

Around NCSSA

The Nature Conservation Society of South Australia is a voluntary organisation. It has members drawn from all parts of the State and all walks of life. One of the primary objectives of the NCSSA is to "foster the conservation of the State's wildlife and natural habitats".

Its activities include: protecting and managing habitats, particularly native vegetation, researching threatened species and habitats, working to ensure adequate park dedication, management and legislation, educating the community and all tiers of government, and cooperating with other conservation groups and land managers.

The Society has taken action on many varied environmental issues since its formation in 1962.

Surveys to support new reserve dedications

A major objective of the NCSSA has been to ensure that South Australia has a comprehensive and representative reserve system. This is a vital part of the system needed to ensure that the State's native plants and animals are conserved in their natural environment.

The Society has sought the addition of new reserves and opposed the withdrawal of existing reserves when necessary. It has been Society policy to put its case objectively, based on the facts available. Since 1966, in most years, there has been a major biological survey carried out by members and other volunteers to support the case for dedication of a new reserve in a particular area or to promote conservation in an area by a range of landholders.

Promoting conservation more widely

The Society has played a strong role in the formation and development of environmental legislation such as the original Native Vegetation Management Act in 1985 and the Native Vegetation Act 1991. It is now obvious that conservation reserves alone will not ensure the survival of all of the State's plants and animals, and that as much native habitat as remains is needed to conserve the biological diversity of South Australia. The Society has played a major role in the promotion of biodiversity conservation on a range of land tenures including Heritage Agreements and in integrating biodiversity objectives into the whole range of land management decisions.

Research about environmental issues

The Society conducts scientific research related to environmental protection and management. Studies done by, or on behalf of the Society, are published as reports and made available to the public through sale and distribution to libraries and government institutions. Grant funding supports this work, awarded on scientific merit from a number of grant sources.

Education and skill development about ecological matters

The Society is also active in public education through activities such as an extension program of biodiversity understanding and management workshops for rural landholders, biological skill and knowledge development for members, informative general meetings open to the public, and through its newsletter Xanthopus.

Getting involved with NCSSA activities

An elected Committee handles the Society's affairs. However it is not necessary to be a Committee member to play an active role in pursuing particular issues or topics of research on behalf of the Society. There are many opportunities to volunteer, such as assist on a survey, help manage a project, lead a members activity, or to promote the organisations activities.

The Society has its offices at **260 Franklin Street, Adelaide, 5000**. The NCSSA is financed by subscriptions, sales of its publications, private donations, and State and Federal Government grants. Much of the work is voluntary, while a few part time staff ably support this volunteer work. Donations are always welcome and fully tax deductible

For more information please contact the office on **(08) 7127 4630**, or by **email: ncssa@ncssa.asn.au**.

NCSSA people

Management Committee

President: vacant - still looking
 Vice-President: Helen Vonow
 Secretary: Robert Lawrence
 Assistant Secretary: Katie Fels
 Treasurer: Richard Winkler (co-opted)

General Committee

Andrew Allanson, Ali Ben Kahn, Valerie Lawley, Tim Milne, Michael Stead, Andrew Crompton (co-opted)

Staff

Conservation Ecologists: Anthelia Bond and Georgina Mollison
 Administrative Manager: Amanda Stewart
 Project Manager: Peter Mahoney (acting)
 Threatened Plant Action Group Programme Coordinator: Tim Jury
 Woodland Bird Survey Coordinator: Tina Gillespie
 Database & Website Project Officer: Lesley Parton
 Bushland Condition Monitoring Project Officer: Peter Mahoney
 Other project staff: Andrea Brown, Abigail Goodman, Kellie MacKenzie, Ben McCallum, Bill New, Simon Parker, Meg Robertson

Regular volunteers

Keith Lloyd: General office support and library
 Max Possingham: Woodlands Birds database
 Christina Robertson: General support
 Rachel Gein: General support

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Around NCSSA

2012 General Meetings

Our first meeting for 2012 will be on on the subject of Marine Parks, Thursday 2nd February.

As in previous years we will continue joint meetings with the Biology Society SA in March, May and August.

The March meeting will commence with a BBQ followed by the speaker.

The meeting in May will be awarding the Conservation Biology Grant(s) and there will be presentations from previous recipients.

As usual our Annual General meeting will be on the first Thursday in September.

Our big 50th celebration gathering will not be the usual meeting format - we are aiming for October / November but we have yet to finalise a date.

Further details in the forthcoming edition.

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50th Anniversary for NCSSA

The NCSSA is turning 50 in June 2012 !!!

We need **your** help. The NCSSA Committee would like to compile a history of our organisation, from the grass roots beginnings and early days of advocacy, up to the wonderful and still relevant organisation that it has grown into today.

We would like to collect oral, visual or written histories from the membership covering the last 50 years. We are after anecdotal tales, achievements, struggles and triumphs had by the NCSSA in continuing to provide an unbiased view for conservation in SA.

