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LOCAL PLANTS CONSERVED IN A MUNICIPAL GARDEN

By 1900, the original woodlands, grasslands and wetlands of the Adelaide Plains in South Australia, had largely been converted to grazing, cropping, vineyards and olive groves, and urbanisation was well under way. Spreading outwards from a number of original settlements, the metropolitan area of Adelaide grew to completely cover the Adelaide Plains by 2000.

In the eastern metropolitan area is a municipality called Burnside. The municipality is almost entirely residential although some steep slopes to the east remain undeveloped. After a history of clearance, grazing and abandonment, this foothills land has become infested with a multitude of introduced weedy species. The major woody weeds include Olive, Aleppo Pine, Hawthorn, Boneseed *(Chrysanthemoides monilifera*) and Buckthorn (*Rhamnus alaternus*). The introduced species increase the fire hazard on the land, compete with the indigenous flora and provide habitat only for common generalist species of fauna. As part of a review of environmental policies a number of years ago, the council adopted a biodiversity policy which aimed to reverse the loss of native flora and fauna in the municipality.

We use four approaches to the conservation of local flora and fauna in residential areas. These are:

1. to protect and restore all native vegetation that remains on council reserve land
2. to propagate local flora in the council nursery
3. to rescue flora from development sites where this is possible
4. to establish local flora at suitable urban sites.

This article is about the highest profile of our urban local flora sites, a landscaped area around a small car-park called “Linden Gardens”. It is located on a busy intersection opposite the town hall. In this article I will focus on the philosophy and management of the garden. It is these aspects that may be of interest to people in other regions of the world. I have listed the species established at Linden Gardens at the end. This list is for botanical rather than horticultural interest as every locality will have its own local plants that can, with a bit of knowledge and care, be given a life in an urban setting.

When the council decided to revamp the old carpark, it decided to remake it as an environmentally benign garden. The design included storm water retention from the porous-paved surfaces, a small wetland which collects stormwater and directs it into soakage pipes under the garden, and plantings of local flora. The garden was planted in February 2003 using plants propagated in the council nursery. The garden was called “Linden Gardens” after the suburb in which it is situated.

Making local plants acceptable in the urban landscape can be difficult, but Linden Gardens presents a particular challenge because of its high profile location, in a busy commercial precinct. It is the sort of location where most people expect to see green lawns, rose gardens and colourful beds of annuals. Our local flora is very diverse but most of the herbaceous plants are quite subtle and are dormant in summer. The strong

seasonality inherent in a Mediterranean landscape is not readily acceptable to the general urban aesthetic. For these reasons, we need to continually learn about managing our local plants to maintain an attractive landscape at all times.

The garden has a framework of local trees. The three local *Eucalyptus* species and the four smaller local tree species will form a canopy over the garden. The dominant tree species is Grey Box (*Eucalyptus macrocarpa*). Its dark bark and dark foliage led the early European settlers to call the area the "Black Forest". Each of the four small trees used in the garden have different reasons for being locally rare.

Large shrubs are not easy to accommodate in an urban area but the two adjoining property owners were happy to have shrubs planted against their boundary fences as a protection from graffiti artists. One local shrub, Sweet Bursaria, which has spectacular panicles of scented white flowers in summer and for this reason has proved to be a great advertisement for our local flora.

The "Black Forest" was originally a grassy woodland. The grassy groundflora contained many species of native grass and many more species of herbaceous perennial plants. The local native herbaceous species are mostly representatives of plant families common in other parts of the world (legumes, daisies, orchids, lilies, buttercups) as well as families more characteristic of the Australian region (Goodeniaceae, Stackhousiaceae). Apart from a few hard-leaved evergreen perennials, all the ground-flora species of the grassy woodland naturally dry off in summer. Our native herbaceous plants do not make bold displays and are quite delicate and subtle.

So how can plants of this natural system fit in an urban landscape? One day, public perception will come to more fully appreciate the seasonality and subtlety of the local flora but this might take a generation or more. To help this process we need to enable the local plants to perform at their best in places where people will see them.

