

Around NCSSA

NCSSA major concerns 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

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What's happenin' on the MLR Birds front?

The MLR Woodland Birds survey started a bit later than last year, but we are well on track for a December finish again. Surveyors have been busy bush-bashing for those birdies and praying for daylight-saving to kick in. With their perseverance and early starts, over half of the surveys (357/489) were finished by the end of October!

About MLR Birds

The Mount Lofty Ranges Declining Woodland Bird Survey is a long-term monitoring program initiated by Professor Hugh Possingham's research group, and running since 1999. It aims to assess evidence for declines in woodland birds through repeated surveys of over 150 sites throughout the MLR. Each 2 ha site is surveyed during three 20-minute visits between September - December. This repetition is necessary to estimate the observation error rates, which is crucial to determining statistically whether birds are declining.

While occasional "snapshot" surveys may be sufficient to keep track of more secure, stable populations, those that fluctuate widely must be monitored annually. This study represents one of few long-term regional scale studies of a group of species in Australia that achieves this goal. Check out Hugh's article on why we're doing this in the next issue of *Xanthopus*.

Special thanks to the funding and participating organisations: Australian Research Council, Department of Environment and Heritage, University of Queensland, University of Adelaide, NCSSA, Adelaide & Mount Lofty Ranges Natural Resources Management Board. We're also very grateful to those property owners that allow us

to access the sites year after year. Continuity is of the essence for long-term monitoring programs such as this, so their ongoing participation is greatly appreciated. For enquiries on the database contact the survey coordinator. (tinabentz@gmail.com)

Investigating Plotless Vegetation Density Estimators

The newest member of staff at NCSSA, Craig Gillespie, Plotless Officer, has accepted the task of investigating the effectiveness of various plotless techniques for estimating the density of plants in Mount Lofty Ranges grassy woodland ecosystems. The project has been funded by the Native Vegetation Council through the Native Vegetation Fund Grants Scheme.

Plotless density estimators are techniques for estimating the density of vegetation components without the need for marking out a quadrat or plot. They have an advantage over quadrat techniques in that they are somewhat less sensitive to spatial scale considerations. This is because distances are measured between neighbouring plants or between a sample point and the plants rather than having to decide what size quadrat will best suit the subject plant population or community. This can also make plotless techniques more time efficient.

The outcomes of the project will include recommendations for the use of plotless techniques as a rapid assessment tool for using plant density to help inform decision making under the Native Vegetation Act with specific reference to the determination of intact strata. It will also provide insight into the use of these techniques in monitoring threatened plant populations, plant recruitment and weed management programs. Watch out for the project report, which will be published in *Xanthopus* next year.

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Scientific Officer's Report:

Mining threatens the heartland of Arkaroola Wilderness Sanctuary

Situated in the Northern Flinders Ranges, Arkaroola Wilderness Sanctuary is one of South Australia's most diverse and treasured natural areas. The Sanctuary was purchased by the famed geologist Reg Sprigg in 1967 to be set aside to ensure the conservation and preservation of this unique environment. In fact in 1969 the property was formally gazetted as a private wildlife sanctuary under the Fauna Conservation Act of 1964-65, and has been run as a conservation and ecotourism hub educating thousands of visitors per year for the last 40 years.

In an ironic twist of fate Mount Gee, which is located in the heart of the Sanctuary, is now at the centre of the uranium mining debate despite being classed as a Geological Monument and appearing on the Register for the National Estate. This vital refuge is home to an array of threatened species including *Codonocarpus pyramidalis* (Bell-fruit tree), *Acacia araneosa* (Spider wattle), *Acanthiza iredalei iredalei* (Slender-billed Thornbill), *Mogurnda clivicola* (Flinders Ranges Purple-spotted gudgeon) and *Petrogale xanthopus* (Yellow-footed Rock Wallaby) after which this newsletter is named.