There is much ground to cover, and we are calling on you to share your NCSSA knowledge and experience. We ask you to cast your mind back and think about what you might be able to contribute to this collective history. If you want to contribute please contact the office on (08) 7127 4630 or ncssa@ncssa.asn.au



Swamp lily *Ottelia ovalifolia* found by Tim and the TPAG crew in a dam on private property, Brookman Rd, Meadows. (Photo: T. Jury)

Threatened Plant Action Group (TPAG)

Its got to that time of year that the winter, spring and early summer working bees are done and it all slows down for a month

However the working bees **Every Thursday** at **Millbrook Reservoir** continue, except for a short break over Christmas and New Year.

So... if you fancy some bush care in January (or the rest of the year) ~ you can come help with the management and restoration of Grassy Red gum - Blue gum woodlands in Millbrook that are habitat for threatened plant species, including: white spider orchid *Caladenia rigida*; clover glycine *Glycine latrobeana*; Behr's cowslip orchid *Diuris behrii* and pale flax-lily *Dianella longifolia* var. *grandis*.

Everyone Welcome

Please contact Tim Jury prior to working bees, as dates and times are subject to change due to weather and other factors.

08 7127 4166 or tpag@ncssa.asn.au

Conservation Ecologist Report

In the last month, we have contributed to the development of Conservation Council of SA's policy on fire management, participated in the Reference Panel for the 2012 Duck and Quail Hunting Season and are preparing a submission on the Draft State NRM Plan.

Protected Areas on Private Lands Discussion Paper

Earlier this year the Department for the Environment and Natural Resources (DENR) released a Discussion Paper on the possibility of developing a strategy to allow private landholders to protect some of their land in conjunction with the State Government and DENR. The Paper discusses options for creating Reserves on private land and updating the current Heritage Agreement system, while also addressing Native Title and resource use for protected areas on private land.

We responded to the formal calls for submissions on the Discussion Paper in early August, and since then the Conservation Ecologists have been researching and preparing for the next stage of the consultation process. While our submission praised the theory of making it easier for private landowners to protect significant areas within their properties, we paid particular attention to the role of resource use and how this will fit with protecting areas of private land. Unfortunately the Paper provides no proposed legislative mechanisms to protect from mining those areas that are deemed by DENR and the landholder to be ecologically significant enough to be granted the status of becoming a National Park or Conservation Park on private land.

Although the Paper states that the issue of resource use requires formal consultation between the Ministers responsible for the *NPW Act* and the *Mining Act 1971* prior to the dedication of the reserve, it fails to state who will have the final say.

There also seems to be a major area of contradiction within the paper relating to the fact that that an area can satisfy the National Reserve System Establishment Criteria and yet it does not receive the same level of protection from exploration and mining as National and Conservation Parks on Crown Lands. This fact may also discourage many private landholders from applying for this type of protective mechanism as there are no guarantees that a property will be protected from what many landholders consider to be the most serious threat to biodiversity on their land.

We will continue to keep members updated on the Discussion Paper and any further opportunities for the public comment.

Interim Framework for the Application of Regulation 5(1)(b) for Clearance Along Roadsides, Intersections and Rail Crossings for Public Safety Purposes.

We are collecting information that can be used to evaluate the impact of the 12 month trial of the "Interim Framework" (see NCSSA Projects, p5, this issue of *Xanthopus*).

Readers may be interested to know that earlier this year, the Honourable Mark Parnell MLC asked some questions in parliament relating to the Interim Framework, particularly the environmental costs of clearance, the expected level of clearance, and revenue foregone (Hansard April 5th, 2011). The response (Hansard September 14th, 2011) is as follows:

In reply to the Hon. M. PARNELL (5 April 2011).
The Hon. G.E. GAGO (Minister for Regional Development, Minister for Public Sector Management, Minister for the Status of Women, Minister for Consumer Affairs, Minister for Government Enterprises, Minister for Gambling): The Minister for Environment and Conservation has been advised:

1. Clearance for public safety under Regulation 5(1)(b) of the Native Vegetation Regulations 2003 does not require a Significant Environmental Benefit in the same way as clearance for the protection of life and property from bushfire. The 'Interim Framework for the Application of Regulation 5(1)(b) for Clearance Along Roads, Intersections and at Rail Crossings for Public Safety Purposes' outlines the circumstances in which Public Safety Regulation 5(1)(b) will apply. The framework requires road authorities proposing to use the Regulation to outline (where applicable) if other safety improvement measures suited to reducing the public safety risk have been considered to avoid or reduce the need for clearance. The Framework only applies to native vegetation with a stem diameter greater than 100mm. The specified distances for clearance reflect the Austroad Guidelines which establish safety standards for Australian Roads.
2. Road authorities must complete the 'Clearance Approval Form' in the Framework which quantifies, among other things, the amount of vegetation proposed for clearance.
3. Clearance for public safety under Regulation 5(1)(b) does not require a Significant Environmental Benefit payment into the Fund. This is consistent with other safety related Native Vegetation Regulations in South Australia.

