

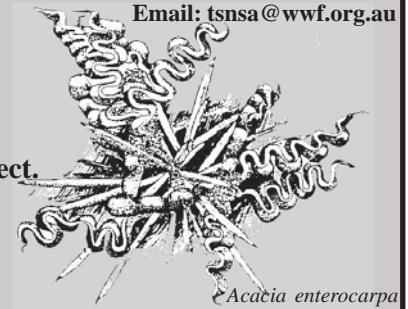
SA Veg. on the Edge

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The joint threatened plant newsletter of the DEH,
Threatened Plant Action Group and SA Temperate Grassland Project.

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Acacia enterocarpa

Saving South Australia's Threatened Seeds

The implementation of effective conservation strategies for native plant species is essential to stem the rapid loss of biodiversity throughout Australia. Of South Australia's 3,500 native vascular plants, over 800 are considered to be threatened (endangered, vulnerable or rare) in their natural environments, if no actions are taken to secure their future. Furthermore, there is evidence that at least 21 indigenous plant species have become extinct statewide in South Australia since European settlement, with the number of regional extinctions significantly higher

In 2002, The Botanic Gardens of Adelaide established the **Seed Conservation Centre** with the aim of contributing to the conservation of South Australia's threatened flora, using *ex situ* (outside natural environment) methodologies and integrating these collections with the State's *in situ* (within natural environment) conservation programs. The primary objective of the Centre is to undertake seed collections of priority plant species throughout South Australia for the establishment of long-term seed conservation collections and the development of germination and storage protocols for each species collected. The Seed Conservation Centre is currently the only unit within South Australia undertaking this type of research with native plant species. The objectives of the Centre



Corunna Daisy (*Brachycome muelleri*) - one of the endangered species being studied at the Seed Conservation Centre.

Photo: P. Ainsley.



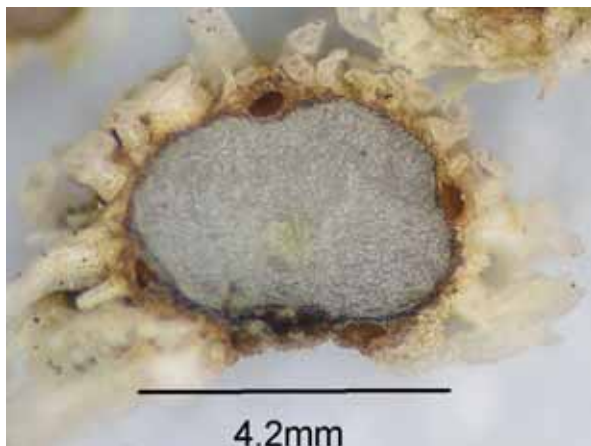
Collecting seed in South Australia's South East.
Photo: P. Ainsley.

have been tightly aligned with state and national legislation, and closely linked with South Australia's regional biodiversity plans. The program also addresses the *ex situ* conservation targets established by the Global Strategy for Plant Conservation as developed by Parties to the Convention of Biological Diversity in 2002.

Whilst it is preferable to conserve a plant *in situ*, it is good practice to implement *ex situ* measures (which are complementary) at the same time. Under certain conditions, where for example there is an imminent threat to the survival of a population, *in situ* conservation alone cannot guarantee the survival of the population or species. An alternative way of viewing *ex situ* conservation is that it acts as an insurance policy for our threatened plant species, retaining a stock of viable propagules that can be accessed just in case a population is lost or a species becomes extinct within its natural environment. Furthermore, *ex situ* research such as that being conducted at the Seed Conservation Centre leads to a better understanding of the biology of seeds from our threatened native species, providing protocols for germinating seed for restoration or translocation activities.

Once a target species is identified in the field, seed is harvested in a manner that ensures a genetic representation of the population. No more than 20% of the available seed is collected, ensuring the long-term impact of seed collection on wild plant populations is minimal. It is however important that sufficient seed be collected, as routine viability and germination trials during the life of the collection use a proportion of the stock. Once collected, seed is kept dry in breathable cotton or paper bags until it reaches the Seed Conservation Centre.