Adelaide based mining company; Marathon Resources have just announced plans to mine uranium in and around the beautiful Mount Gee. The proposed development includes the construction of a decline (tunnel) which will be constructed between the ore body at Mt Gee and a processing facility on the Gilgai Plains to the east of the ranges and major infrastructure developments including a processing facility, haulage and access roads, waste storage facilities (including a permanent facility), a bore field and water storage dam, an accommodation village, a quarry for construction materials, and borrow pits for sourcing foundation materials and embankments. The company also estimates that the 2.5 gigalitres of water needed annually for production would be sourced from the already stressed local aquifers and the Great Artesian Basin.

If it goes ahead this proposal will undermine over 40 years of conservation work within the Sanctuary and will destroy one of South Australia's most significant biodiversity and geological assets. It should not be forgotten that the unique species and landscapes of Arkaroola have slowly developed over the last 440 million years and are not protected in any other National Park or Reserve. This area

is an essential link to the earth's past and a constant reminder of the insignificance of human greed in the face of a timeless landscape.

The owners and staff of Arkaroola are vehemently opposed to the mining of Mount Gee and are currently lobbying the State Government to reject the proposal. More information about the area and a draft letter of objection can be found on their website at www.arkaroola.com.au.

Georgina Green, Scientific Officer



"Mt Painter, the Armchair, Mt Gee and Paralana Hot Springs are recognised as geological and geographical monuments of outstanding scientific interest and are now entered on the Register of the Geological Society of Australia and of the National Heritage. They must be protected and preserved for all time."

Reg Sprigg, 1984

Drowning Mount Bold:

Introduction

The recent announcement by the South Australian premier that the state government will consider increasing the storage capacity for Mount Bold Reservoir raises serious public concerns over adverse impacts on the reserves native vegetation and indigenous species. The proposed height increase of the dam wall would mean flooding up to an elevation of 280m, an increase of around 50m on the current water level. This article briefly highlights some of the threatened plant species and ecological communities that occur in the proposed flooding area and discusses the biodiversity destruction and species loss that would occur as a consequence of the development proposal.

Threatened flora of Mount Bold

Mount Bold Reservoir reserve is one of the largest areas of remnant native vegetation in the southern Mount Lofty Ranges, giving it high conservation significance (Pound 2005). The reserve is rich in biological diversity, containing around 600 indigenous plant species and some of the most intact native flora remaining in the region, including plant species and ecological communities that are threatened at state and national levels (Bates 2004). An extensive mosaic of temperate forests, woodlands, heath, riparian habitats and swamps occurs throughout the reserve over diverse landforms including hill slopes, spring-fed gullies, cliffs and rocky scree in some of the states highest rainfall country.

Habitat for several threatened plant species and communities is under direct threat from the proposal. Populations of EPBC-listed species such as Clover glycine (*Glycine latrobeana*) and Spider-orchid (*Caladenia rigida*) occur within the reserve along with populations of many state threatened plants. These include Skeleton fork-fern (*Psilotum nudum*) a 'living fossil' from an otherwise extinct Devonian flora.



Skeleton fork-fern (*Psilotum nudum*) at Mt. Bold. Photo: T. Jury

The Mt Bold population inhabits a cliff just 2 metres above the current water line and is the only occurrence of this species in South Australia. Increasing the water level would therefore mean causing the extinction of this species from South Australia, a clear contravention of the State governments own No-species-loss strategy.

Several other state endangered species are associated with pockets of grassy Woodland which occur through the reserve, including: Showy violet (*Viola betonicifolia* ssp. *betonicifolia*); One-flower nancy (*Wurmbea uniflora*); and Australian carraway (*Oreomyrrhis eriopoda*). More threatened taxa and rare endemics occur along perennial creeklines (i.e. Slender daisy, *Helichrysum rutidolepis*), in swamps (Swamp raspwort, *Haloragis brownii*), and in sandy seepage habitat near the reservoir edge (Short-leaf donkey-orchid, *Diuris brevifolia*). All these species inhabit lower lying areas situated below the projected flooding line.

