No name (No. 6), N. Seagull, Pigeon, Little Pigeon, Beacon, Lancelin, Sandy.
B. hordeaceus L., Poaceae: Barge Rk, No name (No. 6), N. Seagull, S. Seagull, Pigeon, Little Pigeon, Lumley, Beacon, Long, Pelsart.
Bulbinopsis semibarbata (R.Br.) Borzi, Liliaceae: Eagle Pt, Pigeon, Little Pigeon, Pelsart, M. Doubtful.
Cakile maritima Scop., Brassicaceae: Beacon, Long, Pelsart, Boullanger, Lancelin, Sandy, M. Doubtful.
Calandrinia sp., Portulacaceae: Eagle.
C. calyptrata Hook.f., Portulacaceae: N. Boullanger, Tern, Escape, M. Doubtful, W. Doubtful.
Calocephalus brownii (Cass.) F. Muell., Asteraceae: Hamelin, Sandy, M. Doubtful, W. Doubtful.
Capparis spinosa L., Capparaceae: Meade, Eagle Pt, No name (No. 6), N. Seagull, M. Seagull, Tattler, Pigeon, Little Pigeon.
Carex preissii Nees, Cyperaceae: Whitlock, Hamelin, Sandy.
Carpobrotus virescens (Haw.) Schwantes, Aizoaceae: Eagle Pt, N. Seagull, M. Seagull, Tattler, W. Mangrove, Pigeon, Little Pigeon, Long, Pelsart, Jon Jim, Favourite, N. Boullanger, Boullanger, Tern, Whitlock, Escape, N. Essex Rk, M. Essex Rk, S. Essex Rk, Lancelin, Edward, Hamelin, Sandy, M. Doubtful, W. Doubtful.
Cassytha racemosa Nees, Lauraceae: Boullanger, Sandy.
Centrolepis polygnya (R.Br.) Hieron., Centrolepidaceae: Sandy, M. Doubtful.
Centaurium minus Gars., Gentianaceae: W. Doubtful.
C. spicatum (L.) Fritsch, Gentianaceae: Pelsart.