Incoming seeds are placed in a drying room, under ambient conditions of 15°C and 15% relative humidity. These conditions ensure slow, steady drying and minimise reductions in seed lot viability. Seeds are then cleaned to remove debris and foreign materials.



Dissected seed of a Blue Devil (*Eryngium rostratum*) as seen under a microscope.
Photo: P. Ainsley.

A sub-sample of each seedlot is removed for germination trials. These seeds are then tested for germination under a variety of conditions on water-agar plates. Species exhibiting dormancy mechanisms are subjected to a range of chemical and physical treatments to promote germination. Once fully dried, seeds are transferred to foil pouches, hermetically sealed and stored under low temperature conditions. Although the storage life of seeds is variable, data suggests species producing orthodox (tolerant of desiccation and low temperature storage) seeds can be stored for over 100 years. To test viability and ensure storage conditions are not detrimental to collections, a sub-sample of seed is tested twelve months after first being stored, with subsequent tests every five years.

In some instances, seed from particular plant species may be recalcitrant to long-term storage. Alternatively limitations in population size may prevent sufficient seed being collected from wild populations. Under these circumstances, alternative *ex situ* conservation techniques including the tissue culture based methods of micropropagation and embryo culture are adopted.

To enhance its capacity to contribute to the conservation of South Australia's threatened flora, the Seed Conservation Centre has developed collaborative links with a number of external groups at a national and international level, including botanic gardens, universities and other research institutions.

In 2003 the Seed Conservation Centre entered into a six-year partnership with the **Millennium Seed Bank**, which is managed by the Seed Conservation Department, Royal Botanic Gardens Kew in the United Kingdom. The partnership will enhance the Seed Conservation Centre's capacity to achieve its objectives, providing additional resources as well as an opportunity to embark on collaborative research at an international level. By 2010 the collaborative project aims to undertake long-term seed conservation collections for over 800 of South Australia's priority plant species. Seeds collected during the partnership will be duplicated for joint storage and research at the Millennium Seed Bank in the United Kingdom and are subject to a formal Access and Benefit Sharing agreement.

Partnership projects are under development with other Australian research institutions, in particular the research programs at Kings Park and Botanic Garden, Perth

Opportunities have been made available for tertiary students to undertake research projects at the Seed Conservation Centre. These projects range from small projects suitable for incorporation into undergraduate subjects to more extensive projects suitable for a post-graduate level. Projects are focused on understanding seed biology issues for native Australian plants including germination and long-term storage requirements.

Dr Phillip Ainsley
Germplasm Research Coordinator, Seed Conservation
Centre, Botanic Gardens of Adelaide

Threatened Flora Project Officer - Eyre Peninsula

My name is Katrina Pobke, I am the new **Threatened Flora Project Officer**, covering the Eyre Peninsula (in Anthony Freebairn's previous position). I will be based in Port Lincoln at the DEH office. I am originally from Port Lincoln, from a farming property near Big Swamp, Lower Eyre Peninsula. I moved to Adelaide for further study in 1999 and in 2002 started working in the Mount Lofty Ranges. Some of my previous roles include, research into vegetation recovery along firebreaks, prescribed burning and fuel reduction with the NPWSA Seasonal Fire Prevention Crew, Park Ranger in the Loft/Barossa District, Regional Fire Planner for the Adelaide Region, and recently Park Ranger in the Eyre District.



For further information on the Eyre Peninsula Threatened Flora Project please contact:

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Eyre Peninsula Region,
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Email pobke.katrina@saugov.sa.gov.au

Threatened Flora Ecologist - Mt Lofty Ranges

My name is Wendy Stubbs and I am the new threatened flora ecologist in the threatened species unit in Adelaide DEH (previously Annie Bond's position for those of you who knew Annie).

