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About

The Nature Conservation Society of SA:

Major concerns of the NCSSA include:

- Native vegetation, threatened species and habitats.
- Protecting all forms of life (biodiversity) on land and in the oceans.
- Park dedication, management and legislation.
- Education about biodiversity to all sections of the community.
- Cooperation with other conservation groups and land managers.

Activities include:

- Education about biodiversity including the 'Walks with Nature' program and through our *Bushcare Support* program.
- Scientific research including surveys of areas such as Mokota.
- Lobbying and advising governments for adequate protection of species and habitats.

The NCSSA is an organisation built on the strengths of its members and volunteers with an interest in conservation of our natural heritage. The Society is managed by an elected voluntary committee and administrated by several staff.

Committee:

President – vacant

Vice-President – Helen Vonow

Secretary – Phil McNamara

Assistant Secretary – Annie Bond

Treasurer – Misch Benito

Sara Boulton, Nicole Lewis, David Moyle, Ann Prescott, Peter Tucker, Scotte Wedderburn

Xanthopus Editorial Team: Misch Benito, Bob Brown, Nicole Lewis, Helen Vonow & Scotte Wedderburn

Staff:

General Manager - Tanya Wittwer

Scientific Officer – Matthew Turner

Administrator – Raelene Telfer

Biodiversity Extension Officer – Tim Milne

Bushcare administration - Elizabeth Lonie

Project Officers:

Kerry Gilkes (*Grassy Ecosystems - Upper SE*)

Penny Paton (*Temperate Woodland Campaigner*)

Meg Robertson (*Mokota Vegetation Monitoring & "Stop Bushland Weeds"*)

Katie Rouse (*2003 Survey Coordinator*)

Jo Spencer (*Grassy Ecosystems - Mt Lofty Ranges Eastern Flanks*)

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

SCIENTIFIC OFFICER'S REPORT:

Horses will damage valuable Reserve

The City of Onkaparinga is set to allow horse access to an important reserve adjacent to the Onkaparinga National Park.

Piggott Range Reserve is directly adjacent to the Onkaparinga National Park, separated from it only by Piggott Range Road. It is extremely valuable habitat, comprised of more than 130 native plant species and four vegetation associations. One of these associations is *Eucalyptus microcarpa* (grey box) woodland. Grey box has suffered from preferential clearance since European settlement, and is a high priority for inclusion in NPWS reserves.

The Nature Conservation Society SA supports the establishment of horse trails in suitable areas ~ however high quality bushland must be off limits.

The highly detrimental impacts of horses on native vegetation are well established. They include:

- Trampling of small shrubs and other understorey species (reduced risk where established trails are used)
- Soil erosion resulting from a large weight being supported by a small surface area
- Introduction and establishment of invasive weeds from manure and carried in on the animal itself
- The high nitrogen and phosphorus concentrates in the copious faeces of large domestic animals such as horses, cattle and pigs has been shown to adversely affect, and in some cases kills native flora. These high concentrates also act as a weed fertiliser.
- High risk of introducing diseases such as *Phytophthora cinnamomi* infections carried in from other areas

The Office of Recreation and Sport have prepared a "Horse Strategy" for South Australia ~ one of this document's aims is to provide guidelines on the planning and provision of infrastructure and services for horse trails. The strategy states:

- Protection of high quality remnant vegetation in the Adelaide Hills from all potential impacts, including horse riding, is a high priority. These areas often fall within Conservation and National Parks, but also occur in SA Water Reserves, on private land and along some road reserves. These areas need to be zoned appropriately and access by horses should not be permitted.
- Many remnant areas of intact native vegetation are relatively weed-free and of high ecological value and must be preserved from degradation as a high priority. However, the impacts of horses should be viewed in the context of approximately 90% of the native vegetation in the Mt Lofty Ranges having been cleared, and weed infestation being widespread throughout the hills.
- Horses have the capacity to damage trails by loosening soil. This causes tracks to become more susceptible to erosion, which can lead to the development of erosion gullies. Horse tracks can also become widened and braided. With correctly designed tracks, and tracks that avoid erosion prone areas, this need not be an ongoing issue.

The decision by the Onkaparinga Council to allow horse riding access to this reserve is at odds with the overarching strategy that is intended to allow for horse access, while at the same time, minimise the environmental impacts of such activities.

The poor planning behind the Council's decision is further highlighted by the fact that the City of Onkaparinga is currently negotiating with DEH for transfer of the land into Onkaparinga National Park. Council have resolved that prior to transfer, DEH are to sign a Memorandum of Understanding to ensure horse riding access continues following the transfer.

SCIENTIFIC OFFICER'S REPORT CONT.

To many conservation-oriented people, the thought of allowing horse riding access to reserves with high biodiversity values is grossly ill-informed. When one considers that 86% of the native vegetation from the Metropolitan Planning area has been cleared since European settlement, it is obvious that there are extensive areas of cleared land that is far more suitable for intensive recreational activities such as horse riding.