**Cerastium glomeratum* Thuill., Caryophyllaceae: Sandy.
**Cenopodium murale* L., Chenopodiaceae: Beacon, Pelsart, Lancelin, Sandy.
**Chenopodium* sp., Chenopodiaceae: Eagle, SW Eagle.
**Cirsium vulgare* (Savi) Ten., Asteraceae: W. Doubtful.
Clematis microphylla DC., Ranunculaceae: N. Boullanger, Boullanger.
C. pubescens Hueg., Ranunculaceae: Hamelin.
**Conyza bonariensis* (L.) Cronquist, Asteraceae: Pigeon and Little Pigeon (sp. uncertain), M. Doubtful, W. Doubtful.
Cotula cotuloides (Steetz.) Druce, Asteraceae: N. Boullanger, Whitlock, Escape, Lancelin, Sandy, M. Doubtful, W. Doubtful.
**Cotyledon orbiculata* L., Crassulaceae: Pigeon.
Crassula colorata (Nees) Ostenf., Crassulaceae: Long, Pelsart, N. Boullanger, Whitlock, Escape.
C. macrantha (Hook.f.) Diels, Crassulaceae: Sandy, M. Doubtful, W. Doubtful.
**Cynodon dactylon* (L.) Pers., Poaceae: Pigeon.
Danthonia caespitosa Gaud., Poaceae: M. Doubtful, W. Doubtful.
Dianella revoluta R.Br., Liliaceae: Eagle Pt, N. Seagull, M. Seagull, Pigeon, M. Doubtful, W. Doubtful.
Diplolaena dampieri Desf., Rutaceae: Eagle Pt, No name (No. 6), N. Seagull, M. Seagull, Tattler, Pigeon, Little Pigeon, Hamelin.
**Dischisma arenarium* E. Mey., Scrophulariaceae: Lancelin, Sandy.
Disphyma blackii Chinnock, Aizoaceae: M. Doubtful, W. Doubtful.
**Dittrichia graveolens* (L.) Greuter, Asteraceae: W. Doubtful.
Dodonaea aptera Miq., Sapindaceae: Hamelin.
D. ceratocarpa Endl., Sapindaceae: M. Doubtful, W. Doubtful.
**Ehrharta brevifolia* Schrad., Poaceae: Pelsart, Escape.
**E. longiflora* Sm., Poaceae: Barge Rk, N. Seagull, Tattler, Pigeon, Little Pigeon, Beacon, Pelsart, Lancelin, M. Doubtful, W. Doubtful.
**Emex australis* Steinh., Polygonaceae: Little Pigeon.
Enchylaena tomentosa R.Br., Chenopodiaceae: Barge Rk, N. Seagull, M. Seagull, Tattler, W. Mangrove, M. Mangrove, E. Mangrove, Pigeon, Little Pigeon, Beacon, Long, Pelsart, Jon Jim, N. Boullanger, Tern, Osprey, Whitlock, Escape, N. Essex Rk, M. Essex Rk, Lancelin, M. Doubtful, W. Doubtful.
Eragrostis dielsii Pilger, Poaceae: No name (No. 6), W. Mangrove, Pigeon, Little Pigeon, Pelsart.
Eremophila glabra (R.Br.) Ostenf., Myoporaceae: Escape.
**Erodium cicutarium* (L.) L'Herit. ex Ait., Geraniaceae: Barge Rk, Pelsart, N. Boullanger.
**Euphorbia paralias* L., Euphorbiaceae: W. Doubtful.
E. tannensis Spreng. ssp. *eremophila* (A. Cunn.) Hassall, Euphorbiaceae: Eagle Pt, No name (No. 6), N. Seagull, M. Seagull, Pigeon, Little Pigeon.
**E. terracina* L., Euphorbiaceae, Pigeon.
Eutaxia obovata (Labill.) C.A. Gardn., Fabaceae: M. Doubtful, W. Doubtful.
Exocarpos aphylla R.Br., Santalaceae: Meade (sp. uncertain), M. Seagull, Tattler, Pigeon, Long.
E. sparteus R.Br., Santalaceae: N. Boullanger, Boullanger, Escape, Hamelin.
Frankenia pauciflora DC., Frankeniaceae: Eagle Pt, No name (No. 6), N. Seagull, M. Seagull, Tattler, W. Mangrove, Pigeon, Little Pigeon, Pelsart, Favourite, N. Boullanger, Whitlock, Escape, M. Essex Rk, Lancelin, Edward.
**Gasoul crystallinum* (L.) Rothmaler, Aizoaceae: Eagle Pt, Barge Rk, No Name (No. 6), N. Seagull, M. Seagull, S. Seagull, Shag Rk, Tattler, M. Mangrove, E. Mangrove, Pigeon, Little Pigeon, Lumley, Beacon, Long, Pelsart, Jon Jim, Lancelin, Edward.
Gnaphalium candidissimum Lam., Asteraceae: W. Doubtful.
G. luteoalbum L., Asteraceae: M. Doubtful, W. Doubtful.
G. sphaericum Willd., Asteraceae: M. Doubtful.
Grevillea argyrophylla Meisn., Proteaceae: N. Seagull, M. Seagull, Pigeon.
Hardenbergia comptoniana (Andr.) Benth., Fabaceae: Hamelin.