Annie Bond and Georgina Mollison
 Conservation Ecologists

NCSSA Projects:

We have recently been granted funding from the Native Vegetation Council Research Fund (NVCRF) for two projects:

Assessing the impact of the Regulation 5(1)(b) Interim Framework

Regulation 5(1)(b) (under the *Native Vegetation Act 1991*) allows for clearance to be undertaken without an offset, if the clearance is for public safety. The Interim Framework sets out the Native Vegetation Council's policy for applying Regulation 5(1)(b) to clearance along roads, at intersections and rail crossings and has been in use for about 12 months.

Our project aims to collate information from clearance applications assessed under this framework and audit a sample of these in the field. We will use this information to describe the biodiversity values that have been lost and we are also planning to calculate the value of the Significant Environmental Benefit offsets forgone as a result of clearance approved under the framework.

The project has just got underway with the first meetings held, and data to arrive immanently. The findings of the project will be described in a report to the NVC/DENR which will also include a discussion of the implications for biodiversity conservation and recommendations.



Kate and Pam at a photopoint, Mokota C.P. (Photo: M. Robertson)

Monitoring grassland recruitment for State and Transition Modelling

We applied and received an NVCRF grant to undertake the biennial monitoring of native grassland at Mokota Conservation Park, and to analyse and publish a scientific report on more than ten years of findings.

Conditions were unusual this year - the rainfall has been well above average for three years but a high proportion of the rainfall in the past 12 months fell in summer. Recent dry conditions resulted in early curing of annuals and early seed drop of many native grasses. Such conditions could favour the recruitment of native grasses, especially kangaroo grass *Themeda triandra* and brush wire grass *Aristida behriana*.

Meg Robertson and her team of assistants recorded native and alien plant species in the permanent plots between November 1st and 22nd 2011. Data from 900 quadrats will be analysed along with that from previous years to assess trends in community composition and species abundances.

Many thanks to those who braved the prospect of wind, heat, rain and early mornings to provide field assistance: Jean Turner (Northern and Yorke Ecologist, DENR); Brooke Kerin and Jennifer Munro from the N&Y Natural Resources Management Board; Pam O'Malley and Kate Graham.

SE wetlands snapshot survey

This project was rapidly devised and implemented to take advantage of the extremely wet conditions of the last eighteen months. A lot of ephemeral wetlands, not usually picked up in such a survey, were able to be assessed under full recharge conditions. The project fills a gap in the SA Wetland Inventory Database (SAWID) as many of the 16,000 mapped wetlands in the SE had not been ground surveyed.

Abigail Goodman recently completed the field work sampling 295 wetlands from Keith to Mt Gambier - measuring PH, salinity and recording the major vegetation type. The first draft of the report has been prepared and will be ready for submission to DENR in the new year.



The future of silver banksia *Banksia marginata*

Introduction

Silver banksia *Banksia marginata* is a common component of the shrub layer of many stringybark and gum woodland and forest associations in the Mount Lofty Ranges and (formerly) on the Adelaide Plains. *Banksia marginata* Low Woodland is listed as "poorly conserved in South Australia" (Neagle 1995), but I do not know of any examples of this woodland in the Mt Lofty Ranges. The closest would be a section of Charleston Conservation Park, where the large majority of banksias at this site have recently died and there is no regeneration, so effectively this association no longer exists.

If you are observant and have travelled the roads in the Mt Crawford region of the Mt Lofty Ranges, you may have noticed large dead silver banksias along roadsides and in patches of remnant vegetation. Most trees died during the drought of 2002-2009, particularly from 2007 to 2009. Trees were very stressed by two periods of extended hot and dry weather.

The first was in March 2008 when there were 15 days over 35°C in Adelaide and surrounding areas. Then there was a long and severe heat wave in January-February 2009, when temperatures were above 33°C for a two week period and two days reached 44°C and 45°C. This followed a two-month period with minimal rain. While the death of mature plants may not seem to be particularly worrying, when this is combined with minimal regeneration, then the scenario is grim.

I present data from several woodland sites in the Mt Crawford area as well as anecdotal evidence from other people and from other sites in the Mt Lofty Ranges to document the extensive death of adult plants and the lack of regeneration. There are sites where mature silver banksias are not impacted, notably in areas of higher rainfall and/or lower temperatures at higher altitudes or where soil or hydrological conditions are more favourable. I have not investigated regeneration at these sites, so do not know if they also are affected by lack of recruitment.



