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The vegetation of the Cape of Good Hope Nature Reserve

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ABSTRACT

The Cape of Good Hope Nature Reserve, 7 750 ha in extent, occupies the southern end of the Cape Peninsula. Geologically, it is composed of sandstone beds of the Table Mountain Group of the Cape Supergroup. Topographically, it comprises an interior plateau bounded partly by hills and mountains which reach 360 m on the False Bay coast.

Two structural formations, fynbos and broadleaved scrub, are recognized. Within fynbos, the two floristic categories, Inland and Coast Fynbos, reflect the two major soil types present. The flora of the Reserve, with 1 060 species (35% monocots, 65% dicots) comprises 40% of the flora of the Cape Peninsula. About 40 species are either endemic or rare and endangered to varying degrees.

Alien woody plants that have invaded the veld over the past half-century are presenting a serious and costly management problem.

RÉSUMÉ

LA VÉGÉTATION DE LA RÉSERVE NATURELLE DU CAP DE BONNE ESPÉRANCE

La Réserve naturelle du Cap de Bonne Espérance, d'une superficie de 7 750 ha, occupe l'extrémité méridionale de la péninsule du Cap. Géologiquement, elle est composée de gisements de grès du groupe de la montagne de la Table dans le Super-Groupe du Cap. Topographiquement, elle comprend un plateau intérieur bordé partiellement par des collines et des montagnes atteignant 360m sur le côte de False Bay.

Deux formations structurales, le fynbos et la formation broussailleuse à grandes feuilles, sont reconnues. Dans le fynbos, les deux catégories floristiques, le Fynbos Côtier et le Fynbos de l'Intérieur, réflètent les deux principaux types de sols présents. La flore de la Réserve, avec 1 060 espèces (35% de monocotylédones, 65% de dicotylédones) comprend 40% de la flore de la péninsule du Cap. Environ 40 espèces sont soit endémiques, soit rares, et menacées à des degrés divers.

Des plantes ligneuses étrangères qui ont envahi le veld au cours du dernier demi-siècle présentent un sérieux et coûteux problème de contrôle.

ENVIRONMENT

The Cape of Good Hope Nature Reserve, 7 750 ha in extent, occupies the southern end of the Cape Peninsula which is the most south-westerly point of the African continent. Bounded on the west by the cold Atlantic Ocean and on the east by the warmer waters of False Bay, no point on the Reserve is further than 5 km from the coast and the influence of the sea is everywhere felt. The whole Reserve is composed of level or gently inclined sandstone beds of the Table Mountain Group of the Cape Supergroup, resting on Cape granite which is visible only at the base of the Cape Point cliffs. Block-shaped boulders formed by joint and bedding-plane weathering, are typical of this formation (Figs 1 & 2). The diagonal land boundary of the Reserve follows the line of a fault. The chain of hills south of the fault valley merges into the mountain range of the False Bay coast, with summits to 360 m. The eastern slopes of these mountains, truncated by wave attack, drop almost sheer to the sea, but the western slopes fall less steeply to a central plateau (Figs 3 & 4) that shelves westward for 5 to 6 km until it is terminated in a sandstone scarp (Fig. 1). The present coastal shelf may extend up to half a kilometre westward of the scarp, but is usually narrower (Figs 2 & 5). Inland dunes, now stabilized, occur in the southern part of the Reserve. The soils derived from the Table Mountain Group sandstones are acid, whereas those developed on marine sand dunes are usually neutral or alkaline.

The Mediterranean-type climate is unusually cool and equable for this latitude (34°S). It is tempered in summer by strong south-east winds, often with cloud, whereas in winter the boisterous north-westerly gales bring cool, moist air off the Atlantic, resulting sometimes in days of stormy rain. Rainfall averages 700 mm per annum near the mountains, but the Cape Point rain-gauge records less than half this amount. The gradual transition between summer and winter gives rise to prolonged spring and autumn seasons. The west coast is often clothed in fog during autumn.

Although the Southern Cape Peninsula had been inhabited by primitive man from the earliest Stone Age, it was only after the Dutch East India Company developed Simon's Bay as a winter anchorage in 1742, that the ecosystem became conspicuously altered, initially by destruction of the natural game, later by the practice of stock farming with attendant frequent burning and overgrazing. As large-scale commercial agriculture developed in the hinterland, the smallholdings of the southern Peninsula became uneconomic. Between 1938 and 1965 the area was acquired by the Divisional Council of the Cape as a Nature Reserve. The Divisional Council aims eventually to re-establish the natural

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FIG. 1.—Broad-leaved Scrub at Gifkommetjie. Tall Scrub on scree slopes with *Tarchonanthus camphoratus* (grey) and *Maurocenia frangularia* (dark green). Below it and to left, *Sideroxylon* Scrub on old dunes. Foreground coastal Dune Fynbos.

