Slipping Silently Away? Sand Coprosma (*Coprosma acerosa)* in Auckland and Elsewhere

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Introduction

Over twenty-five years ago Lucy Cranwell suggested one of our sand dune shrubs was in trouble. She described sand coprosma (*Coprosma acerosa*) as "formerly fairly abundant" in the Auckland region and described it as "vanishing in some areas" (Cranwell 1981). Despite this, the species was not formally regarded, nor listed, as a threatened plant until it was included in the "Regionally Serious Decline" category in the latest Auckland Threatened and Uncommon Plants list (Stanley et al. 2005). The authors of this list discussed at the time that sand coprosma had not only declined, it was predicted to continue to decline based on the knowledge of its threats in the region. The question then is "has sand coprosma been silently slipping away from the dunes of Auckland and possibly even nationwide?"

Description

Sand coprosma is admittedly a very variable species, and opinions differ widely as to how many taxa exist within it (Markey & de Lange 2003). For the purposes of this article I am referring to the form with a distinctively suckering habit, orange-yellow branchlets and yellow-green leaves which form loose, "springy" cushions – the most "common" form over most of the country. This is the plant represented by Cunningham's type (Peter de Lange *pers. obs.*), and it is very distinct from the bronze-coloured form (often incorrectly called *C. brunnea*) found within the central North Island, or the compact, densely leaved and branched, non-suckering form common along the South Taranaki coast. Fruit colour in all these forms of *C. acerosa* is also variable but as a rule *C. acerosa* s.s. has fleshy translucent white drupes that may on occasion be flecked with blue.

Ecology

Coprosma acerosa is one of the few native shrubs of the semi-mobile rear or landward side of the dunes often growing with *Ozothamnus leptophyllus* (tauhinu), *Ficinia nodosa* (club rush), *Muehlenbeckia complexa* (pohuehue), *Lachnagrostis billardierei* (sand wind grass), and *Calystegia soldanella* (shore bindweed). It also grows with *Pimelea arenaria* (sand daphne) in other parts of the country however this species is no longer found in the Auckland region. This "curious low-growing-bush" (Cockayne 1906) also provides habitat for lizards, as well as other rare fauna such as the katipo (Patrick 2002). It flowers in October and November and fruit is produced in February-March.

Nationwide distribution

Kirk's flora (1899) notes sand coprosma as "common on blown sand all round the coasts". Cheeseman (1925) noted it was "abundant on sand-dunes and sandy beaches from north cape southwards" and noted it was universally present on all sand dune systems "of any size". The current flora lists it on "coastal sands throughout" (Allan 1961). Sand coprosma is still distributed throughout the country but is no longer as abundant as in the past, however nationally this species is not regarded as threatened (de Lange *et al.* 2004).

Over the past few years I have canvassed botanists throughout the country on the distribution of sand coprosma. It is regarded as locally common in the far north on undeveloped or remote beaches from Waipu/Ruakaka and Pouto up to the Far North (Lisa Forester *pers. comm.*), southern Hawkes Bay around Porangahau and Herbertville, on Farewell Spit, and is abundant on Stewart Island (Eamonn Ganley, *pers. comm.*). However, from north to south, it: had "disappeared from most beaches in Coromandel except the remote northern ones" (Andrea Brandon *pers. comm.*) and was at two sites only on the western Waikato coast at Schackenburg Bay and Marakopa (Eamonn Ganley *pers. comm.*); was "generally very uncommon in Bay of Plenty dunes," (Paul Cashmore *pers. comm.*); at less than 10 sites on the East Coast/Hawkes Bay coastline (Mike Thorsen *pers. comm.*); had "disappeared from all but the most remote beaches" in Wellington (Peter de Lange *pers. comm.*) where it is listed as regionally in "Gradual Decline" (Sawyer 2005); and is known from one beach in South Marlborough, near Cape Campbell, one beach on D'Urville Island, on Farewell Spit and on a few beaches along the north-west Nelson coast just south of Farewell Spit (Shannel Courtney *pers.*

comm.); is "really uncommon" in coastal Canterbury with only two dune sites known (Nick Head *pers. comm.*); " quite local" in Otago "being present at a handful of sites but nowhere abundant" (John Barkla *pers. comm.*); and "not common" on the west coast of the South Island[1] (Phil Knightbridge *pers. comm.*).