Photo 1: Little Mount Crawford enclosure, July 2007, shortly after fence erection, showing dead mature silver banksias & sparse grazed understorey (Photo: P Paton)

in woodlands in the Mount Lofty Ranges



Photo 2: Big Flat enclosure, June 2007, just after fence erection ~ showing sparse understorey and one mature silver banksia (Photo: P. Paton)

Survival and productivity of mature silver banksias at three well-documented sites

For four years I have followed the fate of individual mature silver banksias at three sites:

- Little Mt Crawford Native Forest Reserve (LMC),
- Big Flat Forestry SA Conservation Zone (BF) and
- Cromer Conservation Park (CCP).

At LMC the banksias occur in long-leaved box *Eucalyptus goniocalyx* woodland. In 2007 a 30m by 40m enclosure was erected by Forestry SA to protect silver banksia seedling regeneration. At this time in the enclosure there were ten mature live banksias, five standing dead and two prostrate dead trees. By 20/1/2010, only six of the ten were still alive and one of these had many dead branches and this plant had died by 5/1/11. So in four years half the mature banksias had died. On sandier soils a few hundred metres to the north of this site nearly all the mature banksias have died in the past four years. Photo 1 shows a portion of the enclosure with dead banksias.

At BF banksias occur in a SA blue gum *E. leucoxylon* / river red gum *E. camaldulensis* woodland adjacent to a seasonally-inundated flat. A 50m by 40m enclosure was erected in 2007 when there were 18 live mature silver banksias, one dead standing tree and four prostrate dead trees. On 31/10/08 two of the live trees were dead, and by 6/4/11 a further three trees had died, so in four years just under a third of the mature banksias had died. Photo 2 shows the interior of the enclosure shortly after erection.

At CCP banksias occur in long-leaved box woodland. Detailed notes have not been taken of individual plants, but of the several hundred mature trees present in 2006, it was estimated that about half had died by 2010.

Attempts were made to assess the productivity of the trees that survived the drought at two of these sites. At LMC on 23/2/10, of the six healthy mature banksias, all had some old flowers and new buds. By 5/1/11 only three of the five live mature banksias were described as healthy with either flowers or buds

The future of silver banksia *Banksia marginata* in woodlands in the MLR cont.

or both present. In April 2011 banksias were flowering or budded up but were not flowering well.

At BF it was noted in October 2008 that the live mature banksias varied in health, with some having lots of foliage and others being sparse. No trees had buds or fresh flowers. In February 2009 most trees had old flowers, most had buds (although sometimes only two or three inflorescences per tree) and about half had fresh flowers. In June 2009 some of the banksias still had buds and flowers. A survey in September 2010 described eight of the sixteen live mature banksias as healthy and only one supported buds, but these were described as old and possibly aborted. By April 2011 all live mature banksias were in a healthy state and most had buds and flowers.

While detailed notes were not kept on banksia productivity at CCP, on 16/4/11 banksias were looking healthier than at any time in the last five years and most were budding and flowering.

Survival of banksias generally across the Mt Lofty Ranges

In addition to the three sites above, I have observed similar declines in other areas over the same time period. In November 2009 I surveyed native vegetation remnants on Forestry SA land along Canham Road (midway between CCP and LMC). Silver banksias were quite common, either in twos and threes or in groves of up to 40 plants. I recorded a number of dead banksias, all mature plants of varying ages, but I did not estimate the percentage of dead plants. Few trees had flowered recently and only a few plants had buds or flowers on them. I regularly travel the Gumeracha-Forresteron and Warren Roads and large numbers of banksias occur in roadsides near their intersection. A considerable percentage of mature plants have died along this stretch of road in the past few years.

Pat Wundersitz reported numbers of dead trees on the Tanunda Creek Road in April 2008 and on the Williamstown Road. Steve Taylor likewise recorded the demise of large numbers of banksias in Tea Tree Gully roadside vegetation during the same period. At Sandy Creek CP up to 25% of mature trees have died in the past 10-15 years and there has been limited recruitment, except for small number of plants in exclosures, which were erected in 2001 (D. Paton pers. comm.). Large numbers of seedlings have appeared in most of the last ten years, but few have survived and only inside exclosures.

In a different area, namely the Happy Valley Reservoir, south of Adelaide, a few remnant banksias were alive on my first visits there in the early 2000s but most have died since then.

Regeneration of silver banksias

Regeneration of silver banksias was assessed at the same three sites as above. At CCP banksia seedlings were first guarded with individual guards in 2006 and small numbers were guarded in each year from 2007 to 2011. These guarded seedlings were watered several times per summer to increase their chances of survival. About 50 seedlings were guarded in 2006, a similar number in 2007, a few in 2008 and 2010, and about 50 in 2011. Many of these seedlings died, despite their watering, so by September 2011 there were 70 guarded banksias, with most representing the 2005, 2009 or 2011 cohorts. There were also three larger seedlings, probably ten years old, discovered when large gorse were removed from around them. So while in some years some hundreds of banksia seedlings germinated (e.g. on 4/11/07 there were 263 seedlings in an area about 20m x 20m), few survived their first summer, despite some being guarded and watered. Photo 3 shows one of the guarded banksias; the double guard was necessary because of kangaroos



Photo 3: Double-guarded silver banksias, Cromer CP, 2011 (Photo: G. Butler)

grazing its top with the single guard.