FIG. 2.—Western Hillveld variety of Upland Mixed Fynbos near Olifantsbos with the endemic white-flowered *Staavia dodii* in the foreground and the scattered 2–m high proteoid shrub *Leucospermum conocarpodendron* beyond. Remains of the Thomas Tucker, wrecked in 1941, on the distant shore.

conditions prevailing at the time of the early settlers, while catering for the recreational needs of an increasing number of visitors.

VEGETATION

In 1966 and 1967 the author carried out trials of vegetation survey methods on the Cape of Good Hope Nature Reserve and, as a result, the Braun-Blanquet phytosociological method has been widely adopted for primary surveys of South African vegetation including fynbos (Taylor, 1969 and in preparation).

Two structural formations, fynbos and broad-leaved scrub, may be recognized on the Reserve. Fynbos occurs on sites exposed to fire, whereas scrub develops fully only in certain habitats where fire is excluded.

Fynbos, the shrubby, heath- or maquis-like

FIG. 3.—Restionaceous Plateau Fynbos, about 13 years post-burn, with typical three-layered vegetation. Scattered, domed, light green shrubs are *Leucadendron laureolum* c. 1,5 m; middle layer dominated by *Salaxis flexuosa*. In foreground among rocks, *Aspalathus capensis* (rigid green shrub) and *Erica mammosa* (white flowers).

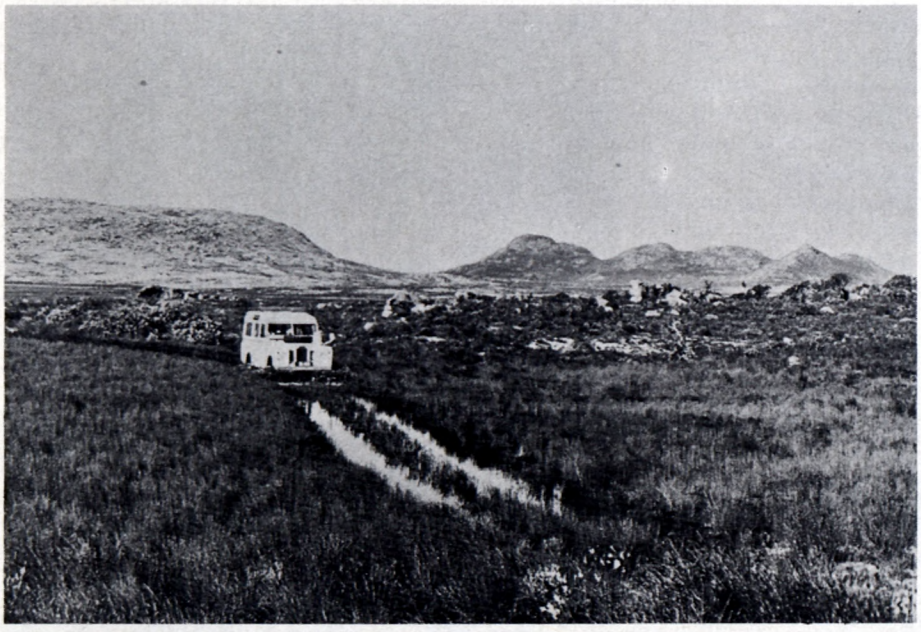

FIG. 4.—Poorly drained parts of the plateau become temporary pans in winter. Restionaceous Tussock Marsh with *Elegia parviflora* dominant on lower right, near Sirkelsvlei.