If you agree that horses and biodiversity don't mix then write to the Chief Executive Officer at Onkaparinga Council expressing your concern (Chief Executive Officer, Jeff Tate, PO Box 1, Noarlunga SA 5168).

Matthew Turner
Scientific Officer
E-mail: scientific@ncssa.asn.au

References:

South Australian Recreation and Sport Horse Strategy 2000 (prepared for ORS by Phillip Gray and Associates). [On line accessed 19 Feb 2004 URL: <http://www.recsport.sa.gov.au/pdfs/horse.pdf>]

City of Onkaparinga- Minutes of the Operations Committee 17 February 2004
[Online accessed 19 Feb 2004 URL: <http://www.onkaparingacity.com/web/binaries?img=1976&stypen=html>]



Walks With Nature is a program of free public nature walks held in National Parks and other areas close to Adelaide. They are coordinated by the Nature Conservation Society of South Australia, and each year five walks are held, monthly in winter and spring. Walks are advertised in the Sunday Mail one week before they commence.

This year's *Walks With* program is still in the planning stages; we'll have the dates fixed and will be finalising locations and allocating walk leaders in the coming months. These will be posted on the NCSSA website - www.ncssa.asn.au - as soon as they are fixed, as there won't be another *Xanthopus* until shortly before the first walk. These Sunday walks will also be advertised in the *Sunday Mail* the weekend before each walk, and directions will be available through the NCSSA office and on the website.

July 4
August 1
August 29
September 26
October 24

Can you help?

We are always looking for:

- walk organisers- to plan a walk and prepare the leader's notes
- walk leaders- to turn up on the day and help the enthusiastic walkers to discover the natural wonders along the way. If you know a little about plants, birds, insects, tracks, scats or any other aspect of natural history that you'd like to share with a captive audience, then this exciting opportunity is for you!

If you would like to attend a walk, simply turn up whenever it suits between 10.30 am and noon on the day. The walks lead off every 10-15 minutes and usually take about 2 to 3 hours.

For more information on the walks, contact Geoff Coombe on 85247050 or 0408 838034, or the NCSSA office on 8223 6301.

Hardware chain removes Invasive Species from their shelves

The impact of invasive garden species on natural ecosystems is well recognised. Many of our worst weeds began their Australian history as ornamental garden species ~ Bridal Creeper, Salvation Jane and Soursobs are particularly nasty examples in South Australia.

While proclaimed plants are generally forbidden to be sold to the public, by the time a plant is proclaimed it is often far too late to consider effective control measures. The issue of invasive species being sold in nurseries and other plant outlets has been of concern to environmental groups for many years. Too often, excuses offered for the sale of such species are poor ~ after all they *are* breaking the law.

In recent weeks the NCSSA learned of the sale of Fountain Grass (*Pennisetum setaceum*) from a Bunnings Hardware store in northern Adelaide. The NCSSA responded to this by sending the local store and its interstate Head Office a letter expressing our concern, and asked that the plant be removed because it is an environmental threat.

Members will be pleased and grateful to know that Bunnings responded quickly and decisively ~ the plant was removed from all shelves within 24 hours. Bunnings were informed that while the plant is not proclaimed it has been identified by the Animal and Plant Control Commission as invasive. The local relevant manager has been provided with a full list of plants that have been found to be “Serious Garden Escapes” and Bunnings are now going through the process of ensuring none of these invasive species are sold in their stores.

The NCSSA congratulates Bunnings for their responsible attitude and their commitment to the environment by removing these plant species from their shelves.

Other Serious Garden Escapes (Prepared by Animal and Plant Control Commission)