Helichrysum cordatum DC., Asteraceae: Boullanger, Sandy.
Hibbertia cuneiformis (Labill.) Gilg., Dilleniaceae: Hamelin, Sandy.
**Hordeum leporinum* Link, Poaceae: Pigeon, Little Pigeon, Escape, Lancelin, M. Doubtful.
Hymenolobus procumbens (L.) Nutt., Brassicaceae: Barge Rk, N. Seagull, M. Seagull, Lumley, Beacon, Long, Pelsart.
**Hypochoeris glabra* L., Asteraceae: M. Doubtful.
**Lactuca saligna* L., Asteraceae: Pigeon.
**L. serriola* L., Asteraceae: M. Doubtful, W. Doubtful.
**Lagurus ovatus* L., Poaceae: Sandy.
Lavatera plebeia Sims, Malvaceae: S. Seagull, E. Mangrove, Pigeon, Little Pigeon, Lumley, Beacon, Pelsart, N. Boullanger, Tern, Whitlock, N. Essex Rk, M. Essex Rk, S. Essex Rk, Lancelin, Edward, Sandy, M. Doubtful, W. Doubtful.
Lepidium foliosum Desv., Brassicaceae: N. Boullanger, N. Essex Rk, Lancelin, Hamelin, Sandy, M. Doubtful.
L. linifolium (Desv.) Benth., Brassicaceae: N. Boullanger, Whitlock, Escape.
L. pseudoruderale Thell., Brassicaceae: Beacon.
Lepidosperma angustatum R.Br., Cyperaceae: Hamelin.
L. gladiatum Labill., Cyperaceae: N. Boullanger, Boullanger, Hamelin, M. Doubtful.
Leucopogon parviflorus (Andr.) Lindl., Epacridaceae: Hamelin, Sandy.
L. revolutus R.Br., Epacridaceae: M. Doubtful, W. Doubtful.
Limonium salicorniaceum (F. Muell.) Kuntze, Plumbaginaceae: Eagle, N. Seagull, M. Seagull, Tattler, W. Mangrove, M. Mangrove, Pigeon, Little Pigeon.
Lobelia alata Labill., Lobeliaceae: Sandy, M. Doubtful, W. Doubtful.
**Lolium loliaceum* (Bory & Chaub.) Hand.-Mazz., Poaceae: Little Pigeon, Lumley, Pelsart, Escape, Lancelin, Sandy.
**Lopochloa cristata* (L.) Hylander, Poaceae: Pigeon, Little Pigeon, N. Boullanger, Sandy.
**Lycium ferocissimum* Miers., Solanaceae: M. Doubtful.
Maireana oppositifolia (F. Muell.) P.G. Wilson, Chenopodiaceae: M. Doubtful.
**Malva parviflora* L., Malvaceae: Pigeon, Lancelin.
**Medicago polymorpha* L., Fabaceae: Pigeon, Pelsart, Whitlock, Escape.
Melaleuca huegelii Endl., Myrtaceae: Hamelin.
M. lanceolata Otto., Myrtaceae: Hamelin, W. Doubtful.
**Melilotus indica* (L.) All., Fabaceae: Beacon, Pelsart.
Microtis unifolia (Forst.f.) Rchb.f., Orchidaceae: W. Doubtful.
Muehlenbeckia adpressa (Labill.) Meisn., Polygonaceae: Hamelin, W. Doubtful.
Myoporum adscendens R.Br., Myoporaceae: Eagle Pt, Barge Rk, No name (No. 6), N. Seagull, M. Seagull, Tattler, W. Mangrove, M. Mangrove, Pigeon, Little Pigeon, Lumley, Beacon, Long, Pelsart, Favourite, N. Boullanger, Boullanger, Tern, Whitlock, Escape, Lancelin, Hamelin, M. Doubtful, W. Doubtful.
**Nicotiana glauca* Grah., Solanaceae: Pigeon.
N. rotundifolia Lindl., Solanaceae: Eagle Pt, Barge Rk, N. Seagull, M. Seagull, Tattler, W. Mangrove, M. Mangrove, Pigeon, Little Pigeon, Lumley, Long, Pelsart, N. Boullanger, Whitlock, Escape.
Nitraria schoberi L., Zygophyllaceae: Meade, Eagle, SW Eagle, Eagle Pt, Barge Rk, No name (No. 6), N. Seagull, M. Seagull, S. Seagull, Shag Rk, Tattler, W. Mangrove, M. Mangrove, E. Mangrove, Pigeon, Little Pigeon, Lumley, Beacon, Long, Pelsart, Jon Jim, Favourite, N. Boullanger, Boullanger, Tern, Osprey, Whitlock, Escape, N. Essex Rk, M. Essex Rk, S. Essex Rk, Lancelin, Edward, Hamelin, Sandy, M. Doubtful.
Olearia axillaris (DC.) F. Muell., Asteraceae: No name (No. 6), N. Seagull, M. Seagull, Pigeon, Long, Favourite, N. Boullanger, Boullanger, Whitlock, Escape, Lancelin, Hamelin, Sandy, M. Doubtful, W. Doubtful.
Opercularia hispidula Endl., Rubiaceae: W. Doubtful.