vegetation typical of the southern and south-western Cape Province (Taylor, 1978), occupies about 97% of the area of the Reserve. It has three distinctive physiognomic elements, restioid, ericoid and proteoid (Taylor, 1977). The two floristic categories, Inland and Coast Fynbos, reflect the two major soil types present. The most complete structural development is seen in the Inland Fynbos of the better-drained, slightly sloping parts of the plateau (Fig. 3) where the vegetation is three-layered with a discontinuous upper stratum of the proteoid *Leucadendron laureolum,* a middle stratum, about 50–90 cm high, of wiry ericoid or narrow-sclerophyll shrubs among which the families Asteraceae, Ericaceae, Rutaceae, Thymelaeaceae and Rosaceae *(Cliffortia)* are conspicuous, and a lower stratum of tufted, wiry hemicryptophytes, mainly Restionaceae (e.g. *Thamnochortus dichotomus*) and Cyperaceae. On poorly drained parts of the plateau where bedrock lies close to the surface, both upper and middle strata are absent and the Restionaceae of the lower stratum strongly dominant (*Elegia parviflora* in Fig. 4). Communities of the rocky hills are floristically the richest, the ericoid middle layer being well developed and the proteoids scattered (*Leucospermum conocarpodendron* in Fig. 2), though in the early post-fire stages the resprouting hemicryptophytes, including grasses, dominate.

Coast Fynbos of the alkaline dune soils, comprising a different suite of species, is similar to Inland Fynbos in structure but lower in stature (Fig. 1, right foreground) and the proteoid element (usually *Leucadendron coniferum)* only becomes conspicuous in the more sheltered slacks and depressions. Rocky coasts, where the Table Mountain Sandstones are exposed, have skeletal soils that are acid like the inland hill soils but, unlike the latter, are close to base saturation. Many of the shrubs are ericoid or narrow-sclerophyll, fleshy or succulent, low, sprawling or cushion-shaped, pruned or scorched by the salty winds off the sea. In rocky places, broad-sclerophylls of the scrub intrude (Fig. 5).

FIG. 5.—Fynbos developing to Broad-leaved Scrub at Ribboksdam. 'Taylor's Shack' was demolished in 1968.

The broad-leaved scrub, a simplified form of the coast forest of the Knysna region, is floristically distinct from fynbos. On dune sands it forms thickets, 2–4 m high, of sprouting broad-leaved sclerophylls dominated by *Euclea racemosa* and *Sideroxylon inerme* (Fig. 1, left foreground), but on rocky screes of the western escarpment which are better protected from fire, it develops into a gnarled mixed scrub of dwarf forest with a canopy height up to 5 m (Fig. 1, right) where *Pterocelastrus tricuspidatus, Tarchonanthus camphoratus, Maurocenia frangularia* and *Chionanthus foveolatus* are among the principal tree species.

FLORA

The present check list of the flora of the Reserve, with 1 060 species (35% monocots, 65% dicots) comprises 40% of the flora of the Cape Peninsula (Adamson & Salter 1950). The eleven most important families, in descending order of species richness, are Asteraceae, Cyperaceae, Fabaceae, Iridaceae, Orchidaceae, Ericaceae, Restionaceae and Poaceae (tied), Liliceae, Campanulaceae and Proteaceae.

About 40 species, including 10 of Erica, are either endemic or rare and endangered to varying degrees. Four examples represent the different categories of noteworthy species. *Watsonia tabularis* (Fig. 6) is endemic to the Cape Peninsula but widespread in the Reserve and not endangered. By contrast, *Leucadendron macowanii* (Fig. 7) is endemic to the

FIG. 7.—*Leucadendron macowanii*, endemic to the Reserve, with a severely restricted distribution, seriously endangered.

FIG. 6.—*Watsonia tabularis* var. *concolor*, endemic to the Cape Peninsula, but not threatened.

FIG. 8.—*Mimetes hirtus*, uncommon on the Reserve, but neither endemic nor threatened.