<i>Acacia baileyana</i>	Cootamundra wattle	<i>Hypericum perforatum</i>	St John's wort
<i>Acacia saligna</i>	golden wreath wattle	<i>Lavandula stoechas</i>	topped lavender
<i>Allium triquetrum</i>	three-cornered garlic	<i>Myriophyllum aquaticum</i>	parrot's feather
<i>Alternanthera philoxeroides</i>	alligator weed	<i>Olea europaea</i>	olive
<i>Anredera cordifolia</i>	mignonette vine	<i>Opuntia</i> spp.	prickly pear
<i>Arundo donax</i>	bamboo	<i>Orbea variegata</i>	orbea
<i>Asparagus asparagoides</i>	bridal creeper	<i>Parkinsonia aculeata</i>	palo verde
<i>Asparagus declinatus</i>	bridal veil	<i>Pennisetum setaceum</i>	fountain grass
<i>Asparagus scandens</i>	asparagus fern	<i>Pinus brutia</i>	Turkish pine
<i>Cabomba caroliniana</i>	cabomba fanwort	<i>Pinus halepensis</i>	Aleppo pine
<i>Chasmanthe floribunda</i>	African cornflag	<i>Pinus radiata</i>	radiata pine
<i>Chrysanthemoides monilifera</i>	boneseed	<i>Pittosporum undulatum</i>	sweet pittosporum
<i>Cortaderia</i> spp.	pampas grass	<i>Polygala myrtifolia</i>	polygala
<i>Cotoneaster</i> spp.	cotoneasters	<i>Prosopis</i> spp.	mesquite
<i>Cytisus scoparius</i>	English broom	<i>Rhamnus alaternus</i>	buckthorn
<i>Delairea odorata</i>	Cape ivy	<i>Rosa rubiginosa</i>	sweetbriar
<i>Dipogon lignosus</i>	dolichus pea	<i>Salix cinerea</i>	grey sallow
<i>Eichhornia crassipes</i>	water hyacinth	<i>Salix fragilis</i>	crack willow
<i>Egeria densa</i>	leafy elodea	<i>Salix nigra</i>	black willow
<i>Equisetum</i> spp.	horsetail	<i>Salix X rubens</i>	basket willow
<i>Erica arborea</i>	tree heath	<i>Salix 'Matsudana hybrids'</i>	NZ hybrid willows
<i>Erica lusitanica</i>	Spanish heath	<i>Salvinia molesta</i>	salvinia
<i>Fraxinus angustifolia</i>	desert ash	<i>Tamarix aphylla</i>	athel pine
<i>Genista monspessulana</i>	Montpellier broom	<i>Tamarix ramosissima</i>	salt cedar
<i>Hedera helix</i>	ivy	<i>Ulex europaeus</i>	gorse
<i>Hydrocotyle ranunculoides</i>	water pennywort	<i>Vinca major</i>	periwinkle
<i>Hyparrhenia hirta</i>	coolatai grass	<i>Watsonia meriana</i> var. <i>bulbillifera</i>	bulbil watsonia

Matthew Turner
Scientific Officer
E-mail: scientific@ncssa.asn.au

NCSSA CONSERVATION BIOLOGY GRANT REPORT:

The Importance of Hypogeous Fungi in the Diet of the Re-introduced brush-tailed bettong (*Bettongia penicillata*), at Venus Bay Conservation Park, South Australia.

Joanne Lee

School of Earth and Environmental Sciences
University of Adelaide

Hypogeous fungi (hereafter referred to as truffles) form mycorrhizal associations with higher plants. They are known to be important as a food source for some animals. Although considered to be very important in Australian systems, there have been few studies into this tripartite and we are only just beginning to understand the relationship (Claridge, Barry *et al.* 2000).



Many Australian mammals in the critical weight range for wide-spread extinctions (35gm~5.5kg) are suspected to have been important dispersers of truffle spores. The disappearance of many of these mammals has given rise to concern about the effects this would have on truffle populations. Bettongs (*Bettongia* spp.) have been found to be highly mycophagous in both temperate and tropical regions. The importance of truffles as a food source for animal populations in arid habitats had been little researched.

In Australia, hypogeous fungi are known to inhabit woodlands and forests in both tropical and temperate climates (Bougher and Lebel 2001). However, few specimens have been collected from the more arid and coastal regions (Bougher and Lebel 2001). Thus mycophagous species from sandy arid regions were thought to consume fewer fungi.

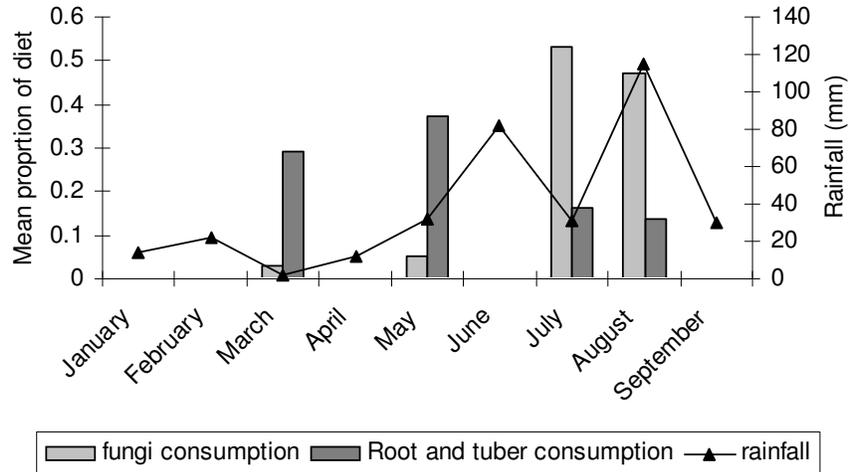
This study focused on the reintroduced brush-tailed bettong (*Bettongia penicillata*) population on the Eyre Peninsula, to determine how arid habitats affect the diet of mycophagous mammals.

Five trips were undertaken in 2003 and a sixth in late February 2004 to establish any seasonal diet patterns. Diet was assessed by scat analysis.

Importantly, this study found that bettongs in arid regions do consume truffles seasonally. Highest truffle consumption was during the winter, when approximately half their diet consisted of truffles. This is thought to be linked to water requirements of truffles for fruiting. Figure one shows that the period of highest truffle consumption correlates with the period of highest rainfall.

