

TRAVIS SWAMP REVISITED

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Introduction

In 1984 Partridge prepared a report in response to proposed infilling of Travis Swamp for urban subdivision. Botanical values that might be jeopardized were assessed. Although no development has taken place in the intervening four years, proposals by Travis Country Estates Ltd have been recently reactivated (Christchurch Star, December 11 1987, Travis Country Estate Concept Plan 1987).

Since the earlier assessment of the swamp there has been little change to the area and there is little to add to Partridge's description of a stream ("Travis stream"), its islands and their vegetation.

As Partridge (1984) pointed out "the islands of *Carex secta*... are excellent examples of remnant swamp vegetation of the Christchurch city area. Similar vegetation is rare." Partridge argued that "the development of a park with the stream at its focus would ... (preserve) the vegetation and (provide) an attractive amenity."

Of the total wetland area, bounded by Travis, Frosts and Mairehau Roads and, in the west, by Travis Swamp Drain, Partridge was able to visit only a small part, mainly in the south and east - the rest being flooded at the time. Apart from the natural stream and islands, which he correctly identified as valuable (above), most of the area examined is relatively well drained and natural values are largely degraded by cattle grazing.

However, a recent examination of the wetter, northwestern corner of Travis Swamp revealed some outstanding, though modified, remnants of Christchurch freshwater mires. For example, the large, insectivorous sundew (*Drosera binata*) has not been reported in the Christchurch area since last century (Armstrong 1869, Herriott 1919, Wall 1923) and indeed, in Canterbury, is known elsewhere only at Ellesmere (Clarke and Partridge 1984) and Coleridge (A.Shanks pers. comm. 1988). Some other species are unknown in Christchurch, or are now restricted to a few, threatened pockets, or no longer exist in natural surroundings. For example, native ferns and sedges are largely confined in the Canterbury Plains to drains, canals and river banks, where they are mixed with adventive tall

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Scale:

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See also Norton & Meurk - Conservation Blueprint for study: 3-15

grasses and herbs which are regularly mown. Moreover, many open waterways are being replaced by pipes.

Vegetation, with emphasis on northern area

The western boundary of the swamp is defined by a drainage channel (Travis Swamp Drain) at the foot of an ancient sand dune, now built on, and by the artificial fill of a Post Office Reserve - some of which covers former stands of manuka (*Leptospermum scoparium*) (G. Collett pers. comm. 1988). To the north (along Mairehau Road) are horse-grazed sand ridges dominated by lupin. South and east of these boundaries is the low-lying (<1.5 m a.s.l.) swamp proper. A mosaic of several plant communities on peats and gleyed silts is recognized and these are described below (see Map). Appendix 1 is a species list.

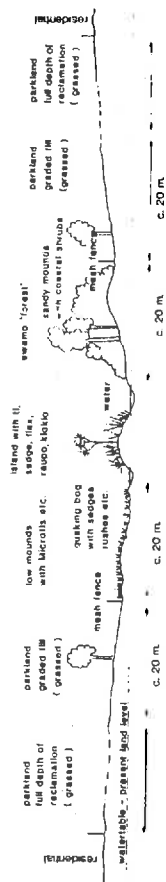
1. Willow Woodland (crosshatched on map) This is dominated by thickets, ca. 5 m tall, of grey (*Salix cinerea*) and golden willows (*S. alba*) on peats 1.5-2 m deep:

(i) The wetter, and periodically flooded parts are reminiscent of carr woods of Europe. There is a vigorous ground cover of kiokio (*Blechnum minus*) under the grey willow canopy. Three small colonies (4, 7, 16 plants) of the spider orchid (*Corybas rivularis* - some flowering through 3-29.10.88) occur on low banks, some beside cattle tracks through manuka and willows. The species is not known elsewhere on The Plains. Occasional saplings of karamu (*Coprosma robusta*), mikimiki (*C. propinqua*), ti (*Cordyline australis*), rare kohuhu (*Pittosporum tenuifolium* in Partridge 1984) and introduced species occur in the understorey. Bryophytes were quite common on the ground (*Racomitrium strumiferum*, *Hypnum cupressiforme* and *Brachythecium salebrosum*).