Mount Bold also contains remnant examples of state threatened ecological communities including Manna gum (*Eucalyptus viminalis* ssp. *viminalis*) Woodland, Blue gum - Pink gum grassy Woodlands and Upland swamps that contain threatened plant associations. Again these communities mainly occur on lower hill slopes and along gullies that would be drowned by the projected increase in reservoir water level.

Watering down nature conservation commitments

It is a responsibility of the state government to ensure the protection of indigenous biodiversity for future scientific study and enjoyment by the South Australian public. Organisations like Trees for Life, Friends of Scott Creek and the Threatened Plant Action Group are currently working with SA Water to manage and restore bushland at Mount Bold.

A watery grave for our threatened native flora?

The efforts of SA Water land management staff and these community groups appear to have been totally overlooked by the proposal.

The Mt Bold proposal provides a test case for key objectives of the recently adopted No-species-loss strategy aimed at maintaining and improving the status of threatened species and ecological communities - Goal 1, Obj 1.3 (DEH 2007). If development proposals such as this are allowed to proceed then it raises serious questions over the value of such strategies, as having top-down documents 'in place' and keeping up appearances



Diuris brevifolia, a threatened orchid species found in Mount Bold

of supposedly doing the right thing for nature conservation will not convince the public. It is actions, not words that define real intent and demonstrate genuine commitment.

Government water policy and planning needs to resist bowing to unrealistic public and commercial water use demands. Free for all access to unlimited water is clearly a thing of the past. We really need to start joining the dots between our actions as individuals (i.e. domestic and commercial water use) and their consequences at broader regional, catchment and ecosystem levels.

Increasing storage capacity at Mount Bold would drown important ecological communities and threatened species habitat, effectively condemning a very significant suite of the states' threatened flora to a watery grave. This seems difficult to comprehend given the state government's widely promoted "No species loss" strategy and big talk on environmental sustainability and nature conservation.

While they purport to be preventing further loss of indigenous species they don't seem to mind drowning a heap to support bad water use habits.

Mount Bold reserve is one of the few areas left in the region that retains a sense of wildness. It provides a critically important refuge for our natural heritage and cannot be destroyed by narrow mindedness that puts unsustainable water demands ahead of such a significant state conservation asset. If approved, the proposal will be the last nail in the coffin for some of our most threatened native flora. Stay tuned...

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Tim Jury

**Threatened Plant Action Group Coordinator
Nature Conservation Society of South Australia**



Intact remnant woodland near the reservoir's edge

Lake Hawdon South

It's not often that 3190 hectares of native vegetation in excellent condition gets added to the reserve system in the agricultural areas of South Australia, particularly in the wetter, more productive areas of the state. But in August, the Minister for Environment and Conservation approved the future proclamation of Lake Hawdon South as a conservation park. This is a fruitful end to several decades of effort by a string of scientists, conservationists and landholders.

Lake Hawdon South is one of the largest and most intact wetlands in the South East and one of its most significant for biodiversity conservation. It is larger than the Ramsar listed Bool Lagoon and has a water regime that is probably more intact. It is almost completely surrounded by private land hence its relatively low public profile. Although only 15km inland from Robe, it is visited by few people – long may it stay that way.

George Fife Angus passed by Lake Hawdon South in the mid 1840's, describing it as "... a flat, swampy plain, which, in the rainy season, is covered with water" (Angus 1847). The situation today is little changed. The delivery of water to the lake was originally via natural run-off and sheet flow from flats to the south-east. Today these flats are drained by the Biscuit Flat and Bray drainage systems. Although the drains have probably increased the rate of flow into the wetland at peak times, the maximum depth (less than 1m) and duration of inundation appear to be little changed. The wetland typically begins filling in early winter and is largely dry by February.