NCSSA CONSERVATION BIOLOGY GRANT REPORT cont.

During the autumn period roots and tubers were predominant in the scats, making up 30% and 37% respectively. This was during the drier period of the year (figure one). Fungi fruits also figured predominantly in the August diet, at 30%. Very little leaf material was evident.



Prior to this study the diet of re-introduced bettongs had not been investigated. Moreover, there has been little consideration of truffle distributions and their use in more arid environments. Although truffle abundance was expected to be limited due to environmental factors, the consumption by this population of bettongs was similar to other populations in areas considered more favorable to truffle presence. Future studies into the affects the extinction of mycophagous species has had upon arid zone truffles would be beneficial.

References

- Bougher, N. L. and T. Lebel (2001). "Sequestrate (Truffle-like) fungi of Australia and New Zealand." *Australian Systematic Botany* **14**: 439-484.
- Claridge, A. W., S. C. Barry, et al. (2000). "Diversity and habitat relationships of hypogeous fungi. II. Factors influencing the occurrence and number of taxa." *Biodiversity and Conservation* **9**: 175-199.

The NCSSA Conservation Biology Grant

Last year the NCSSA initiated its Conservation Biology Grant, to provide financial assistance to Honours and Postgraduate students conducting research aimed at:

- improving understanding of the conservation status of species or ecological communities
- providing recommendations for improvement of some aspect of biodiversity conservation; understanding the ecology of species or communities
- understanding threats to biodiversity and management of those threats

From the 17 applicants, four students were successful in obtaining up to \$1000 towards their projects. The above article is the first presented in Xanthopus by one of last year's successful applicants. Others will be published in future additions.

Applications for the 2004 Conservation Biology Grant are currently being accepted. The closing date for applications is the **26th of March 2004**.

Around NCSSA

Committee and Staff

Our Committee and staff met in January for our annual navel-gaze and planning day. We discussed our place in the scheme of things in the area of biodiversity advocacy and management, and our relationships with other organisations, and how these affect our future direction.

Sara Boulton has recently accepted the Committee's invitation to be a co-opted member on the Committee. Sara is also our volunteer Members Activities Organiser.

Raelene Telfer, our Administrator has recently decided not to renew her contract after five years of service. We thank Raelene for her contributions to the Society and we hope that some association will continue in future.

The committee is currently considering the administrative structure of the organisation, but in the meantime we will keep the ship afloat.

And speaking of structures... there has been some re-organisation of the office space ~ including the removal of a couple of interior walls by some hardy volunteers during the February heat wave.

General Meetings

At the April meeting we will be starting meetings at 7pm and the doors will be open at 6.45pm. This will be a trial, in response to suggestions from some members. The speakers for the next three meetings are listed on the back of this edition.

Xanthopus

As of this issue we are altering the publication of *Xanthopus* to quarterly in March, June, September and December. You will notice the bright new cover using some of the images from our Display boards and the Brochure used to publicise the Society. Thank you to all the photographers who allowed us the use of their photographs.

NCSSA Projects

Our Society has a long history, with a particular emphasis on carrying out scientific studies and lobbying on nature conservation issues. Most of the scientific studies are funded by competitive application from granting bodies (see details in the Annual Report: *Xanthopus* Vol 21 No. 5). An outline of ongoing projects follows.

2003 NCSSA Survey

Katie Rouse is currently finalising a report on our survey of an area about 20km S of Burra (see a short report from Katie in this edition). This survey was funded from the Native Vegetation Research Fund.

NCSSA has nominated Katie for the Young Achiever's Environmentalist Award.

Bushcare Support

Tim Milne, our Biodiversity Extension Officer has been working with Trees For Life (TFL) on a joint funding application through the National Competitive Component of Natural Heritage Trust (NHT).

Tim is continuing the trailing and evaluation of the *Bushland Condition Monitoring Manual*. He is also commencing development of a monitoring and assessment tool for the SE region, to be used to assess the vegetation quality for landholders who are willing to offset their drainage levy by changing the management of their native vegetation

As well as these, Tim is also organising workshops for the Northern Agricultural Districts and Rangelands region. NAD workshops will be two workshops focussing on the importance of coastal environments for birds (for April/May), and a workshop on the significance of remnant habitats for bats (in April).

A database of projects, workshops, etc carried out over the duration of the project is nearing completion.

Grassy Ecosystem Extension Officers

Upper South East

Kerry Gilkes continues with this project for the third year, funded by the South East Natural Resource Coordinating Committee (SENRCC). However this project does not appear in the next SE Integrated Natural Resource Management strategy. The society has written regarding the poor process, and is pursuing further funding for Kerry via the SE Drainage scheme.

Kerry recently organised two workshops. The Grassy Woodland/Native Grass ID at Boston Reserve was attended by 15 people and led by Peter Tucker of Trees for Life. A Tatiara Council Workshop on Basic Grassy Woodland Identification for spraying, gardening, grader, dozer etc workers was attended by 16 participants.

