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WHEN IS A DRYLAND A WETLAND?

by

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1. EPHEMERAL WETLANDS OF DUNES

A native gentian relative, *Sebaea ovata*, was discovered in a dry dune hollow at the Whangaehu River mouth near Wanganui, in January 1989 after being "missing" in New Zealand for 17 years. This event has had some media attention through newspaper and TV news items, and is detailed by me in the latest Wellington Botanical Society Bulletin (Ogle 1989). The find has focussed attention on the place where it occurs. Why should *Sebaea* remain here after disappearing from a string of locations between Hokianga and Lake Ellesmere over the past 150 years?

Since writing up the *Sebaea* story, I have re-visited the plant's habitat every few weeks, and through winter and spring was impressed by the wetland character of the dune hollows. From January to June the parallel dune hollows (dune slacks) were surface-dry, though they support indigenous and adventive plants that indicate a high water table: *Coprosma propinqua*, cabbage tree (*Cordyline australis*), toetoe (*Cortaderia toetoe*), sand gunnera (*Gunnera* var. [= *G. arenaria*]), *Isolepis basilaris*, jointed rush (*Juncus articulatus*), grass-leaved rush (J. caespiticius), jointed wire rush (Leptocarpus similis), *Limosella lineata, Mazus* sp. (unnamed; M. pumilio of New Zealand authors), *Myriophyllum pedunculatum, M. votschii*, New Zealand flax (*Phormium tenax*), lady's tress orchid (*Spiranthes sinensis*), and others.

Between July and December 1989 sheets of shallow water lay over low, flat surfaces, or in channels on uneven ground. Black-fronted dotterel (*Charadrius melanops*) and spur-winged plover (*Vanellus miles*) waded and dabbled in the shallow waters. Thus, for half the year the Whangaehu dune hollows are undoubted wetlands; for the other half of the year most observers would describe them as dryland. Although the term "ephemeral" is used to describe such wetlands in this paper, other authors have used terms such as temporary or seasonal.

In all seasons, a high table water determines the ecological character of these dune hollows. As well as providing conditions for wetland plants and fauna, periodic inundation is essential for weed suppression. Relatively few adventive species seem to cope with the alternate wet/dry nature of the habitat. However, pampas grass

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[1] This paper first appeared in the Department of Conservation's Wetlands Newsletter No. 5 (November 1898). Some additions and editorial changes were made in producing the current version.

(*Cortaderia selloana*) has been controlled here recently, and some monitoring is being undertaken of several clovers (*Trifolium* spp.) and related legumes, hawkbit (*Leontodon taraxacoides*) and Yorkshire fog (*Holcus lanatus*).

Elser (1969) described similar plant communities near Himatangi on the Manawatu coast. I saw these dune hollows with him in 1969, but the area is now almost unrecognisable through the spread of pampas grass, Yorkshire fog, strawberry clover (*Trifolium fragiferum*) and other weeds. It is not known whether this deterioration of the natural character resulted from a lowering of the water table, so that the periodically wet areas are no longer inundated as deeply or for as long, or whether there was oversowing of pasture plants or use of fertiliser. About 6 years ago, however, the dune hollows were mown and 'hay'-bales were made of jointed wire rush!

Further south, in stabilised dunes in Queen Elizabeth Park near Paekakariki there are ephemeral wetlands surrounded by pasture. These are rather different floristically from the Whangaehu dune hollows, and contain tall spike-rush (*Eleocharis sphacelata*) (in its closest occurrence to Wellington), and other regional rarities like tumble grass (*Lachnagrostis filiformis*) and *Gratiola sexdentata*. When wet, the area is used by waterfowl, including New Zealand shoveler (Anas rhynchotis) and black swan (*Cygnus atratus*), and also by dabchick (*Podiceps rufopectus*), pukeko (*Porphyrio porphyrio*), white-faced heron (*Ardea novaehollandiae*), and shags (*Phalacrocorax* spp.).

The wetlands were identified for protection from grazing in the 1982 Management Plan for the Park, and were fenced off from grazing in the period 1982-84. After the area was fenced, a nationally uncommon grass, *Amphibromus fluitans* was found.

The different perceptions which people have of ephemeral wetlands can be seen by the actions of the Queen Elizabeth Park Board after it came under the Kapiti Borough Council in 1984. Cattle and sheep were again grazed in the area, and horse trailing and cross-country motor cycle racing were permitted. Appeals to the Board over five years by members of conservation groups and, more recently, by staff of the Department of Conservation and Botany Division, DSIR, obtained a recent respite from horses and motor cycles, but not grazing.