It seems that Lake Hawdon South may be one of the few large wetland areas in the South East to have escaped major damage in the face of the enormous hydrological impact that drainage has had upon the region as a whole. Survey maps prepared by C. A. Cleland in 1890 show areas of "thick rushes", open water, cutting grass and low rises with wattles that correspond very closely to the vegetation that exists today. The thick rushes referred to by Cleland include probably the largest area of *Baumea arthropphylla* (Swamp Twig-rush) dominated sedgeland known.

As unallotted crown land, Lake Hawdon South has been grazed since the 1840s. Uncertainty about the ecological value of Lake Hawdon South and North, and debate about the most appropriate form of management, led to two initiatives in the late 1990's. A committee was established by the Minister to make recommendations about the future management of Lake Hawdon, and

Department for Environment and Heritage (DEH) undertook a biological survey. The survey results, combined with previous and some subsequent work, show that Lake Hawdon (North and South) supports at least 127 bird species (45 of conservation significance), 4 native mammals, 15 species of reptile (one of conservation significance), eight species of amphibian, 64 native plants species (13 of conservation significance) and six vegetation communities (Stewart *et al.* 2001, DEH 2007).

Lake Hawdon South is a particularly important wetland for migratory waders. Sharp-tailed Sandpipers, Curlew Sandpipers, Pectoral Sandpipers, Common Greenshank, Marsh Sandpipers and Red-necked Stint all utilize the exposed mudflats that become available each summer. Wader numbers as high as 8250 have been recorded, including internationally significant (>1% of the flyway population) numbers of Sharp-tailed Sandpipers and nationally significant numbers of Marsh Sandpiper (Christie & Jessop 2007). Other notable birds include Glossy Ibis, Latham's Snipe, Black-tailed Godwit, Australasian Bittern, Crested Tern, Diamond Firetail and a host of state and regionally threatened species.

One of the most interesting features of Lake Hawdon South is an area of seasonally inundated mudflat of about 330 ha that is covered with thousands of symmetrical round stones, each about 80cm diameter and 25cm high. These are thrombolites; rocks formed by the actions of a living organism. The organism is unknown, but each thrombolite is covered by a creamy-coloured, clotted material resembling the texture of cauliflower. When water levels drop, a haunting, otherworldly landscape appears.



Lake Hawdon South full to the brim, 1 October 2004

– A New Conservation Park for the South East

The Lake Hawdon area, with its extensive *Gahnia* spp. sedgelands, was possibly the last stronghold of the now extinct Toolache Wallaby. The last living specimen was held captive in Robe in 1939 (Stewart *et al.* 2001).

Once convened, the committee (the Lake Hawdon Management Planning Steering Committee) began preparing a management plan but, after a promising start, fell into inactivity for several years. It was reconvened in 2005 and a productive phase of activity has followed. Use of this approach to resolving questions of land management has its advantages. The committee included adjoining landholders, the field and game association, local council and DEH. A forum where all parties could voice their opinions and concerns and be heard was invaluable and ensured that no one was left out of the loop. While not all are happy with the committee's final recommendations, particularly the grazier whose annual grazing license of the area is to be extinguished, the decision was made with the support of a range of interest groups, including neighbouring local graziers. The conservation value of Lake Hawdon South was clear to the overwhelming majority.

However, now that its future as a conservation park is assured, several issues need to be resolved.

Stock will be removed in May 2008 for the first time since the 1840s. This represents quite a dramatic change to the disturbance regime and it is important that the response of the vegetation is monitored, from both a biodiversity and fire management perspective.

Other issues include the illegal pumping of water directly from the wetland to irrigate pasture. DWLBC staff are aware of this activity but to date the agency has failed to take any action. In some areas the wetland is unfenced, with stock on neighbouring properties, including cattle, having unrestricted access. In other areas fences have been erected within the wetland. But the most important issue for Lake Hawdon South is to ensure that the quantity of water supply from the catchment (Biscuit Flat) and the local aquifer is maintained in the long term. There is little water to spare. Lake Hawdon South only spills into



The wetland (middle distance) with the Woakwine Range to the west

downstream Lake Hawdon North in very wet years (A. Ogilvie, *pers. com.*). Thus Lake Hawdon South uses all of the water that flows into it in most years. The ever increasing pressure on water resources, particularly in the South East, means those concerned for the conservation of this magnificent wetland will need to remain vigilant.