(ii) On slightly elevated, more silty terrain, the willow woodland is drier with less kiokio, more of the fern *Hypolepis ambigua*, with other native ferns and herbs (*Hydrocotyle*, *Centella*, *Cardamine*, introduced herbs, cocksfoot grass, shrubs and *Dryopteris* fern, the *Coprosma* species and hybrid, and some shaded fl. A few native lichens and mosses occur epiphytically on willow trunks throughout (*Xanthoria*, *Punctelia*, *Ramalina*, *Parmotrema*).

2. Swamp Shrubland (S on map) Along the northern fringes of the willow carr are scattered shrubs of manuka (mapped in 1856 as significant woodlands in this area, recently considered extinct in Christchurch, but now also known from a few plants at Brooklands Lagoon, Lincoln and Ellesmere), mikimiki (otherwise in the region confined now to Riccarton Bush, hills and coasts), willows,

Profile across proposed Travis Stream reserve.



LEGEND

- buildings
- fence line
- - - ditches or boundaries
- drain direction
- - - Landcorp boundary (to west)
- ▨ willow and coplar
- ▩ swamp shrubland and Brumera
- ▧ tussocky rush - sedge - grass mire
- ▦ Eucalyptus dominant
- ▥ grass - low siltation with tall rushes: raupo, puri and harakeke purei
- ▤ quaking bog
- ▣ open water
- ▢ dune sand
- town and gorge etc.

VEGETATION MAP



Travers Swamp showing major vegetation, landform and soil units. The profile diagram is a concept for integrating urban, buffering parkland and conservation zones in the "Travis Stream" area.

blackberry (*Rubus echinatus*, *R. laciniatus*, *R. procerus*), gorse (*Ulex*), broom (*Cytisus*) and hawthorn (*Crataegus*). Pushing up around these taller woody plants are robust stands of kioiio and the reddish brown native reed *Baumea rubiginosa* (known otherwise only from small, threatened populations in the Cockayne Reserve, Saltwater Creek, Orton-Bradley Park and Ellesmere; Mason 1975, 1976). In shelter some of the *Baumea* is over 2.5 m tall. Also, in shorter rush-sedgelands among the islands of scrub, are occasional plants of *Triglochin striatum*, *Juncus planifolius*, rare *Luzula picta* and the remarkable find of sundew (*Drosera binata*) as scattered individual plants and in larger patches (ca. 1 m²); emerging on 8.11.88 with foliage up to 15 cm tall on 9.11.88.

3. Rush-sedge-grass-Mire This mosaic of tussock and turf vegetation covers the greater area of Travis Swamp with rushes and sedges dominating in the north and grasses and forbs in the south. The relative dominance of rushes (*Juncus articulatus*, *J. effusus*, *J. planifolius*, *J. gregiflorus*, *J. bufonius*), sedges (*Carex flacca*, *C. virgata*, *C. secta*, *C. maorica*, *C. ovalis*, *Eleocharis acuta*, *Baumea*) and grasses (*Agrostis stolonifera*, *A. ?capillaris*, *Holcus lanatus*, *Glyceria plicata*, *Anthoxanthum odoratum*, *Dactylis glomerata*, *Poa pratensis*, *Cynosurus cristatus*) varies according to drainage, nutrient supply and grazing pressure. Of sporadic importance are buttercups (*Ranunculus repens*, *R. acris*, *R. sceleratus*), legumes (*Trifolium repens*, *T. fragiferum*, *Lotus pedunculatus*), docks (*Rumex crispus*, *R. conglomeratus*), catsear (*Hypochoeris radicata*), *Hypericum tetrapterum* and the native herbs *Microtis unifolia*, *Epilobium insulare*, *E. pallidiflorum* and *Potentilla anserinoides*.

Three phases of this mire are recognized together forming a matrix through the whole area:

(i) *Baumea* sedgeland (S on map) - fringing and mixed with the shrubland and woodland. This together with *Carex secta* is currently browsed by cattle and should recover and overshadow naturalized rushes (*Juncus articulatus*) and sedges (*Carex flacca*, *C. ovalis*) once the cattle are removed. About 50 plants of the spider orchid were noted here in flower on 3.10.88. *Potentilla* is scattered throughout.