Oxalis corniculata L., Oxalidaceae: N. Boullanger, Whitlock.
**Parapholis incurva* (L.) C.E. Hubbard, Poaceae: Lancelin.
Parietaria debilis Forst.f., Urticaceae: Beacon, Long, Pelsart, Jon Jim, N. Boullanger, Lancelin, Sandy.
Pelargonium sp. (seedlings), Geraniaceae: Meade, Eagle, SW Eagle.
P. australe Willd., Geraniaceae: Sandy, M. Doubtful.
**Petrorhagia prolifera* (L.) Ball & Heywood, Caryophyllaceae: W. Doubtful.
Phyllanthus calycinus Labill., Euphorbiaceae: Escape.
Pimelea ferruginea Labill., Thymeleaceae: Hamelin, M. Doubtful, W. Doubtful.
P. microphylla R.Br., Thymeleaceae: No name (No. 6), N. Seagull, M. Seagull, Tattler, W. Mangrove, Pigeon.
Pittosporum phillyraeoides DC., Pittosporaceae: Eagle Pt, No name (No. 6), N. Seagull, M. Seagull, Tattler, W. Mangrove, Pigeon, Escape.
Platysace compressa (Labill.) Norman, Apiaceae: M. Doubtful.
**Poa annua* L., Poaceae: Beacon.
Poa sp., Poaceae: Eagle.
P. poiformis (Labill.) Druce, Poaceae: N. Boullanger, Boullanger, Whitlock, Hamelin, Sandy, M. Doubtful, W. Doubtful.
**Polycarpon tetraphyllum* (L.) L., Caryophyllaceae: Pigeon, Little Pigeon, M. Doubtful.
**Raphanus raphanistrum* L., Brassicaceae: Pigeon, Pelsart.
Rhagodia baccata (Labill.) Moq., Chenopodiaceae: No name (No. 6), N. Seagull, M. Seagull, Tattler, W. Mangrove, Pigeon, Favourite, N. Boullanger, Boullanger, Tern, Osprey, Whitlock, Escape, Lancelin.
R. crassifolia R.Br., Chenopodiaceae: M. Doubtful, W. Doubtful.
R. obovata Moq., Chenopodiaceae: Meade.
R. radiata Nees, Chenopodiaceae: Hamelin, Sandy.
**Rumex crispus* L., Polygonaceae: Sandy.
Salsola kali L., Chenopodiaceae: Meade, Long, Pelsart, Favourite, N. Boullanger, Boullanger, Whitlock, Escape, Lancelin.
Samolus repens (Forst.) Pers., Primulaceae: N. Boullanger, Escape, Hamelin, Sandy, M. Doubtful.
Sarcocornia blackiana (Ulbrich) A.J. Scott, Chenopodiaceae: Lancelin, Edward, Hamelin, M. Doubtful.
S. quinqueflora (Ung. Sternb.) A.J. Scott, Chenopodiaceae: No name (No. 6), N. Seagull, M. Seagull, Tattler, W. Mangrove, M. Mangrove, Long, Pelsart.
Sarcocornia sp., Chenopodiaceae: Sandy.
Sarcostemma australe R.Br., Asclepiadaceae: Eagle Pt, M. Seagull, Pigeon.
Scaevola crassifolia Labill., Goodeniaceae: Meade, N. Seagull, Pelsart, Favourite, Boullanger, Whitlock, Escape, Lancelin, Hamelin.
S. nitida R.Br., Goodeniaceae: Hamelin.
Scirpus cernuus Vahl., Cyperaceae: Sandy.
S. nodosus L., Cyperaceae: N. Boullanger, Boullanger, Escape, Hamelin, Sandy, M. Doubtful, W. Doubtful.
Selenothamnus sp., Malvaceae: Eagle.
Senecio lautus Forst.f. ex Willd., Asteraceae: N. Seagull, M. Seagull, Tattler, W. Mangrove, Pigeon, Little Pigeon, Beacon, Long, Pelsart, Favourite, N. Boullanger, Boullanger, Whitlock, Escape, Lancelin, Hamelin, Sandy, M. Doubtful, W. Doubtful.
Setaria dielsii Henr., Poaceae: Barge Rk, No name (No. 6), N. Seagull, M. Seagull, Tattler, W. Mangrove, M. Mangrove, Pigeon, Little Pigeon, Long, Pelsart.
**Silene nocturna* L., Caryophyllaceae: M. Doubtful.
**Sisymbrium irio* L., Brassicaceae: Lancelin.
**S. orientale* L., Brassicaceae: Beacon, Lancelin.
**Solanum nigrum* L., Solanaceae: Pigeon, Little Pigeon, Sandy, M. Doubtful.
S. symonii Eichler, Solanaceae: N. Seagull, M. Seagull, Lumley, Beacon.
Sonchus oleraceus L., Asteraceae: Meade, Eagle Pt, Barge Rk, No name (No. 6), N. Seagull, M. Seagull, S. Seagull, Tattler, W. Mangrove, M. Mangrove,

E. Mangrove, Pigeon, Little Pigeon, Lumley, Beacon, Long, Pelsart, N. Boullanger, Tern, Whitlock, Escape, Lancelin, Hamelin, Sandy, M. Doubtful, W. Doubtful.