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BEN TAYLOR

XANTHOPUS

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

Copy deadline for the Autumn edition is **21st January 2008**.

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

Editorial Team for this issue: Helen Vonow, Tim Milne and Elizabeth Lonie.

Please let us know if you would prefer to have your *Xanthopus* emailed in preference to a hard-copy
~ we are considering this as an environmentally friendly option.

The health and conservation status of Candlebark (*Eucalyptus dalrympleana* ssp. *dalrympleana*) vegetation communities in the Mount Lofty Ranges.

Introduction

Candlebarks (*Eucalyptus dalrympleana* ssp. *dalrympleana*) are a tall majestic Eucalypt tree, with a distinctive white bark and one of the few true forest species occurring in South Australia. The species is considered Rare for both South Australia (NPWS Act 1972, Schedule 7) and the Southern Lofty Botanic Region (Lang & Kraehenbuehl 2006).

Although occurring over relatively wide geographic areas in Victoria, Tasmania and New South Wales, within South Australia Candlebark is restricted to higher rainfall, cool areas of the Southern Mount Lofty Ranges. Based on Candlebark's naturally very limited occurrence in South Australia, and with most remnants degraded or threatened by weeds, fragmentation, and incidental clearance of trees associated with residential land use and stock grazing, Candlebark-dominated vegetation types are considered to be Endangered in South Australia (DEH 2001).

Past and Current Distribution of Candlebark within the Mount Lofty Ranges

The current geographic extent of Candlebark is approximately 10 km north-west of Gumeracha and the most southerly record is approximately Parawa on southern Fleurieu Peninsula. Within this north-south range, Candlebark sites are restricted to the central spine of the Mount Lofty Ranges, thus spanning an area of approximately 80 km from north to south and 40 km from west to east. Within this area Candlebark-dominated vegetation is generally further confined to small narrow bands along drainage lines in sheltered valleys and adjoining lower slopes, or occasionally on nearby elevated slopes and ridges receiving 750 mm–1000 mm rainfall (Boomsma 1981). The main extant Candlebark stands are located alongside the Onkaparinga River and in the Mount Torrens, Norton Summit, Carey Gully, Bridgewater and Mylor districts with outliers in the Kyema, Mount Compass and Parawa districts. Although the occurrence of Candlebark trees has contracted within this range, the current geographic extent is believed to be similar to that of pre-European vegetation, as indicated by the following quote:

"There is so little of this species [Candlebark] growing that it does not form a forest but is merely of local occurrence in the stringybark (*E. obliqua*) and yellow gum [now Blue Gum] (*E. leucoxylon*) forests. It is often in a pure stand but its extent is extremely limited on account of its wet habitat."

Ising & Ham 1926, p.97

More specifically, the authors stated:

"The candlebark gum is essentially a tree of the rain forest of the Mount Lofty Ranges, attaining its maximum development in the sheltered gullies of the stringybark (*Eucalyptus obliqua*) formation. This species dominates the gullies amongst the stringybark forest ... but in lower altitudes where the quartzites give place to the clay-slates, ... the red gum (*E. rostrata*) [now *E. camaldulensis*], yellow gum [now Blue Gum] (*E. leucoxylon*) and Manna Gum (*E. viminalis*) flourish in association with it."

Ising & Ham 1926, p.94

Taxonomy and Identification

In South Australia, Candlebark (*Eucalyptus dalrympleana* ssp. *dalrympleana*) was until recently considered to be *Eucalyptus rubida* (Nicolle 1997; Barker et al. 2005). The taxonomic status of Candlebark in South Australia, however, is still the subject of conjecture. The species *Eucalyptus rubida* is still recognised, but as occurring only in New South Wales, Tasmania and Victoria.