(ii) Rush-sedgeland (T & E on map) - the northern part of the swamp is crisscrossed with defunct drains; the 1 m deep peaty gel has its vegetation more or less at the minimum water table. In places it is dominated by the introduced glaucous sedge (*Carex flacca*), elsewhere by the native spike rush (*Eleocharis*) or tussocks of *Carex secta* and *C. maorica*, and then again by jointed rush (*J.*

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articulatus), buttercups, monkey musk (*Mimulus guttatus*) and other introduced graminoids (*Agrostis*, *Holcus*) and forbs (*Hypericum*, *Rumex*). Small (2-4 m tall) grey willows are beginning to spread onto the mire. At present they are quite scattered.

(iii) Grass-rush-wet pasture (JP on map) - in the south, on the better drained shallow peats and heavy silt loams are old dairy pastures locally dominated by clumps of soft rush (*J. effusus*). The grazed turf supports jointed rush, grasses, clover, occasional sedges (*Carex ovalis*) and populations of the onion-leaved orchid.

4. Tall Swampland (stipple and dashes on map) The tall monocultural raupo, purei and harakeke stands are best developed in "Travis stream" as described by Partridge (1984). Floating or submerged rafts of duckweed (*Lemna*), *Wulfia*, floating fern (*Azolla*) and pondweed (*Potamogeton*) occur in natural and artificial ponds and channels. *Cotula coronopifolia* and *Potentilla* are common in the grassy verges of the sluggish "Travis" stream.

5. Sand Ridges and Reclamations (D&L on map) These are highly modified, some by horse grazing, and are dominated by lupin, broom, various other introduced trees, shrubs, forbs and grasses with native bracken (*Pteridium esculentum*) and sparse poroporo (*Solanum laciniatum*).

Soils: The soils described and mapped by Harris *et al.* (1946) are more or less as follows: sandy loams on the dunes, 1-2 m deep peats and peaty silt loams under the willow and mire (phases i and ii), and gleyed, heavy silt loams under the wet pasture (mire, phase iii).

Vertebrates: Forty two birds, including 26 natives, a skink, as well as eel (tuna) and galaxids (inanga) are recorded from the greater Travis Swamp area (Appendix 2).

Conservation status of vegetation
Given the virtual elimination of Christchurch's natural estate, within the space of a mere 150 years, the Travis Swamp area must be regarded as an invaluable, natural monument - ranking alongside the kahikatea forest of Riccarton Bush, the remaining salt and brackish marshes of the Avon-Heathcote Estuary, Brooklands Lagoon and Lake Ellesmere, the pingao dunelands of Kaitorete Spit, and the silver tussock and dry shrublands of the Port Hills and McLeans Island area. These are the few representatives we have left of the pre-European vegetation. They are the touchstones upon which future generations will interpret and judge their

environmental roots and natural history, and their ancestors' foresight and industry. The wider Christchurch context of this issue is considered further by Meurk and Norton (1988).

Wall listed 50 freshwater swampland species in his Christchurch flora. Of these 63% are presently found in Travis Swamp suggesting that the half-dozen or so communities described are a fair representation of Christchurch's original extensive wetlands (formerly occupying about 70% of the area). Indeed Travis Swamp could be considered more representative of pristine Christchurch than Riccarton Bush.

A number of regionally rare, threatened or restricted species have been identified in Travis Swamp. Moreover, Travis Swamp preserves some of the only undeveloped examples of the 4000 ha of Canterbury Plains peatlands and gley soils. Despite modification of the marshland, the surviving mosaic, incorporating communities with a high proportion of native species and dominants, or with potential for restoration, must be regarded as a nationally significant relic. This is particularly so because of its location within a major city and its consequent value as an aesthetic, cultural, recreational and educational resource.

The following points can be noted in comparing Travis Swamp with other eastern New Zealand wetlands. *Drosera binata* and *Baumea rubiginosa* are recorded from a peaty site between Allans Beech and Hoopers Inlet, Otago peninsula (P.N. Johnson, pers. comm. 1988). The sundew is also thought to occur in a coastal wetland north of Timaru. In the southern and eastern North Island, only four of 11 major wetlands assessed share more than 50% of the native species found at Travis Swamp, and the average similarity is 40% (from data supplied by C. Ogle, pers comm. 1988). In the whole eastern New Zealand, Lakes Wairarapa and Ellesmere, both internationally significant wetlands from a wildlife standpoint, are the only wetlands with comparable floras, each supporting 70% of the Travis Swamp native plant list.