Spergularia rubra (L.) J. & C. Presl, Caryophyllaceae: Barge Rk, N. Seagull, M. Seagull, Tattler, W. Mangrove, Pigeon, Little Pigeon, Lumley, Pelsart.

Spinifex hirsutus Labill., Poaceae: Sandy.

S. longifolius R.Br., Poaceae: Meade, N. Seagull, M. Seagull, M. Mangrove, Beacon, Long, Pelsart, Favourite, N. Boullanger, Boullanger, Whitlock, Escape, Lancelin.

Sporobolus virginicus (L.) Kunth., Poaceae: Eagle, No name (No. 6), N. Seagull, M. Seagull, Pigeon, Boullanger, Whitlock, W. Escape, Sandy, M. Doubtful, W. Doubtful.

Spyridium globulosum (Labill.) Benth., Rhamnaceae: Boullanger, Hamelin.

Stipa sp. (*?flavescens* Labill.), Poaceae: N. Seagull, M. Seagull, Tattler, W. Mangrove, M. Doubtful, W. Doubtful.

S. elegantissima Labill., Poaceae: No name (No. 6), N. Seagull, M. Seagull, Long.

Stypandra imbricata R.Br., Liliaceae: M. Doubtful, W. Doubtful.

Sueda australis (R.Br.) Moq., Chenopodiaceae: N. Seagull, M. Mangrove, E. Mangrove, Beacon, Long, Pelsart.

Templetonia retusa (Vent.) R.Br., Fabaceae: N. Boullanger, Hamelin.

Tetragonia amplexicoma (Miq.) Hook.f., Aizoaceae: N. Boullanger, Boullanger, Whitlock, Escape, Hamelin, M. Doubtful.

T. decumbens Mill., Aizoaceae: Favourite, N. Boullanger, Boullanger, Whitlock, Escape, Lancelin.

Threlkeldia diffusa R.Br., Chenopodiaceae: Eagle Pt, Barge Rk, No name (No. 6), N. Seagull, M. Seagull, Tattler, W. Mangrove, M. Mangrove, E. Mangrove, Pigeon, Little Pigeon, Lumley, Long, Pelsart, Jon Jim, Favourite, N. Boullanger, Boullanger, Tern, Whitlock, Escape, N. Essex Rk, M. Essex Rk, Lancelin, Hamelin, Sandy, M. Doubtful, W. Doubtful.

Thryptomene saxicola (A. Cunn.) Schau., Myrtaceae: M. Doubtful.

Thysanotus patersonii R.Br., Liliaceae: N. Seagull.

**Trifolium glomeratum* L., Fabaceae: W. Doubtful.

Triglochin trichophora Nees, Juncaginaceae: Barge Rk, Pelsart.

T. mucronata R.Br., Juncaginaceae: Pelsart.

Vittadinia sp. (*Eurybiopsis gracilis* Hook.f.), Asteraceae: W. Doubtful.

V. triloba (Gaud.) DC., Asteraceae: Barge Rk, No name (No. 6), N. Seagull, W. Mangrove, M. Mangrove.

**Vulpia membranacea* (L.) Dum., Poaceae: Hamelin; W. Doubtful (sp. uncertain).

**V. myuros* (L.) Gmel., Poaceae: No name (No. 6), W. Mangrove, Pigeon, Little Pigeon.

Westringia dampieri R.Br., Lamiaceae: M. Doubtful.

Wilsonia backhousei Hook.f., Convolvulaceae: N. Boullanger, Edward.

W. humilis R.Br., Convolvulaceae: N. Boullanger, Osprey, Whitlock, Escape, M. Essex Rk, Lancelin.

Zygophyllum apiculatum F. Muell., Zygophyllaceae: Beacon, Long.

Z. billardieri DC., Zygophyllaceae: Favourite, N. Boullanger, Whitlock, Escape, N. Essex Rk, M. Doubtful, W. Doubtful.

Z. aurantiacum (Lindl.) F. Muell., Zygophyllaceae: Lancelin.