Remnant trees at Rubida Reserve, Stirling Photo: Sonia Croft

During this research, some 'Candlebark' trees appeared to contain taxonomic features characteristic of *E. rubida* while other trees appeared to contain features characteristic of *E. dalrympleana* ssp. *dalrympleana*. The wide variation in observed physical features of Candlebark during this research, and Candlebark's occurrence at a range of altitudes, soil types and rainfall levels, suggests that one or both species and, possibly a different subspecies and/or hybrids, may be present in South Australia.

Of greater practical difficulty is the extreme similarity in appearance between adult Manna Gum (*Eucalyptus viminalis* ssp. *viminalis*) and adult Candlebark. Both species are considered Rare in South Australia, occur in similar habitats and often co-exist, or even hybridise. Although non-taxonomic differences between Manna Gum and Candlebark, including branch angle, trunk colouration, the amount and nature of bark retention and fruit and leaf size, are often used as field clues for identification, the species can only be reliably distinguished by their juvenile leaves. Sites where Candlebark occurs as a sub-dominant to Manna Gum are largely centred on the Onkaparinga River between Ambleside and Mount Bold.

Methods:

For the purpose of the research, a Candlebark-dominated vegetation type was defined as an area of naturally occurring vegetation where Candlebarks contributed to 50% or more of the overstorey canopy and there were at least 10 Candlebark trees present. A Candlebark stand was arbitrarily defined as an area of Candlebark-dominated vegetation and where the gap between the nearest Candlebarks was less than 200 metres. This included continuous vegetation on adjoining land tenures and areas now cleared, but thought to have been originally occupied by Candlebarks.

During 2006, seventy four survey sites were established in Candlebark-dominated vegetation types to assess the condition of this threatened plant community. Of these 74 sites, 39 were assessed using the Bushland Condition Monitoring method (Croft et al 2005). The Bushland Condition Monitoring method quantifies various indicators of bushland condition, based on an area of 900m² (Croft, Pedler and Milne 2005). All 74 sites were assessed using more subjective and rapid assessments of Candlebark communities. These more rapid assessments involved less detailed data recording than the Bushland Condition Monitoring sites, but assessed an entire area of Candlebark-dominated vegetation that was considered to be in the same condition, rather than being restricted to an area of 900m².

The majority of survey sites were located in the existing highest concentrations of Candlebark remnants; namely Bridgewater, Mylor, upper reaches of Onkaparinga River, Ambleside, Lobethal and Mount Torrens regions. The most northerly site surveyed was the most northerly occurrence known to the author (10 km north of Gumeracha) and the most southerly site surveyed was at Spring Mount, approximately 15 km north-west of Victor Harbor. It is estimated that up to 60% of existing Candlebark stands were surveyed either partially or in full.

Results:

Size of Remnant Stands

The sizes of remnant Candlebark stands are extremely small compared with most other vegetation types in the Mount Lofty Ranges. The research surveyed 31 stands of Candlebark-dominated vegetation, totalling an estimated 83 ha out of an estimated 120–150 hectares of Candlebark vegetation remaining in the Mt Lofty Ranges. Based on these estimates, Candlebark-dominated vegetation types occupy one of the smallest total areas of all the vegetation types that DEH (2001) consider to be threatened in South Australia. Of other threatened plant vegetation types in South Australia, only Red Stringybark Open Forest (90 ha mapped by DEH) and Silver Banksia Woodland (no areas currently mapped by DEH) are estimated to be of a lesser area than Candlebark. Stand sizes surveyed during this research ranged from 0.1 ha to approximately 35.0 ha. However, 80% of stands were ≤ 2.0 ha and 25% were < 0.6 ha. In many cases, Candlebark stands are confined to a small, very narrow band, sometimes only about 10 m wide on either side of a drainage line. The small size of stands has implications for the long term viability of the Candlebark population.