Originally from Adelaide where I completed my honours degree, I have recently returned from 5 years in New Zealand where I investigated the importance of niche limitation amongst several coastal plant communities. Whilst the theory that competitive exclusion occurs between species which obtain their resources in very similar ways has been widely accepted and is often used as the basis for conservation management, very little support for this theory has actually ever been found in plant communities. My studies found some support for this theory in two out of the five communities examined, but I also found that in other communities coexisting species were more similar to one another than would be expected at random.

After the completion of my PhD I returned to Adelaide for a short time before travelling around the world for ten months. Upon returning I worked for a short time at the Australian Water Quality Centre, writing a report on water quality in our local creeks and rivers for an Adelaide catchment board, before starting with DEH.

My contact details are:

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Threatened Flora Ecologist

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Threatened Biodiversity Recovery in the Murraylands

The South Australian Department for Environment and Heritage is conducting multi-species recovery planning for nine floral species and four bird species through funding provided by the South Australian Murray Darling Basin Integrated Natural Resource Management (SA MDB INRM) Group. In the South Australian Murray Darling Basin, 22 species of plants and nine species of birds are listed under the *Environmental Protection and Biodiversity Conservation Act 1999*.

Habitat clearance and alteration has been the historical reason for the decline of most wildlife species. The better quality soils, and therefore most productive and richer habitats were favoured for intensive agriculture and not surprisingly it is these vegetation associations that are poorly represented in today's landscape and reserve system. As a result, many of the threatened species are now found on the edge of their preferred range in poorer habitat. The persistence of these species is threatened by a variety of processes, including fragmentation, grazing by introduced and native herbivores, herbicide drift, altered fire regimes, predation, roadside disturbances and weed invasion.

Chris Obst of Environmental and Biodiversity Services is conducting the threatened flora component of this project. Experts from the Threatened Plant Action Group (TPAG), Threatened Species Network (TSN), Local Action Planning (LAP) groups, Rural Solutions and Department for Environment and Heritage (DEH) form a project team to provide assistance and guidance. Of the nine species (see table 1) the project team has identified 5 priority species to survey. These include three species of orchids, the Sand-hill Greenhood, Coloured-spider Orchid and the Metallic-sun Orchid as well as the Fat-leaved Wattle and the Monarto Mintbush.

So far Chris has been collating existing knowledge of all species and collating records from DEH Databases and the South Australian Herbarium to determine the historic location of each species. Several of the records are old and located in areas that are now housing developments or used for agriculture. This has allowed Chris to identify areas where each species can be found today.

Field work for this project began in mid-June focusing on two of the priority species, Fat-leaved Wattle and the Monarto Mintbush. Field work for the other priority species will be conducted later in the year when these orchid species begin

to flower. The field work will include searching for new populations and surveying existing populations to identify the current status and threats to these populations.

Early results for the Fat-leaved Wattle are that the populations appear to be senescing (getting older) or they are dying from currently unknown causes. There is also very little natural recruitment into these populations, which is of concern. As these populations are found in long narrow strips of roadside vegetation, the remaining populations are threatened by further fragmentation, road works, weed invasion, disturbance from trail bikes, herbicide drift and possibly *Phytophthora* (dieback). The weed species recorded at these populations include Bridal Creeper, Bridal Veil, Scabiosa, Boxthorn and several other highly invasive species.

Luke Geelen

Bush Management Advisor - Murraylands Region,

Department for Environment and Heritage.

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Guidelines for the Translocation of Threatened Plants in Australia

The Australian Network for Plant Conservation (ANPC) has recently released a revised edition of their publication, *Guidelines for the Translocation of Threatened Plants In Australia*. The second edition was produced as new information on techniques and approaches was gained through an increasing number of translocations. The revised version brings together more information on assessing whether a translocation is advised, monitoring and evaluation, and how to involve local communities. Case studies from across Australia are used to highlight the main points. The new 80-page colour publication includes information on:

- definitions and objectives;
- deciding whether translocation is a viable option;
- the translocation process from project proposal, development, through to monitoring;
- community participation; and,
- Case studies.