At LMC, the story is similar. Twenty-six banksia seedlings were guarded in late 2003 with individual guards, and an additional 26 seedlings were marked as controls. Most of the controls had died or disappeared by February 2004, while about half of the guarded ones were still alive. However by March 2004 most of the guarded seedlings were dead, despite some being watered over the summer. A 30m x 40m exclosure erected in 2007 included one of the surviving guarded banksias which is still alive today. Only one other guarded banksia is alive and is now about 1.2m tall.

The exclosure at LMC provided the opportunity to protect all banksia seedlings that germinated and each year these have been watered over the summer months. In February 2010 there were 33 live seedlings in the exclosure and in February 2011 about 50 seedlings were present. Excellent regeneration occurred in the winter and spring of 2011, probably due to better rainfall as well as better flowering in 2010 by the few mature banksias left in the exclosure. In October 2011 there were about 100 banksia seedlings in the exclosure mostly from the 2007-11 cohorts and 27 additional 2010 and 2011 seedlings were guarded outside the exclosure.

There is a very different story at BF, in one respect. As at LMC, the exclosure was erected in 2007 but seedling banksias have not been watered because the site is less accessible. Also the seedlings did not seem to be suffering from water stress. In fact between 2007 and 2011 several thousand banksia seedlings have germinated and very few have died over the summers. In June 2009 I estimated that there were many 100s if not several thousand seedlings and an estimate of about 1000-2000 was made on 30/10/2011. So most of the seedlings that have germinated inside the exclosure in the last four years have survived and most have put on good growth compared to those at CCP and LMC. Photo 4 shows a patch of about 50 seedlings that are barely five years old. Presumably the soil in this area retains moisture better than the soils at the other two sites. However outside the exclosure at BF, few seedlings survive unless under the protection of bushes.

Reasons for banksia decline and lack of regeneration

The large number of deaths of mature silver banksias appears to be attributable to the long-running and severe drought of the first years of the 21st century and, more particularly, the very severe weather conditions in the late summers of 2008 and 2009.



Photo 4: A group of silver banksia seedlings that germinated between 2007-2011 within the Big Flat exclosure, November 2011 (Photo: P. Paton)

Deaths have not occurred at all sites, so the physical attributes of sites and local weather conditions are clearly important. However the deaths are widespread and severe, and coupled with lack of recruitment, will lead to the extinction of silver banksias from a number of sites where it was once a common plant.

At one site, CCP, the drought has been exacerbated by the proliferation of dams in the catchment to the east of the Park, ensuring that flows into the Park occur less often and later in the season than previously. In the early 1980s there was one dam on the eastern boundary and there are now four dams, three being large. Observers familiar with the Park in the 1980s concur that much of the low-lying parts of CCP were inundated every winter and spring, a situation that rarely occurs now.

Lack of banksia regeneration is more complicated as it involves not just weather conditions but additional threats. It is clear from the guarding of banksias at some sites that, without additional water, few if any seedlings would have survived through their first summer in most years during the drought years. The exception is BF, where soil conditions appear more favourable. So weather is one factor.

Another factor is that, with the loss of many mature trees and with poor flowering and seed set noted in the drought years, there are fewer seeds available in the soil. My observations are that most banksia seed germinates in the winter/spring after the seeds are released from the cones. That is, there is not a long-lasting seed source in the soil. So a second factor inhibiting banksia regeneration is a lack of seed in the soil seedbank which will worsen as more mature trees senesce and die.

The future of silver banksia cont.

The third factor operating on banksia regeneration is over-abundant Western Grey Kangaroos. At both LMC and CCP unguarded banksia seedlings disappeared quickly, either from predation by kangaroos or from physical damage from large animals, presumably kangaroos. The exclosures at LMC and BF provide evidence for the grazing pressure at these sites (Photos 5 & 6) and these are not atypical for the Mt Lofty Ranges.

This situation has been going on for some years judging by the age structure of silver banksias. At most sites there are two age classes of banksias – mature trees and seedlings and not much in between. Most of the mature plants are clearly quite old (probably 50 years or more) so there has been no appreciable regeneration of this species for at least 50 years in the sites I am familiar with.

Implications of declining silver banksias

Banksia marginata Low Woodland was listed as “poorly conserved in South Australia” (Neagle 1995) by reason of most remaining areas being small and/or degraded and/or atypical. It was classed as a Priority 3 association (with one being the highest priority and 11 the lowest). Thus we are dealing with an association that is already poorly represented and poorly conserved in this state. However silver banksia occurs widely in the Mt Lofty Ranges as well as being an association in its own right. If the noticed declines are caused by hot and dry weather, then the climate change implications for silver banksias suggest ongoing declines of mature trees and more problematic recruitment.