Kerry has also had discussions with Rangers about the management of a grassland site at Bool Lagoon, and met with the DEH Upper SE Threatened Species project officers to discuss projects.

Eastern Mount Lofty Ranges

Jo Spencer continues her work in the region, and the Catchment Board has granted an extension for her project to the end of March. She has submitted an interim report showing excellent progress towards the objectives of raising community awareness, providing technical information, gathering data and working towards management agreements.

Jo believes that further work over the next two or three years would yield good results on the foundation established, and has prepared a funding submission under INRM arrangements with the Catchment Board.

The Native Grasses fact sheets will be ready for distribution soon. The Native Grasses Resource Group, and the Eastern Hills and Murray Plains Catchment Group contributed funds for the printing.

Temperate Woodlands Project

Penny Paton continues working with agencies involved in the management of significant areas of grassy woodlands to develop and implement appropriate management strategies. We have received further funding for Penny to continue with this role for one day a week until September.

SA Water The Birds For Biodiversity Grant of \$4,500 has paid for a number of activities at Happy Valley Reservoir Site 5 (grey box with Brown Treecreepers). The two signs for this site are in preparation. Weed control work continued in Happy Valley Reservoir, including GPS'ing of rare/unusual plants and weeds of concern.

Forestry SA Penny spent a day with FSA staff and volunteers in late November establishing experiments on *Banksia marginata* recruitment at two sites – Little Mt Crawford and Waterholes. Half the seedlings were guarded, and a proportion of unguarded and guarded seedlings watered. *Banksia* seedlings were watered again early Jan.

Because Ian Tanner has left the position, Penny has also consulted with FSA on a new liaison structure. FSA has ear-marked \$5000 in 03-04 budget for minimum disturbance weeding at priority woodland sites.

Mokota C.P. Vegetation Monitoring

Meg Robertson spoke about this project at our August General meeting, and we are publishing her talk in this issue of *Xanthopus*.

A small group met with the Regional Ecologist, Andy Sharp to discuss writing a joint funding proposal to continue the monitoring work, as DEH will be making other priorities with limited funds available from the regional NRM.

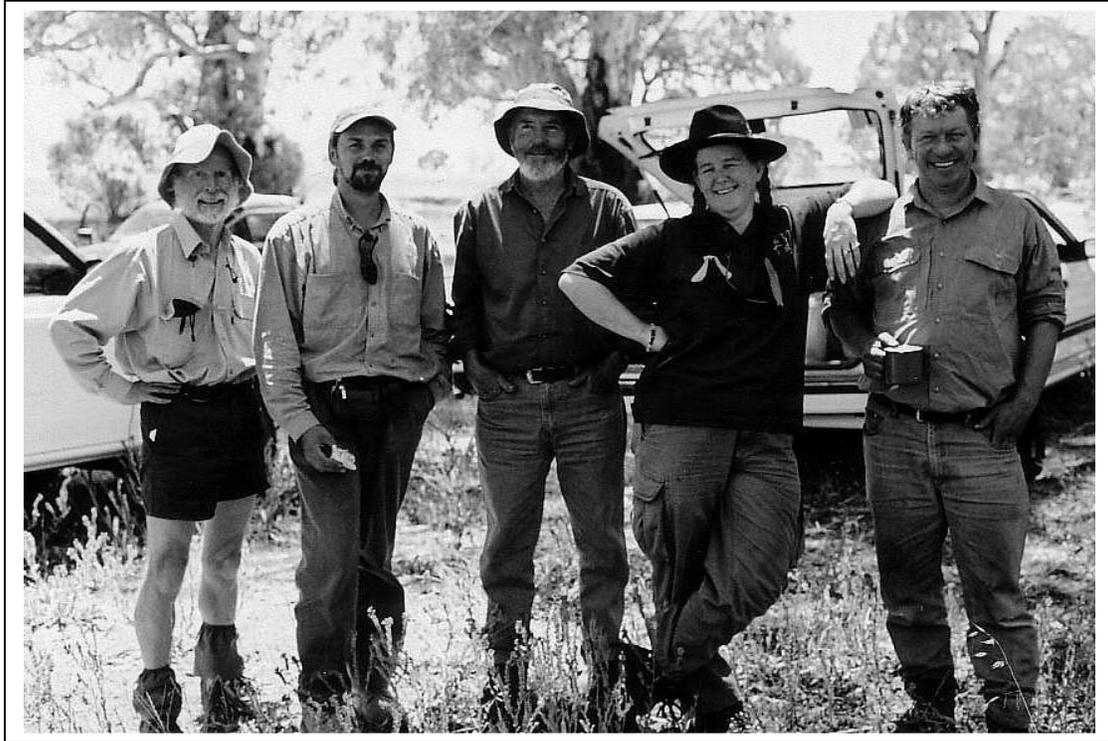
"Stop Bushland Weeds"

Meg Robertson continues work on updating its Third Edition and researching and writing information on additional weeds species. Ian Grant is once again illustrating the needed new diagrams and botanical plates. We anticipate that this edition will be published in mid 2004.