While there is in parts of Travis Swamp a large, and even dominating, exotic element (rushes, sedges, grasses and willows), some of these are related to native species (at the generic, growth form or functional levels), or do not interfere with the wilderness character of the site, or can be controlled, removed or gradually replaced with native species. It is not pristine but it is not beyond salvage and repair. Furthermore, one must realistically acknowledge that all reserves in an urban context will be modified

to some extent and even Canterbury's lowland Scientific Reserves have a high proportion of adventive species.

It is an established biogeographical principle that with decreasing reserve area the probability of species extinction and habitat degradation increases - unless there is a countervailing input of intensive management effort. Large boundary:area ratios create greater opportunity for marginal degradation and weed or predator invasion. A corollary of this is that with small, isolated, fragmented reserves the only way to reduce the risk of catastrophe is to replicate habitat types and populations among several reserves, attempt to maintain stepping stones or corridors between them, and/or actively translocate genetic material between restricted populations. Thus, the existence of other wetlands in eastern Canterbury does not render this (quite extensive) one superfluous to conservation needs. There is no other wetland in Canterbury with a similar combination of species, communities and environmental gradients - with the possible exception of the Ellesmere lake shore. A large unfragmented reservation would assure the best prognosis for Travis Swamp's future survival.

Proposed conservation plan

Travis Swamp is a freehold property, largely owned by Travis Country Estates Ltd. The northwestern part is under Landcorp control and is therefore subject to a Waitangi Treaty claim by the Kaitahu. The land was zoned residential G1 in 1974. As such the developers or owners have the legal right to drain and fill the swamp and establish an urban estate, provided certain conditions are met to the satisfaction of the Waimairi District Council, the local controlling authority, and the North Canterbury Catchment Board. The Travis Country Estate Concept Plan (1987) is a document primarily dealing with engineering, town planning and sociological matters. As this article goes to press the fate of Travis Swamp is in the hands of a North Canterbury Catchment Board tribunal considering water right applications, and the Waimairi district Council who have heard submissions concerning planning and reserve matters.

At this point a range of options for the site exists - from abandoning the development, and creating a nature reserve status for the whole area, to carrying out the full development as presented in the Concept Plan.

The following conservation and management proposal is premised firstly on the core natural values described for 'Travis Stream' and the Landcorp block, and biogeographical principles of reserve

design. Secondly, re-establishing fragments of this system in Clare Park as the developers have suggested is not feasible nor viable as a conservation measure (alienating genetic populations from their natural environmental context). Thirdly, there is a requirement of that the developer must incorporate a certain proportion of 'parkland' within urban development (45-130 m²/section).

The proposal is as follows:

1. Minimally the whole northern third of Travis swamp should be protected (see Map). This would encompass a small dune ridge along Mairehau Road, 'Travis Stream' and its first three or so islands (defined by Partridge 1984), the western willow woodlands, shrublands and sedgelands, and the connecting rush-sedge-grass mire complex. All of the Landcorp-administered land should be involved. This whole unit comprises areas that are mapped by Harris *et al.* (1946) as peats and some heavy silt loams, which are at or below the winter water table. As such it comprises a natural catchment or ponding area.

2. The first management necessity would be to remove the cattle which will allow *Carex*, *Eleocharis*, *Baumea* and *Coprosma* spp. to recover.

3. Control of noxious weeds including blackberry, hawthorn gorse and broom, and containing the willow, would be the next priority.

4. Wholesale clearance of willows is not envisaged, but some areas might be gradually replaced or enriched (in several nuclei) with swamp forest species from Riccarton Bush - in particular kanikatea (*Dracrycarpus dacrydioides*) and other flood-tolerant woody plants - manatu (*Plagiantus regius*), *Pittosporum*, *Pseudopanax*, weeping matipo (*Myrsine divaricata*), makomako (*Aristotelia serrata*), kapuka (*Griselinia littoralis*) and others at a later stage.

Sedges, rushes, harakeke, raupo and kiokio (from islands 4-6 of Partridge, 1984) could be scooped up and used to enrich parts of the proposed swamp reserve which is presently depleted by cattle grazing and pugging.