Banksia marginata provides a rich source of nectar for nectarivorous birds due to the large inflorescences and clumped nature of the plants. Moreover it flowers predominantly over the summer and autumn at a time when there are few other floral resources available for nectarivorous birds and other animals. The loss of this species from substantial areas of the Mt Lofty Ranges will impact on a range of animal species, predominantly honeyeaters, and possibly insects.

Given the seriousness of the situation, what management actions could be implemented to reverse the decline?

- A survey of all major silver banksias occurrences, combined with an assessment of the threats at each site, would provide base-line information.
- Where impacts are related to changed water flow regimes, then measures could be put in place through Water Allocation Plans to alleviate these impacts.
- Kangaroo management could be dealt with on



Photo 5: Comparison along exclosure fence, LMC, September 2010, three years after fence construction (Photo: P. Paton)



Photo 6: Comparison along exclosure fence, Big Flat, June 2009, two years after fence erection (Photo: P. Paton)

a sub-regional or local scale, where this was observed to be a threat.

Drought is the one factor that is outside management control, but a succession of average or above-average rainfall years could see recruitment of silver banksias, **if** the other threats are under control.

Conclusion

Silver banksia *Banksia marginata* is a common component of the shrub layer of many stringybark and gum woodland and forest associations in the Mount Lofty Ranges and (formerly) on the Adelaide Plains.

Banksia marginata Low Woodland is listed as “poorly conserved in South Australia” (Neagle 1995).

Data from several woodland sites, mainly in the Mt Crawford region, highlight the decline and death of large numbers of mature silver banksia trees during the drought of 2002-09, coupled with a lack of recruitment for this species over this time-frame and indeed for the last 50 years.

Reasons for the death of mature trees and lack of seedling establishment appear to be extreme summer weather conditions and drought, over-abundant Western Grey Kangaroos and changes to flow regimes through dam establishment for agricultural production.

The widespread decline of this species in the Mt Lofty Ranges is very concerning.

The loss of this species from substantial areas of the Mt Lofty Ranges will impact on a range of animal species. *Banksia marginata* provides a rich source of nectar; and flowers predominantly over the summer and autumn at a time when there are few other floral resources available for nectarivorous birds and other animals.

Management actions to address this include :

- a survey of all major silver banksias occurrences in woodlands,
- an assessment of the threats at each site,
- kangaroo management and
- changes to Water Allocation Plans.

Drought is the one factor that is outside management control, but a succession of average or above-average rainfall years could see recruitment of silver banksias, if other threats are controlled.

References

Neagle, N. 1995. *An update of the conservation status of the major plant associations of South Australia*. Department of Environment and Natural Resources, Adelaide.

Acknowledgements

Forestry SA has supported this research and habitat manipulation for eight years and some of this work was conducted when working for the Nature Conservation Society as the Woodlands Campaigner. I am grateful to both organizations for their support and encouragement.

The work at Cromer Conservation Park has been carried out in conjunction with the Friends of Cromer CP, the Upper Torrens Land Management Program and the Department of Environment and Natural Resources and I am indebted to all those concerned.

Penny Paton

XANTHOPUS

The views presented in this newsletter are not necessarily those of the NCSSA

Copy deadline for the AUTUMN edition is 25th January 2012.
Contributions in a variety of formats will be considered, but electronic submissions are preferred.

Editors for this issue: Helen Vonow, Andrew Allanson.

Conservation Biology Grant Report:

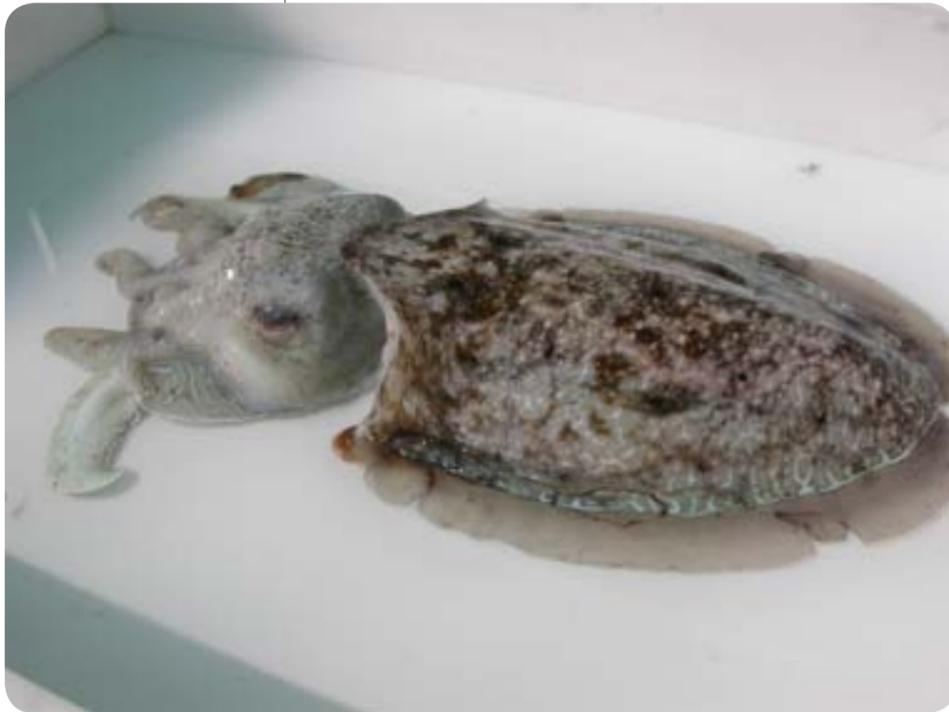
Dicyemid parasite diversity in South Australian cephalopod species as a tool to explore species status in *Sepia apama*, the giant Australian cuttlefish.