Copies are available from the ANPC for \$22 + postage and handling. An order form is available for download from <http://www.anbg.gov.au/anpc/books.html>. Also available is *Plant Conservation: approaches and techniques from an Australian perspective* edited by Claire Brown, Fiona Hall and Jeanette Mill. Produced by ANPC in 2003, it is available for \$55 + postage and handling. The TSN office in the Conservation Centre of SA at 120 Wakefield Street has a copy if you would like drop in and check it out.

SA Threatened Species – the Large-club Spider-orchid

There are more than 1600 species currently listed on the Australian Government's *Environment Protection and Biodiversity Conservation Act 1999*. Approximately 320 of these species are animals, but plants dominate the list; currently more than 1230 are listed. One of these is the Large-club Spider-orchid, *Caladenia macroclavia* (syn. *Arachnorchis macroclavia*).

Currently listed as Endangered under the EPBC Act, the Large-club Spider-orchid is a native terrestrial orchid with a single

short and narrow hairy leaf that is dull green with irregular red / purple blotching at the base. Flowering time is August to October. The flower stalk measures 15-28cm, and the flowers are about 5cm across. Flowers are green to yellowish green, with brown tipped club-shaped petal and sepal tips. The



Large-club Spider-orchid, *Caladenia macroclavia*.
Photo: K. & B. Bayley.

labellum or lip, has green to yellow-green fringes and a dark maroon centre.

The Large-club Spider-orchid is endemic to the Yorke Peninsula of SA where it occurs at five sites: Agery Reserve, Mona Railway Reserve, Muloowurtie Conservation Reserve, Pt Julia site and Pt Vincent site. The orchid's distribution may once have covered the Eyre Peninsula to the Murray Region, but now appears to be confined to the Yorke Peninsula.

The orchid grows on sandy clay loam soil over limestone in mallee and broombush. While mallee woodland and grassland were once widespread over Yorke Peninsula, the Large-club Spider-orchid now survives mostly in small remnant blocks and along roadsides. Vegetation at all known sites is dominated by mallee species such as *Eucalyptus gracilis*, *E. socialis* and *E. incrassata*.

The current population size is estimated to be just 250 plants. The subpopulation at Agery Reserve is considered critical for the survival of the species as it contains the largest number of flowering plants. Most of the species' subpopulations are very small and under serious risk of extinction.

Habitat loss and fragmentation caused by vegetation clearance has impacted significantly on the orchid and also increased the effect of other threats. These other threats include grazing

by vertebrate animals, competition from weeds, habitat damage by vehicles, dumping of soil or rubbish, herbicide drift and road works. Weed species such as bridal creeper, soursoybeans, wild oats and African boxthorn threaten to displace Large-club Spider-orchid at many sites. Kangaroos, rabbits and sheep eat the plants, and sheep and rabbits also cause soil erosion and spread weeds. The populations on private property and not currently protected by conservation management agreements. Habitat fragmentation also limits the abundance and movement of pollinators. Without successful pollination, the species will not increase in number.

In 2003 the SA DEH produced a recovery plan¹ for the Large-club Spider-orchid, which was adopted under the EPBC Act. This plan complements existing management plans for individual sites. The Lofty Block (North) Threatened Orchid Recovery Team is managing the recovery effort, which ultimately aims to remove the species from the endangered list. In order to achieve this, the decline in population numbers and limited distribution must be reversed and individual populations increased to ensure their viability.

There are a number of groups involved in the management of the Large-club Spider-orchid, including community volunteer groups, government agencies and private landholders. NOSSA has been involved in population monitoring for a number of years. Since 2001, there has been concerted monitoring of the species by several groups and private landholders. This has resulted in an increase in the number of known populations and plants, and has provided important information about the species.