Distribution in the Auckland Region (as defined by de Lange and Cameron 1997)

In Auckland the two largest populations are Mangawhai and Woodhill. At these sites are extensive patches in the back dune along almost the full extent of the beach from the canal just north of Te Arai Point 7 km north to the DOC managed Mangawhai Wildlife Refuge. It is also locally common in the dunes north of Muriwai (Chris Muller *pers. comm*). Further south on the Waitakere coast there are only a few patches at O'Neills Beach (Eamonn Ganley *pers. comm.*) and a few individuals near Karekare. On the east coast there are a couple of plants at Tawharanui (Barry Greene *pers. comm.*), and moderate populations on Great Barrier Island. It is also present on the western coast of the Awhitu Peninsula (Haines 2000). It has disappeared from all east coast beaches in the Auckland Isthmus and Takapuna District (Kirk 1870), Piha (Esler 1975), Rakitu Island (Cameron & Wright 1982), and Kawau Island (Buchanan 1875).

Why has it declined in Auckland?

It seems that the more remote the beach, the more likely that sand coprosma is present, with larger populations being only at beaches that get little visitation.

It would be difficult to argue that the decline of sand coprosma is not attributable directly to the impacts of people and coastal development. Development in the rear dunes (e.g. coastal housing subdivisions) destroy its habitat, as does farmland extending to the coast covering the dune with smothering pastures grasses. Proportionally Auckland has lost 68% of active dunelands (Hilton et al. 2000).

Marram grass (*Ammophila arenaria*) and radiata pine (*Pinus radiata*) plantations have stabilised many sand dunes in New Zealand (Hilton 2006) and sand coprosma, like other dune plants, needs bare and shifting sand for recruitment. It is rare to see seedling plants (R. (Bec) J. Stanley *pers. obs*). In addition dune weeds such as lupin, boxthorn (C. Ogle pers. comm.) and climbing dock can out compete, and in the latter case smother sand coprosma (Williams *et al.* 1998). It is also browsed by rabbits, cattle (RJS *pers. obs*.) and probably also sheep and horses. Sand coprosma is intolerant of mechanical damage from 4WD vehicles and trampling by people, and stock. It is never seen in areas regularly trampled by people (RJS *pers. obs*.).

The importance of protecting sand coprosma throughout its range

Coprosma acerosa is clearly not just one species and the late A. P. Druce (1920-1999) recognised upwards of six entities within it (Markey & de Lange 2003; Eagle 2006; P. J. de Lange & C. C. Ogle *pers. comm.*). Recent molecular research confirms the validity of most of these. However further work is required as some unique sequences have been found between morphologically indistinguishable taxa (Markey & de Lange 2003; R. C. Gardner, J. Keeling, S. D. Wright & P. J. de Lange unpubl. data). While taxonomists may quibble it is clear that to preserve these patterns of diversity it is all the more critical to conserve the full range of the "species" diversity.

Conservation measures in Auckland

The Auckland beaches and dunefields have already lost *Atriplex hollowayi*, *Euphorbia glauca* and *Pimelea arenaria*, and *Austrofestuca* is now confined to small parts of its mainland range and Great Barrier Island. Most of Auckland's dunes are now very modified, and only a few remote beaches maintain components of original dune vegetation. They face increasing pressure from development, visitation/trampling, and spread of weeds. It is eerie to read passages such as the following from Thomas Kirk in 1895:

"In many instances a comparatively few species of naturalised plants have taken possession of sea-beaches, completely displacing the original vegetation by their more vigorous growth and their vast numbers-simply crowding it out by depriving it of air and light, and to a large extent absorbing its nourishment…" at some places "the displacement is almost complete, the original littoral vegetation having been driven to a few peculiarly favoured spots, where it maintains a somewhat precarious existence".

We are now protecting the "last of the last" when

[1] It is not known around Westport but is expected to be present at some of the more remote beaches further south of Westport Phil Knightbridge *pers. comm.*

it comes to our intact dunes, or even dunes with some native character. Sand coprosma looks to be one of the next wave of threatened plants - silently slipping away. Priority must be given to protecting all remaining sand coprosma sites in Auckland. There is interest from many community groups and agencies to re-introduce sand coprosma as part of coastal restoration planting projects. As long as the closest population to the planting site is used as a source, so as not to affect any future taxonomic work, and as long as all the threats listed above are mitigated before any translocation is attempted this is appropriate.

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Appendix 1. Auckland's sand coprosma records.