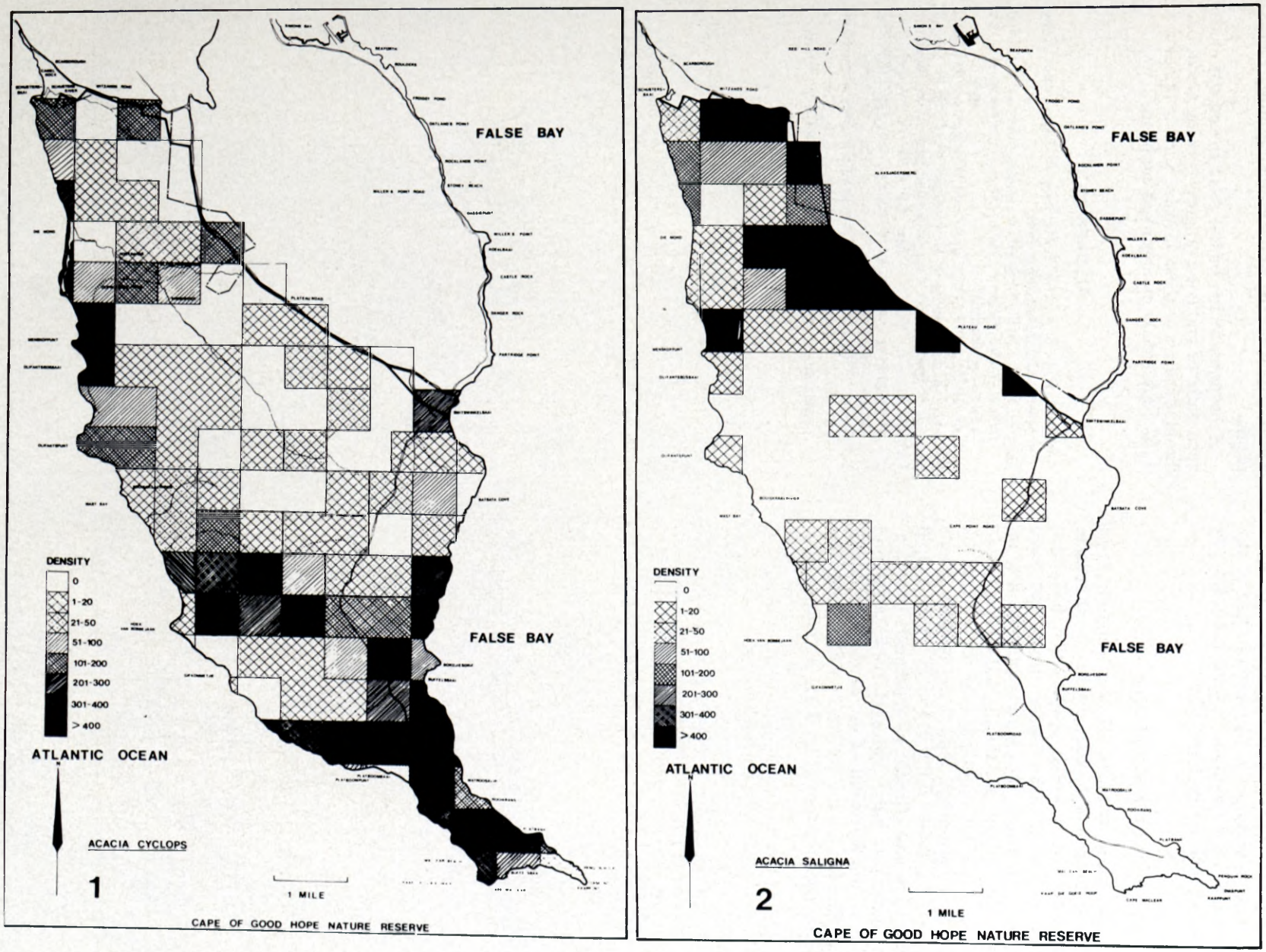

FIG. 9.—Distribution in 1966 of: 1, *Acacia cyclops;* 2, *A. saligna.*

Reserve and severely restricted to two small colonies which are in imminent danger of extinction. *Staavia dodii* (Fig. 2), also endemic to the Reserve but not as seriously threatened, occurs on the rocky hills bordering the plateau. *Mimetes hirtus* (Fig. 8) is rather rare in seepages in the northern part of the Reserve but is more common beyond its borders, on the coastal shelf across False Bay.

INVASIVE PLANTS

In the early decades of this century when smallhold farming in the southern Peninsula became uneconomic, alien woody species that had been planted as windbreaks, shade trees and sand stabilizers developed into inpenetrable thickets on the abandoned lands and then, aided by fire, spread unchecked into the adjoining veld. Because of the competitive advantage that these invasive plants have over the native flora, especially by their rapid regeneration and efficient establishment after fire, each successive burn increases their range and density to the detriment of the natural vegetation. Chief offenders on the Reserve are the Australian wattles *Acacia cyclops* (Fig. 9.1), *A. saligna* (Fig. 9.2) and *A. longifolia,* followed by *Pinus pinaster, Leptospermum laevigatum, Eucalyptus* species and *Hakea suaveolens.* During my survey in 1966–67, only 10% of the sampling sites on the Reserve, each with a 183 m radius, were completely free of alien plants.

A programme to combat their spread has since been initiated and good progress is being made, but the eradication of these invasive species remains a serious and costly management problem.

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