Introductions to the swamp proper might include a native buttercup (*Ranunculus glabrifolius*), and the grasses (*Hierochloa* or karetu, and toetoe). Some of these plants occur in the area and further searching of Travis Swamp may show others to be present.

Toetoe was reported earlier by Harris *et al.* (1946). From these stocks, material could be propagated in a nursery for later planting.

The sand ridge along Mairehau Rd could be planted with akeake (*Dodonea viscosa*), ngaio (*Myoporum laetum*), ti, kanuka (*Kunzea ericoides*), kohuhu, karamu, akiraho (*Olearia paniculata*), rohu (*Lophomyrtus obcordata*), poroporo, and tauhinu (*Cassinia leptophylla*). Other species like kapuka, mahoe (*Meliccytus ramiflorus*), totara (*Podocarpus totara*) and mapau (*Myrsine australis*) might be planted in later.

5. Close monitoring of the rush-sedge-grass swamp would be maintained to ensure the survival of the rarities and lower growing species such as *Potentilla*, *Drosera*, *Microtis*, *Epilobium*, *Corybas*, *Luzula*, *Centella* and *Triglochin*. Some localized management such as mowing, scything or more drastic disturbance might be required. It should be noted that the present habitat exists under a management of light cattle grazing. Bird cropping combined with the high water table may be sufficient to keep some areas open.

6. Again some swamp birds, and even bush birds, may be encouraged to establish here. Additional ponds, with islands, excavated from already heavily modified areas would encourage a greater diversity of bird life. Stocks of eel and galaxids should be maintained if possible with access to the sea.

7. Some patches of harakeke, planted into areas of exotic sedges, and other reeds might be harvested on a small scale for traditional Maori uses.

8. The final and most crucial component in all such work is the human factor. It seems that the best way to combat vandalism and abuse of the work is for it to be a community venture in which the neighbourhood establishing around the park and reserve grow up with it, understand it, learn from it, have a hand in its construction and management, and thus develop a vested interest in protecting it. Particularly in the formative years, protection and replanting is likely to be required - until the hydrology and land has settled into its new configuration and trees have reached a size whereby they can look after themselves. The swampiness will deter major human intrusion and strategic fencing should hopefully eliminate any hazard. But controlled accessibility will be important. This may be achieved by a ring track, board walks, hides, interpretation boards, and graded marginal parklands. There is major scope here for an important bicultural educational resource. An appropriate

landscape and management plan with wide participation will be integral to the success of the concept.

It should be recognized that there are precedents for wetlands within urban areas - e.g. Matawai Park - Rangiora, Avon and Heathcote rivers, and in the Warrington "ecological plantings" in England (see also the Dip. L.A. thesis by Dinah Hansman, 1987). A neighbourhood conservation group would be the ideal means of ensuring the success of this type of venture.

Summary

The biological significance of Travis Swamp is reassessed because of reactivation of proposals to fill in the wetland and develop an urban estate.

176 vascular plants are recorded, of which 50 are native. At least 27 lower plants are noted. 42 birds (26 native), a skink, and two indigenous fish are also reported.

Five compound plant formations are recognized: Willow woodland (two phases), swamp shrubland, rush-sedge-mire (three phases), tall swampland, and sand ridge. The sand ridges are almost devoid of native species, the willow woodland although dominated by exotic willow, has an important natural component, while the other three formations have a substantially natural/wilderness character with some locally and nationally significant elements, and some regionally rare species (sundew, manuka, sedges, orchids). These wetland communities were once a characteristic feature of the Christchurch area, but are now largely eliminated or severely modified. These vestiges in Travis Swamp offer some of the last opportunities for protection and restoration of such representative examples of our local natural heritage.

It is recommended that 'Travis Stream', draining Frosts Road, and its islands, and the western woodland, shrubland and mire should be protected in a single large reserve occupying at least the northern third of the total 80 ha area. This would fulfil all the criteria for a viable reserve - an unfragmented area with more or less natural landform/catchment boundaries. It would preserve most of the peat and sand dune soils and smaller patches of the heavy silt loams which predominate in the southeast and which would be more amenable to development if this is inevitable. A plan is presented involving one possible scenario within a continued, but modified, urban development, and management issues are discussed.

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