**Helen Vonow
Acting President (still)**

NCSSA 2003 SPRING SURVEY WRAP-UP

The 2003 NCSSA annual spring survey was at Hopkins Creek, a 516 ha property recently acquired by the Department for Environment and Heritage, south-east of Burra, South Australia, to gather baseline biological data of its biodiversity. It will be gazetted as a Conservation Park in the near future. With the help of 25 enthusiastic and tireless volunteers, seven sites were surveyed across a range of dominant plant associations and landforms. At each site, data on the flora and fauna was collected using standard Biological Survey of South Australia methodology.



Hopkins Creek survey participants.

From Left, Graham Medlin, Dragos Moise, John Smyth, Misch Benito and Ginty Kubilis. Photo by Katie Rouse

The major findings of the survey were as follows:

- 467 plant species were located on the property. 312 of these were native and 155 introduced. 52 native plants had a significant conservation rating at a national, state or regional level, including the nationally endangered Lanky Buttons (*Leptorhynchos tetrachaetus*).
- 11 mammal species were recorded through direct observation or from identifying animal traces. Five were native, including Red and Western Grey Kangaroos, Short-beaked Echidna, Brush-tailed Possum, and White-striped Free-Tailed Bat.
- 23 native reptile species and two native amphibians were found as a direct result of trapping or active searching. The Southern Rock Dtella (*Gehyra* sp. '2n=44')¹, Dwarf Skink (*Menetia greyii*), and Common Snake-eye (*Morethia boulengeri*) were among the most abundant reptiles. The Freshwater Yabby, *Cherax destructor*, was also recorded in a permanent pool on the eastern side of the property.
- 61 bird species were observed, 59 of which were native. The vulnerable Diamond Firetail (*Stagonopleura guttata*) and the rare Peregrine Falcon (*Falco peregrinus*) were the only two species with a significant statewide conservation rating. The most common bird observed was the Galah (*Cacatua roseicapilla*) with over 200 observations across all sites.

¹ For the benefit of non-members of the herpetology *cognoscenti*, '2n = 44' is the genetic moniker given by the molecular biologists to this as yet unnamed species. (Eds.)

NCSSA 2003 SPRING SURVEY WRAP-UP cont.

The property displays many typical signs of degradation associated with previous grazing practices. Clearance of native vegetation on the western side has promoted weed infestations, caused habitat fragmentation, and encouraged pest species such as deer, goats, cats and foxes. Nevertheless, the area still retains substantial tracts of remnant vegetation which support native plants and animals in a mostly cleared and cultivated local landscape. This is confirmed by the persistence of a number of threatened plants and birds. Hopkins Creek thus constitutes an important gain for the South Australian parks system, affording greater protection to the mid-north's biodiversity.

A weed eradication policy in conjunction with revegetation programs are among the NCSSA's key recommendations to enhance Hopkins Creek biodiversity. Further work has also been proposed to obtain more information on plant associations and landforms that were not surveyed, and to record and account for seasonal and yearly variations. It is hoped that by compiling a thorough inventory of the status of resident flora and fauna, appropriate management decisions can be made to ensure the persistence of this important tract of land. A full report on the Hopkins Creek spring survey will be available at NCSSA from mid-March 2004.

Katie Rouse
NCSSA Project Officer

JOINT MEMBERSHIP OPPORTUNITY

The previous edition of *Xanthopus* mentioned that our Society and *Trees For Life* are offering joint membership to each organisation's respective members.

The two organisations have worked together on environmental projects since 1998, when we cooperated to deliver components of the *Bushcare Support Consortium* contract. More recently, NCSSA has been contracted by *Trees For Life* to develop an advanced monitoring program for their *Bush For Life* sites. We have a close, regular and cooperative working relationship in sharing ecological information.

Trees For Life has been working to revegetate South Australia for 23 years, by growing and planting over 23 million trees. Its *Bush For Life* program was developed nine years ago to protect remnant bushland using minimum disturbance weed control. *Bush For Life* has over 600 carers working on 290 sites. In 2002 *Trees For Life* developed a direct-seeding program to enable broad-acre revegetation on previously cropped land. Their members also assist with seed collection, distribution of germination materials, seed germination and seedling care instructions to new members, and general help in the office. "ReLeaf" is the quarterly newsletter for *Trees For Life* members.

Further information is available on the *Trees For Life* website; www.treesforlife.org.au

NCSSA and *Trees For Life* are offering the opportunity to be members of both organisations at a reduced rate. This offer is available to NCSSA members who are not current members of *Trees For Life*. An initial annual membership to *Trees For Life* will be discounted to \$30 instead of the regular \$38.50. After 12 months the subscription rate will resume at the normal cost. Please note that new members taking advantage of the concessional price will not be able to order seedlings in this first 12 months.