To create a garden from the local species, we have separated the grasses from the herbaceous species. Only Kangaroo Grass is used in the planted areas as it does not spread rapidly and can easily be managed. Three species of native grasses are used to form an equivalent of a lawn. Perhaps it is better to call it a grass patch. Several other grass species are used in the verges along the road frontages. The grass patch can be cut as required. As infrequently as twice a year or as frequently as once a month depending how we judge the aesthetic tolerance of the population.

In the planted areas, the herbaceous plants are allowed to set seed before being cut back. This allows the plants to spread naturally. Already, after one year, we are beginning to get germination of many species of herbaceous plants.

Total weed eradication is important. An old publication on nursery hygiene from the University of California said about pathogenic fungi: "don't fight them – eliminate them". The same can be said about weeds in a garden and particularly in a local flora garden where you want the plants to regenerate over the site. Everyone working in this garden must be able to distinguish seedlings of indigenous plants from weed seedlings at an early growth stage. Every weed is spotted and dealt with as soon as it germinates. The local plants are allowed to germinate but may need to be managed if

they come up in an unacceptable position. With judicious grooming and management of the plants, the garden will look good without compromising its value for conserving local flora.

Ultimately the herbaceous species will form drifts over the site. There will be no need to replant in the future. These plants knew how to persist without human intervention for millennia and, given the correct environment, they can continue to do so.

Last summer was the first summer for the garden and it was important to ensure that the plants established well and looked good. We gave the garden a good watering once every three weeks. In future, the garden will not actually need any extra water at all, but probably three irrigations during each summer will be sufficient for its appearance to be generally acceptable. The application of supplementary water also extends the flowering season of some herbaceous species. Less water will be needed if we get a summer thunderstorm and the water harvesting function of the design will also help with the growth and appearance of the trees and shrubs.

From a conservation viewpoint, the existence of Linden Gardens, and other planted local flora sites, provides a place for many of our local species to have a life in an urban setting. It also provides urban people with a way to connect with their own local natural history and is a living seed-bank for people interested in propagating and growing local plants in their gardens. It is certainly not a substitute for the conservation of the remaining patches of original native vegetation. Many species can not be included because they have specialised habitat or propagation requirements. Also planted areas can never match the natural diversity and biological interactions present in a natural ecosystem.

From a functional viewpoint, the cost saving and environmental benefits of this garden compared to a conventional garden will be apparent over time. There will be no need for fertiliser, little water, labour and energy inputs will be low, it will not generate organic wastes, it will not generate increased storm water runoff nor will it generate nutrient runoff. Of course, many species choices and planting styles could be used in a garden and still have these functional benefits but it is only the use of local flora that makes this garden guaranteed not to be a source of environmental weeds and gives this garden its particular sense of belonging to its location.

A natural heritage map and basic information about the land management and biodiversity program can be found at the City of Burnside website at
http://www.burnside.sa.gov.au/webdata/resources/files/naturalheritagemap.pdf
A brochure about “Linden Gardens” is also available at the site.

List of indigenous species established at Linden Gardens

Trees

Acacia pycnantha	Golden Wattle	Mimosaceae
Acacia melanoxylon	Blackwood	Mimosaceae
Allocasuarina verticillata	Drooping Sheoak	Casuarinaceae
Callitris gracilis	Native Pine	Cupressaceae

Eucalyptus camaldulensis var. *camaldulensis*	River Red Gum	Myrtaceae
Eucalyptus leucoxylon ssp. *Leucoxylon*	SA Blue Gum	Myrtaceae
Eucalyptus microcarpa	Grey Box	Myrtaceae