In September 2004 the Nature Conservation Society of South Australia's 'Threatened Plant Action Group' was announced as recipients of funding through the Threatened Species Network Community Grants program to work on the Large-club Spider-orchid and several other species of threatened flora in the Mid-North region. Monitoring and surveying of threatened plants on the Yorke Peninsula will include the endangered Jumping-jack Wattle *Acacia enterocarpa*, and the vulnerable Winter Spider-orchid *Caladenia brumalis*.

If you think you may have a population of Large-club Spider-orchid on your property, or know of a location somewhere else, please DO NOT pick it. Take a photo or a good sketch, and notes detailing its appearance and location. Ask a member of one of the conservation groups or the SA DEH for help in the identification of any likely specimens. If you would like to be involved in the conservation of the Large-club Spider-orchid or other threatened flora, please contact one of the organisations listed.

For more information on the community grant project involving Large-club Spider-orchid and other threatened flora, please contact:

- Tim Jury, Project Officer, Nature Conservation Society, Threatened Plant Action Group (08) 8223 6301;
- Jean Turner, Bush Management Advisor - NYAD Region, SA DEH; or,
- Karina Mercer, SA State Coordinator, Threatened Species Network (08) 8223 5155.

¹ Bickerton, D. (2003) *Recovery Plan for Arachnorchis macroclavia (syn. Caladenia macroclavia) Large-club Spider-orchid*. Government of South Australia and Threatened Plant Action Group.

Acting to conserve threatened flora on Kangaroo Island: Threatened Plant Action Group 2004 field trip summary

In September 2004 the Threatened Plant Action Group (TPAG) made their 6th annual field trip to Kangaroo Island. TPAG have been working on the island since 1997 to conserve several nationally threatened plant species and an endangered ecological community that are endemic to the region.

On-ground recovery actions were implemented for a series of threatened plant rehabilitation sites, situated along a habitat corridor between Kingscote and Penneshaw. Work at these sites included the management of threats such as weed invasion, through appropriate minimum-disturbance techniques. Bridal Veil (*Asparagus declinatus*), a serious environmental weed in the region, was targeted for control along with introduced bulbs, grasses, and broadleaf herbs. Other measures were taken to reduce erosion and to monitor the size and condition of threatened plant populations. Additional occurrences of nationally listed species such as the Kangaroo Island Turpentine Bush (*Beyeria subsecta*) were discovered along several sections of roadside.

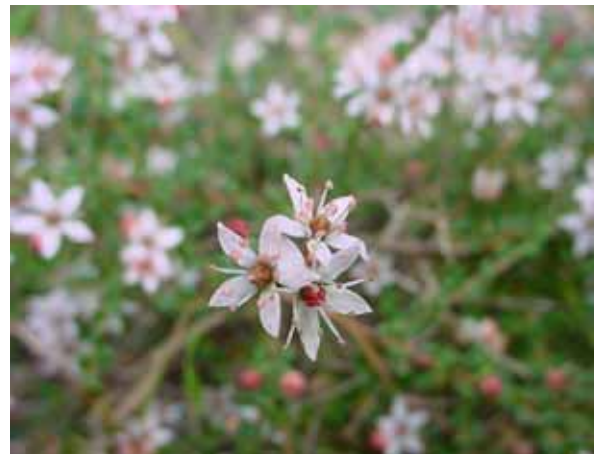
TPAG and the DEH Threatened Species Officer for KI, Dave Taylor, convened a field day to assess several management trials that are being undertaken to recover threatened flora on the island. Experimental treatments such as burning, ripping, and smoke water have been employed at different sites to stimulate regeneration of threatened plants such as Kangaroo Island Phebalium (*Leionema equestre*). The trials have produced some very positive results, particularly at the Kingscote Airport where inspection of a recent prescribed burn revealed spectacular seedling recruitment of the endangered KI Daisy-bush (*Olearia microdisca*).