The giant Australian cuttlefish, *Sepia apama*, is the largest species of cuttlefish in the world with a maximum recorded size of 520 mm mantle length and 6.2 kg weight. It is endemic to southern Australian waters with five populations recognized throughout this species distribution.

A large localized breeding aggregation of *S. apama*, believed to be the only mass breeding aggregation of cuttlefish of such density in the world, occurs during the winter months each year in Upper Spencer Gulf (USG), South Australia (SA).

This unique breeding phenomenon is recognised as a significant and spectacular natural history event in Australian waters. Consequently, it attracts hundreds of recreational divers, tourists, film crews and researchers from Australia and overseas, contributing to the local economy. However the cuttlefish breeding aggregation is under threat from industrial developments and human activities which are degrading the USG environment.

Recent molecular data shows that the USG cuttlefish aggregation population is genetically distinct from the four other populations in southern Australian waters. Additionally, the USG population differs in some aspects of its morphology (e.g. shape of beak) and behaviour (density at breeding sites, male mate vs. den guarding behaviour during mating and egg-laying) and may indeed be a separate species. As such, 'local' extinction would have a dramatic and lasting impact.



The giant Australian cuttlefish, *Sepia apama*. (Photo: S. Catalano)

Thus it is vital to establish the species status of the breeding aggregation population, which has very recently diverged and requires verification from innovative analyses.

Parasites are an important tool in studies of ecology and fisheries biology. If parasites are treated as a phenotypic characteristic of their host, they may be used as phenotype markers, providing a reliable guide to understand the biology of their host. Furthermore, if a parasite species is more finely subdivided among populations than its host, then one could potentially use the genotypes of individual parasite species to assign hosts to their population of origin with higher probability than using the host's own genotype.

Dicyemid parasites, one of the simplest groups of multicellular organisms with bodies consisting of only 8 to 40 cells, are found in the kidneys of benthic cephalopods (squid, octopus and cuttlefish). Because of these parasites high degree of host specificity and high intensity of infection, they are good candidates to use as biological tags, and can be used specifically in my study to explore the population structure and potential species status of the giant Australian cuttlefish in southern Australian waters.

However, dicyemid genetic differences within and between host species needs to be quantified and defined first so a genetic 'yardstick' can be established for measuring genetic distances within the focal host species, *S. apama*.

This requires collecting a diversity of cephalopod species, analyzing their dicyemid parasite species genetics and constructing a preliminary phylogeny so that a measure of dicyemid genetic distances within and between species can be defined.

Subsequently, individuals representing nine different cephalopod species have been collected from SARDI prawn surveys in Spencer Gulf and Gulf St Vincent.

Seven of the nine species were found to be infected by dicyemid parasites, as inferred from kidney smears which were analysed using a compound microscope.

Genomic DNA from the left and right kidneys of the seven infected cephalopod species has been extracted and dicyemid specific primers were designed to target the mitochondrial COI gene. Currently, the complete COI gene plus a small non-coding fragment (1520-1563 base pairs) has been amplified and sequenced for four of the seven infected species, with



The view from a prawn boat in Gulf St Vincent where a diversity of cephalopod species was sampled from their bycatch. (Photo: S. Catalano)



The kidney of a cuttlefish with hundreds of dicyemid parasites attached ~ white, fuzzy strands visible all around the kidney. (Photo: S. Catalano)



Dicyemid parasite diversity in South Australian cephalopod species as a tool to explore species status in *Sepia apama*, the giant Australian cuttlefish cont.

conserved and highly variant regions recognised between the different dicyemid species from the different host species.

Future work will involve amplifying and sequencing the complete COI gene plus non-coding region for the remaining three infected cephalopod species (which requires new primer design to conserved regions of the COI gene) and using this sequence data to construct a preliminary phylogeny or 'yardstick' which will be crucial to define interspecies differences.