The membership form for *Trees For Life* is enclosed with this edition.

XANTHOPUS COPY DEADLINE

Copy for the Winter issue of *Xanthopus* is **Monday 28th April 2004**.

Contributions in a variety of formats will be considered, but electronic submissions are preferred.

Native grassland in Mokota Conservation Park

- three years of monitoring and how should it be managed?

1. ABOUT MOKOTA CONSERVATION PARK

The first grassland park in SA, Mokota was acquired in 1999 with funding from the Natural Heritage Trust, Nature Foundation SA and the SA Government, to contribute towards making our national reserve system more comprehensive, adequate and representative. It is located about 15km north of Burra in the Yorke / Mid-North Park region and covers 455 hectares.

Conservation values: *Lomandra multiflora dura* +/- *Lomandra effusa* tussock grassland is a priority 1 plant association, recently nominated under the Environment Protection and Biodiversity Conservation (EPBC) Act, 1999. It supports more than 130 indigenous plant species and 32 species of conservation significance in SA, including two nationally threatened species; *Cullen parvum* and *Dodonaea procumbens*. Extensive areas support a high diversity of native plant species and there are records of two butterflies of conservation significance.

HISTORY

Prior to 1860	Fire regime, grazing patterns (of both large and small native herbivores) and intensity unknown.
1866	Surveyed as pastoral land, the site was granted as four sections to two pastoralists.
From 1879 to 1999	All four sections owned by the Gebhardt family and grazed by sheep.
1990's	North West corner included in Biological Survey of SA.
Autumn 1996	Area was part-burnt
1998-9	Acquired by SA government for conservation, sheep removed.
1999	NCSSA flora and fauna survey. Threatened Plant Action Group started monitoring Nationally Threatened plants.
2000	NCSSA baseline annual vegetation monitoring program commenced
2002	Department for Environment & Heritage (DEH) /Grassy Ecosystem Technical Advisory Group (GETAG) experimental management trials set up, and baseline vegetation survey completed.
2003	first treatments applied in trials.

2. MAJOR MANAGEMENT ISSUES

There is evidence from grassland research elsewhere of potential risks to biodiversity from changing land use from sheep/cattle grazing to 'conservation' (= protection from disturbance). Interstate Grassland researchers have adopted the principle that if an area has retained high biodiversity value under a given management regime, then that regime should be continued until there is good evidence to change it. eg in Victoria, when they were reserved, stock was completely removed from Yassom Reserve, but not from Terrick Terrick National Park. Within four years, thickening vegetation in Yassom had crowded out some threatened plants, and completely eliminated the nationally-endangered Plains-wanderer, an aberrant quail-like wading bird. At Terrick Terrick, low stocking densities have been maintained and so have threatened plants, Plains-wanderers and threatened reptiles.

Past management at Mokota was light sheep grazing. This has allowed a diversity of native annual and perennial herbs to persist over 140 years. Should the above-mentioned interstate principle be applied at Mokota?

1. Extensive areas of Mokota are dominated by alien plants, eg. hill-tops, where sheep camped at night, south facing slopes and around dams. Will alien plants continue to dominate or will native plants regenerate with removal of sheep?
2. Has sheep grazing prevented large dominant native plants out-competing the smaller species and thus reducing their biodiversity? Grasslands occur in relatively productive environments and comprise mainly herbaceous species, so this process can occur relatively rapidly.
3. Did sheep grazing prevent litter from dead grasses building up, especially that from annual grasses? Will removal of sheep result in small native plants being smothered by litter?

Native grassland in Mokota Conservation cont.

There is a lack of research into grasslands in the Mid-North to help us to answer these questions.

We know that grassland at Mokota experiences a particular combination of climate and soils, and differs structurally and floristically from any that have been studied elsewhere. How applicable to Mokota are conclusions drawn from interstate research? Why not continue sheep grazing?

Apart from general discomfort among conservationists and park managers about sheep grazing in a park, there is the issue that the condition of the degraded areas would not improve because sheep would continue to impact some areas more than others.

These issues indicated the need for monitoring and an experimental approach to management, and two projects have commenced:

- 1) An NCSSA vegetation monitoring program yearly from 2000 to measure changes since removal of sheep grazing from the park.
- 2) DEH adaptive management trials from 2002/3 to test biomass reduction techniques.

3. THE MONITORING PROGRAM INITIATED BY NCSSA, 2000-2002

This consists of eighteen pairs of 6m square permanently marked plots. Each pair consists of one plot in sparse grassland, and one in nearby dense grassland (about ten metres apart). Frequency of all plant species in each plot is measured by recording their presence or absence in 25 randomly selected subquadrats of 30cm square. Monitoring is being carried out in November, and the same subquadrats are recorded each year.

WHAT HAVE WE LEARNT FROM THE MONITORING?