2. OTHER EPHEMERAL WETLANDS

Ephemeral wetlands can be found also in land systems other than coastal dunes. Some botanically significant ones are in karst country of the north-west Ruahine Range. In a sea of red tussock is a mosaic of hollows, the Makirikiri Tarns, which supports mats of mostly short stature 'turf' plants. Every hollow is floristically different, *Leptinella pusilla* dominating one, *Carex rubicunda* the next, *Tetrachondra hamiltoni* the next and so on. After rain, all the hollows fill with water. Some dry out almost immediately, but others take days and weeks and some pools remain as permanent water.

A very similar situation occurs around the highest parts of the Maungaharuru Range in inland Hawkes Bay. Turf mats on hard substrates resist the trampling of cattle, sheep and goats which graze the surrounding pasture (at over 1800m altitude). Soft-bottomed, seasonally wet areas are badly trampled and adventive plants (e.g. jointed rush, *Isolepis*

setacea and *Carex ovalis*) and have invaded them. An inspection early in 1989 failed to re-find *Carex enysii* here, the site of its only North Island record.

Wild animals can also have considerable impacts on ephemeral wetlands. For example, in periodically wet areas of the southern Kaimanawa Ranges wild horses are modifying the habitat of nationally threatened plants. On-going research by Dr Geoff Rogers of FRI at Rotorua has already shown that the present high numbers of horses are incompatible with the conservation of the diverse native flora of these wetlands. Plants at risk include *Gnaphalium ensifer* and *Carex berggrenii* in their only North Island sites, *Amphibromus fluitans*, and a brown hairy form of *Ranunculus recens*. Ironically, the horses are protected under the Wildlife Act but the threatened plants have no formal protection.

Saline ephermeral wetlands of Central Otago have been comprehensively surveyed and described by Patrick (1989). Although these areas have some similarities in flora and fauna to coastal saltmarshes, long periods of isolation from the coast have produced unique ecosystems with endemic biota. Agricultural practices have eliminated many inland saline wetlands, and adventive plants are invading those that remain. Patrick (ibid) makes a strong plea for the conservation of remaining examples, but stresses the need for management to retain or restore their natural character.

Other types of ephemeral wetlands can be found on lake shores such as Lake Wairarapa (Moore *et al*. 1984) and inland lakes of Canterbury and Otago (e.g. Macmillan 1979). Moraines and gravel surfaces resulting from glacial events contain yet other types, such as occur in Tekapo, Pukaki, and Omarama Ecological Districts. Espie *et al*. (1954) called these "kettlehole tarns", or simply "tarns", without clearly indicating their often ephemeral nature. In the central North Island, some "frost flats" contain wetlands which are ephemeral in character. They exemplify the difficulty of classifying communities as "wetland" or "dryland". Areas with hard tussock (*Festuca novae-zelandiae*) and monoao (*Dracophyllum subulatum*) which are wet underfoot only during heavy rain seem to be undoubted drylands, but these grade into progressively wetter areas with wetland species such as *Shoenus pauciflorus, Olearia virgata, Baumea* spp., tanglefern (*Gleichenia dicarpa*) and bog pine (*Halocarpus bidwillii*).

3. CONSERVATION NEEDS

There is a major lack of appreciation of ephemeral wetlands, of their ecological importance, their national rarity, their great range of types, and of the dynamics of such systems, including the vulnerability of many types to disturbance. Nature conservation tends to fare badly in competing interests for use of wetlands that are not permanently wet.

Disturbance of the native vegetation and substrate by, for example, livestock or vehicles, allows the entry of weeds. Once weeds are established it appears very difficult to eradicate them, and restoration of the natural condition is likely to require much more than merely fencing to exclude animals or vehicles. Some grazing may be necessary to suppress weed growth. Carefully designed experiments should be undertaken before or during attempts to manage disturbed wetlands.

The important first step to conserve ephemeral wetlands is to recognise their existence. This should be followed by recording their flora and fauna, in all seasons, and mapping to achieve an understanding of what changes are happening. Study of earlier maps and aerial photographs may add to this appreciation of the dynamic nature of ephemeral wetlands.

The WERI database should incorporate all ephemeral wetlands with significant natural values.

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