This will allow me to use parasite genetics to address my main question of whether the Upper Spencer Gulf *Sepia apama* breeding aggregation population represents a distinct species from the other four populations in southern Australian waters, and as such, requires conservation and management plans to be implemented to ensure sustainability into the future.

Sarah Catalano
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The giant Australian cuttlefish collection field sites at Whyalla ~ Fitzgerald Bay. (Photo: S. Catalano)



BOOK REVIEW:

Start with the Leaves: A simple guide to common orchids and lilies of the Adelaide Hills

By Robert Lawrence

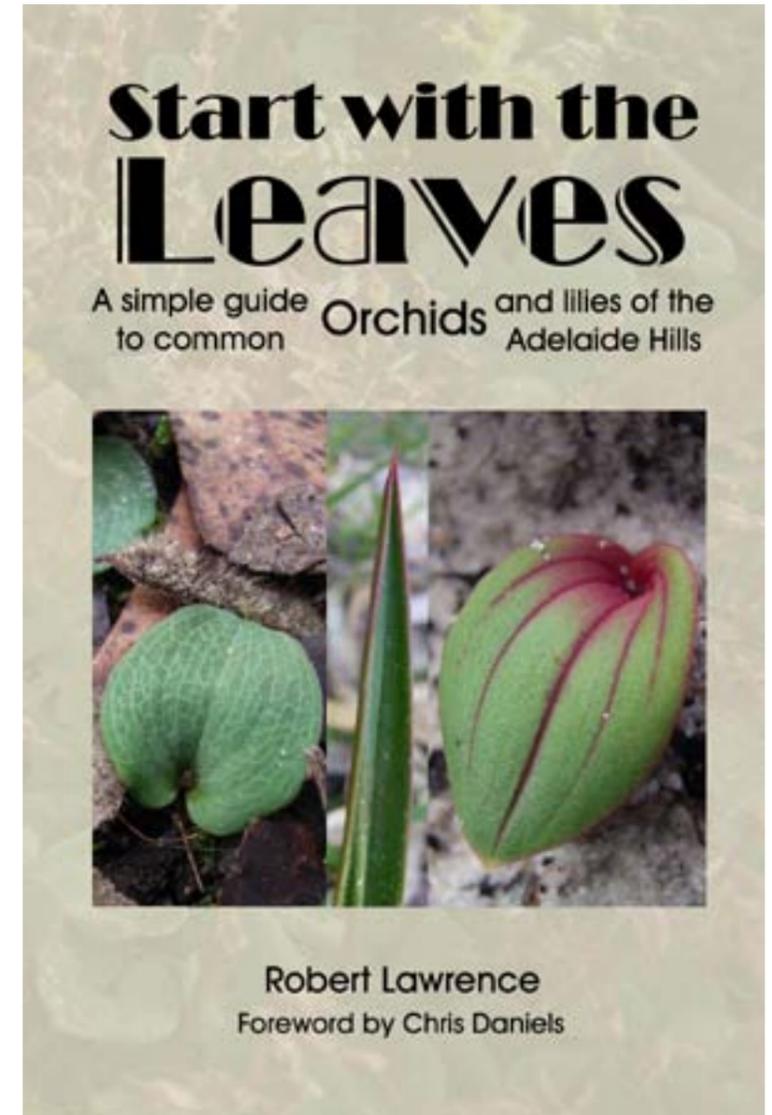
With over 20,000 species worldwide, orchids are an object of fascination and desire for people across the world. Most people, used to the gaudy displays of imported orchids at flower shows, are unaware that orchids form part of Australia's natural flora.

This 192 page book describes 50 orchids of the Adelaide Hills, the bulk of which are the most commonly occurring species. It also includes descriptions of weedy orchids, and 20 common orchid-like native and weedy species that could be confused with orchids.

As the title suggests, the book is based upon using the leaves of the orchid as the first diagnostic feature. Using leaves performs a valuable dual function – firstly, it is an excellent way to subdivide the orchids into eight main groups to look at secondary features for identification, and secondly there are many times that avid orchid watchers will find only the leaves, and not the flowers of the orchid. Using leaves alone will still allow positive identification to genus and on occasions even species level.

The book is well laid out and easy to follow. Orchids within each leaf type are grouped together and colour coded, with a small leaf type diagram at the top right of each page. Each orchid species depicted is allocated two pages, generally with a picture of the leaves, the flowers, and the whole plant in situ. The verbal description provides appropriate distinguishing features for identification, including both the leaves and flowers, as well as appropriate notes on habitat preferences.

Even those with no botanical skills will be able to quickly and easily identify species using this excellent book.



It will become an invaluable addition to the bookshelves of aspiring (and current) botanists, and its relatively compact size means it can easily be transported and used in the field.

The book is available for \$35 through: heritagebushcare.wordpress.com

Tim Milne