GRASSLAND COMPOSITION

1. Structural composition - life cycle, differences between alien and native flora

- There are twice as many native as alien species
- The number of native and alien annual forbs is comparable
- The largest group of species comprises perennial native forbs, whereas there are few perennial alien forbs
- The native grass flora is all perennial, whereas the alien grass flora is mainly annual
- Even though we call it a grassland, most diversity is in non-grass herbs

2. Floristic (plant species) composition

Hard Mat rush *Lomandra multiflora* spp. *dura* and Brush wire grass *Aristida behriana* are common and widely distributed in both sparse and dense grassland plots, as are weeds such as *Romulea*, some annual grasses and clovers. Most other species are predominantly found in either sparse or dense grassland.

Composition of sparse grassland:

- Wallaby grasses (*Danthonia* spp.)
- A variety of native annual and perennial forbs
- Several species of native spear grasses (*Austrostipa* spp.) – the less robust species
- Varying abundance of alien species
- Bare ground, moss and lichen

Composition of dense grassland:

- Wild oats (*Avena barbata*) as a dominant, an abundance of other alien annual grasses
- Several species of native spear grasses (*Austrostipa* spp.) – the more robust species
- A few native perennial forbs including Blue Devil (*Eryngium*) and *Solenogyne*, a rosette-form daisy
- The alien perennial forb, wild sage (**Salvia verbenaca*) is present, but not abundant
- Introduced clovers (*Trifolium* spp.) are abundant in good seasons

TRENDS OVER TIME?

In the long term, the purpose of monitoring is to detect directional change in plant biodiversity due to non-interventionist management at Mokota. In the short term, the influence of seasonal variations could mask any directional trend over time.

Native grassland in Mokota Conservation cont.

Rainfall records at Mount Bryan 2000-2002 indicate a large variation in seasons over the three years of monitoring. Plants with different attributes such as life cycle and growth form will respond differently to both seasonal variations and management changes, for example, annual species generally vary more widely in abundance than perennial species with rainfall variation.

How does species frequency, with above average rainfall in 2001, compare with 2002 (spring rainfall 44% of average), at Mokota?

- Most annual species were much less abundant in 2002; most perennial species were slightly less abundant
- A group of plant species of particular conservation significance occur in the plots. Most are perennial, and most declined slightly in 2002
- Some species declined in dense grassland, but not in sparse grassland
- In general, the frequency of large, alien robust grasses such as Wild Oats (*Avena barbata*) increased from 2001 (favourable season) – 2002 (poor season), while small, fine grasses such as Hair Grass (*Aira* sp.) decreased. However, some species decreased in dense grassland and increased in sparse grassland.

4. DEH EXPERIMENTAL MANAGEMENT TRIALS

The trial was designed in the context of limited resources with which to apply basic management strategies – burning, sheep grazing, control. Each treatment was applied in three replicate plots of just under three hectares. In designing the trial the challenges were when and how often to apply treatments. The issues considered were:

- Management history of Mokota
- Results of Best Practice Grazing Trials being conducted by the Mid North Grassland Working Group
- Seasonal response of native and alien grassland species

Treatments in 2003

1. Planned autumn fire.
2. Short pulse(s) of sheep in autumn to winter.
3. Control – no fire or sheep grazing.
- 4 kangaroo exclosures in part of the fire plots – otherwise, all treatments are open to macropod grazing.

Null hypothesis:

‘That the composition of native forbs and grasses would not change under the following treatments:

- removal of approximately half of total living and dead biomass by sheep grazing
- removal of most of the total biomass by planned fire
- no intervention to remove biomass – macropod and other wild fauna grazing only.’

At the time of the 2003 treatments, most of the biomass that we aimed to remove comprised dead grass litter, mainly wild oats. Monitoring commenced before any treatments, and measured both frequency of all plant species and levels of grass biomass. Monitoring and assessments will be continued in future years and management attentions and additions made if indicated.

References

Robertson, M.A. (2003, unpublished) Experimental Vegetation Management at Mokota Conservation Park. Trial and Treatment Specifications for 2002-3. Report to Department of Environment and Heritage.

Robertson, M.A. (2001, unpublished) Mokota Conservation Park Vegetation Monitoring. Report to the Native Vegetation Council.

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Meg Robertson
NCSSA Project Officer
(based on a talk given to the Society in 2003)

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THANK YOU FOR YOUR CONTINUING MEMBERSHIP SUPPORT AND DONATIONS

GENERAL MEETINGS

1st Thursday of the Month

**at the Conservation Centre Meeting Rooms
120 Wakefield St, Adelaide**

7pm (front door open at 6.45)

- 4th March** Jo Spencer, Grassy Ecosystem Extension Officer : 'Taking a closer look at grassy ecosystems in the Eastern Flanks of the Mount Lofty Ranges'
- 1st April** Matthew Ward : 'Mistletoe in the Mount Lofty Ranges'
Joanne Lee : 'Truffles and Bettongs' (see article this issue)
- 6th May** Timothy Moulds : 'Cave-dwelling Insect Conservation in the Flinders Ranges'
Megan Fowler-Walker : 'Title to be announced'