A. Herbarium specimens of *Coprosma acerosa* for Auckland

Location	**Collection Date**	**Herbarium Specimen** (AK= Auckland museum herbarium, CHR= Allan Herbarium Landcare Research, Christchurch).
Muriwai Beach & Woodhill sand dunes	1883-2007	AK 211600, AK 263439, AK 224348, AK 299519, AK 8938-8946
Waitakere	1885-1902	AK 263438, AK 263441
Karekare & Tunnel Point	1943-2005	AK 132203, AK 161365, AK 277212, AK 228400, AK 289520
Manukau Heads	1884	AK 8947
Karioitahi/Awhitu	1965-1999	AK 115953, AK 232952, AK 236460, AK 106205

Pakiri Beach to Mangawhai spit	1939-2007	AK 234104, AK 37463, AK 287405, AK 298682, AK 299779
Takatu Point (Tawharanui Peninsula)	1975	AK 135991
Tamaki sandspit [Tahuna-Torea]	Kirk herbarium n.d.	AK 11684
Kaitoke Beach & Oruawharo Bay, Great Barrier Island	1938-1990	AK 22200, AK 271544 [both Kaitoke Bch], CHR 466149

B. Literature records of *Coprosma acerosa* in Auckland

Author	**Location**
Hutton & Kirk 1868	Arid Island [Rakitu]
Kirk 1868	Great Barrier (noted as abundant)
Kirk 1870	Auckland Isthmus and Takapuna District
Buchanan 1875	Kawau Island
Esler 1975	Piha
Cranwell 1981	West Coast

Botanical collecting in the central Pacific Ocean region

Rhys Gardner

This article summarizes plant-collecting activities in the central Pacific Ocean region (hereafter, central Oceania) up to the year 1800. Another, on the following 75 years, is intended. Originally part of a review of the region's grasses (Gardner 2007), this material grew too long to be placed there.

"Central Oceania" comprises the islands and island-groups of Rotuma, Wallis & Futuna, Fiji, Tonga, Samoa, Niue, and the Cook Islands. With the exception of the (plant-less) Minerva Reef of Tonga, they are all located entirely within the tropics, between 9 deg. South and the Tropic of Capricorn. The distance spanned, from Rotuma in the west to Penrhyn in the east, is c. 2700 km.

Information has mostly been gleaned from secondary sources: van Steenis-Kruseman (1950); Buck (1953); Beaglehole (1955-67); Sharp (1960); Dunmore (1965-69); Smith (1979); Spate (1988); Dunmore (1992); Badger (1996). The compilation of Brigham (1900) is very useful where older names of islands are concerned, and Robson (2000) is an invaluable atlas and itinerary for Cook's First, Second and Third Voyages. Where particular plant collections are likely to be found today can generally be determined from the Index Herbariorum Part II (Collectors) series, e.g. Vegter (1976), and from notes in the taxonomic bibliographies "TL 1" and "TL 2" (Stafleu 1967; Stafleu & Cowan, 1976-88).

The earliest voyages of discovery into central and eastern Oceania, in the 17th and 18th centuries, went in search of wealth and geographic knowledge, and made no systematic collections. The last of them can be mentioned here, since it marks the transition to what has been called "The Golden Age of Scientific Exploration". This was the voyage of Captain Samuel Wallis in H.M.S. *Dolphin* along with two other vessels. His orders were to search for land in the southern Pacific Ocean, notably the 'Southern Continent' that had been predicted by theoretical geographers. After sailing west through the Tuamotu Islands Wallis reached the easternmost island in the Society Islands group, Meheitia, which he named 'Osnaburgh Island'. 0n 18 June 1767 Tahiti was discovered.

Wallis named Tahiti 'George III Island' and stayed there somewhat more than a month. He gave names to Moorea ('Duke of York's Island') and three other of the leeward islands in this group. Leaving this archipelago, the *Dolphin* sailed westwards to pass Niuatoputapu and Tafahi in mid-August and, a few days later, Uvea, or 'Wallis Island', as Wallis's men would have it. From Uvea the *Dolphin* continued westwards to Batavia, to regain England on May 20 1768.

The first important scientific expedition into the eastern Pacific was made by the French, under Louis-Antoine de Bougainville, whose ships *Boudeuse* and *Etoile* set sail from Nantes in France on 15 November 1766. Philibert Commerson was the expedition's Royal Botanist and Naturalist. They entered the Pacific through the Straits of Magellan, sailed past the Tuamotus, and on 2 April 1768 reached Meheitia in the