Shrubs and sub-shrubs

Acacia acinacea	Round-leaf Wattle	Mimosaceae
Acacia paradoxa	Kangaroo Thorn	Mimosaceae
Bursaria spinosa	Sweet Bursaria	Pittosporaceae
Dodonaea viscosa	Hop Bush	Sapindaceae
Einadia nutans	Climbing Saltbush	Chenopodiaceae
Enchylaena tomentosa var. *tomentosa*	Ruby Salt Bush	Chenopodiaceae
Goodenia amplexans	Clasping Goodenia	Goodeniaceae
Hakea carinata		Proteaceae
Hardenbergia violacea	Native Lilac	Fabaceae
Myoporum viscosum	Sticky Boobialla	Myoporaceae
Olearia ramulosa	Twiggy Daisy Bush	Asteraceae
Pultenaea daphnoides		Fabaceae
Senecio hypoleucus		Asteraceae

Herbaceous plants

Arthropodium strictum	Chocolate Lily	Liliaceae
Atriplex semibaccata	Berry Saltbush	Chenopodiaceae
Atriplex suberecta	Lagoon Saltbush	Chenopodiaceae
Bulbine bulbosa	Bulbine Lily	Liliaceae
Calostemma purpureum	Garland Lily	Amaryllidaceae
Cheilanthes austrotenuifolia	Rock Fern	Adiantaceae
Chenopodium pumilio	Clammy Goosefoot	Chenopodiaceae
Chrysocephalum apiculatum	Common Everlasting	Asteraceae
Convolvulus erubescens	Austral Bindweed	Convolvulaceae
Cotula australis		Asteraceae
Cullen australasicum	Native Scurf Pea	Fabaceae
Dianella longifolia var. *grandis*	Pale Flax Lily	Liliaceae
Dianella revoluta var. *revoluta*	Flax Lily	Liliaceae
Dichondra repens	Kidney Weed	Convolvulaceae
Epilobium billardierianum	Native Willow Herb	Onagraceae
Glycine clandestina	Twining Glycine	Fabaceae
Glycine latrobeana	Clover Glycine	Fabaceae
Gonocarpus elatus		Haloragaceae
Goodenia albiflora	White Goodenia	Goodeniaceae
Goodenia ovata	Hop Goodenia	Goodeniaceae
Goodenia pinnatifida	Cut-leaf Goodenia	Goodeniaceae
Kennedia prostrata	Running Postman	Fabaceae
Linum marginale	Native Flax	Linaceae
Lobelia alata	Native Lobelia	Lobeliaceae
Lomandra densiflora	Irongrass	Liliaceae
Lomandra multiflora ssp. *dura*	Stiff Irongrass	Liliaceae
Lotus australis	Autralian Trefoil	Fabaceae
Microtis unifolia	Onion orchid	Orchidaceae
Pseudognaphalium luteoalbum	Cudweed	Asteraceae

Ptilotus spathulatus	Pussytails	Amaranthaceae
Ranunculus lappaceus	Native Buttercup	Ranunculacea
Rubus parvifolius	Native Raspberry	Rosaceae
Senecio quadridentatus	a native groundsel	Asteraceae
Scaevola albida	Fan-flower	Goodeniaceae

Grasses, sedges and Rushes

Bothriochloa macra	Red-leg Grass	Poaceae
Carex appressa	a sedge	Cyperaceae
Carex breviculmis	a sedge	Cyperaceae
Carex fascicularis	Tassel Sedge	Cyperaceae
Carex inversa var. *inversa*	a sedge	Cyperaceae
Chloris truncata	Windmill Grass	Poaceae
Cyperus vaginatus	a sedge	Cyperaceae
Danthonia geniculata	Kneed Wallaby Grass	Poaceae
Danthonia linkii var. *fulva*	a Wallaby Grass	Poaceae
Danthonia racemosa var. *racemosa*	a Wallaby Grass	Poaceae
Enneapogon nigricans	Black-head grass	Poaceae
Juncus bufonius	a rush	Juncaceae
Juncus pauciflorus	a rush	Juncaceae
Juncus planifolius	a rush	Juncaceae
Juncus subsecundus	a rush	Juncacae
Stipa nodosa	a spear grass	Poaceae
Stipa semibarbata	a spear grass	Poaceae
Themeda triandra	Kangaroo Grass	Poaceae