A management workshop and working bee was also organized at a former council recreation reserve to explore management options for rehabilitating several degraded sections of the reserve. This small reserve contains remnant vegetation that includes endemic Narrow-leaved Mallee (*Eucalyptus cneorifolia*), an endangered ecosystem for South Australia. Previously this mallee community occupied large areas in the lower Cygnet River catchment and the MacGillivray Plateau but has been heavily cleared and fragmented. Most surviving remnants are confined to roadsides where they are subject to ongoing threats such as weed invasion and



TPAG surveys the scene at the new Conservation Park, a former KI council reserve.
Photo: Tim Jury.

bulldozing. Consequently this ecosystem is poorly conserved on KI and aside from some protection in heritage agreements is represented in only one other formal reserve. Through the ongoing involvement of TPAG and other local conservationists this land parcel is currently in the process of being re-gazetted as a conservation park under the SANP&W Act (1972).



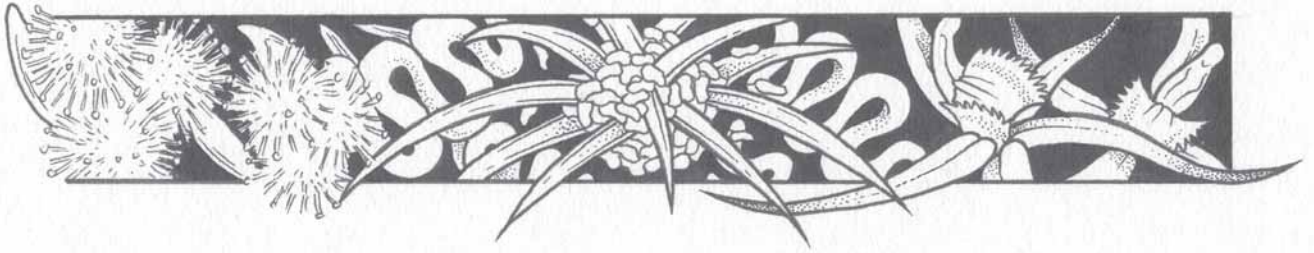
Endangered Kangaroo Island Phebalium (*Leionema equestre*) in flower.
Photo: Tim Jury.

TPAG members also contributed to broader conservation programs in the district through assisting local threat abatement measures in the release of Bridal Creeper rust spore-water (*Puccinia myrsiphylli*) along several sections of roadside vegetation with high conservation significance. Another day was spent training and supervising a Green Corps group to control woody weed invasion by Cape Wattle and Tree Lucerne in remnant vegetation along Halls road, further south toward D'estrees Bay.

Time was also taken to liaise with private land holders and other local stakeholders on future management issues for the district, such as revegetation to reduce escalating landscape threats from dryland salinity, as well as the need to enlarge and link existing habitat patches of remnant vegetation for conserving local avifauna. This important part of TPAG's work on the island is essential in conveying conservation objectives, and building community support for protecting and managing threatened plant habitats and native vegetation communities in the area.

In combination with project partners such as DEH, TPAG continues to take a key role in providing critical on-ground support for regional conservation programs on KI, including threatened flora recovery, native vegetation protection, as well as broader biodiversity conservation and landscape management initiatives. We look forward to returning next year!

Tim Jury
Program Coordinator
Threatened Plant Action Group



Invitation to submit articles

SA Veg. on the Edge is a community newsletter that aims to keep interested groups up to date with the activities of others working for endangered plant species throughout South Australia. I encourage anyone with an interest to submit articles to *SA Veg. on the Edge* on their group's activities, upcoming events, achievements and to canvass support. Graphics complementing articles are also welcome and for clarity should be a minimum of 300dpi.

Thank you to all the contributors for this issue. Please send material to: TSN, *SA Veg. on the Edge*, c/- Conservation Centre, 120 Wakefield St, ADELAIDE SA 5000 or email tsnsa@wwf.org.au.

Regards, Karina Mercer - State Coordinator.

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