Key Environmental Parameters defining Distribution

The findings of the research suggest that a combination of water, soil and light are the key parameters determining Candlebark distribution, with Candlebark requiring large amounts of water and light. At many of the survey sites the author noticed that, of the two main slopes within a valley, Candlebarks are confined to

the gentler slope (< 10°) that receives more insolation. Invariably during this research, the Candlebark stand was receiving sunlight while the vegetation on the steeper opposite slope of the valley was in shade or part sun (often this opposite slope supported a Stringybark-dominated vegetation type). Approximately 85% of survey sites have a slope of 10° or less, reflecting that Candlebark is largely confined to flat land or adjoining gentler lower slopes. It appears, therefore, that shading may be a factor limiting the natural distribution of Candlebark. Candlebark occurred roughly equally on southerly and northerly aspects, or flat land with no aspect.

Average annual rainfall at survey sites ranges from 750 mm–1100 mm, with the majority of survey sites receiving annual rainfall totals of 1000 mm or more. Rainfall totals at the lower rainfall survey sites are lower than that indicated in relevant literature. Altitude of survey patches ranges from 250–605 m above sea level and, within this range, does not seem to be as limiting a factor in Candlebark distribution as is rainfall or shading. The lower limits of altitude for survey sites recorded during this research are lower than that cited in previous published literature.

Soil texture recorded during this research was variable but can be placed in two main categories: alluvial (along drainage lines) and podsollic (sand over clay soils of varying fertility) soils on non drainage lines. This agrees with published accounts of Candlebark ecology.

During the survey, nine other *Eucalyptus* species were recorded in association with Candlebark. These species either contributed an equal amount, along with Candlebark, to the canopy layer (that is, were co-dominant) or contributed more than 5% to the canopy layer, but less than Candlebark (that is, were sub-dominant). The most common co-dominant or sub-dominant species was Messmate Stringybark, followed by Manna Gum (including uncertain identifications between Manna Gum and Candlebark) and then Blue Gum. Other *Eucalyptus* species growing in association with Candlebark were Red Gum, Pink Gum, Long-leaved Box, Cup Gum, Swamp Gum and Brown Stringybark.

Population Structure

At the Bushland Condition Monitoring sites, the trunk diameter at breast height (DbH) of Candlebark trees was recorded and used as an indicator of tree age. The great majority of existing Candlebark trees surveyed were relatively young trees. Of the 903 live Candlebark trees for which DbH was recorded, 46% had a DbH of ≤ 10 cm and 61% had a DbH of ≤ 20 cm. All trees that had not borne fruit or buds ('juvenile' trees) had a DbH of < 10 cm and most 'juvenile' were of much smaller DbH.

The majority of Candlebark trees in most survey patches are relatively young trees that have grown since past broadacre clearance, with only isolated old growth trees in most survey patches. Ideally, in a viable population there should be many more young trees than adult trees, because of the large number of small trees required to cover the space occupied by a single mature tree, and attrition due to mortality (George 2005). Therefore, for the collective Mount Lofty Ranges population of Candlebark, in the absence of unforeseen widespread tree death due to climate change or unnatural disturbances, the survey results indicate that the long-term viability of the Candlebark population is potentially high.

From observations made on the range in size and form of trees during this research, the author considered that a tree with a

The health and conservation status of Candlebark vegetation communities...cont.

DbH of 50 cm is a relatively young Candlebark tree in terms of its potential life span. At 70% of survey sites, 75% of trees surveyed had a DbH of < 50 cm. Within the Candlebark stands surveyed, very few mature trees remain. According to the relevant literature, Candlebark is mostly a tall to very tall tree usually up to 40 m in height and 1.0–1.5 m in diameter, but under favourable conditions it may exceed 60 m in height, with trunk diameters over 2 m (Boland et al. 1984). On this basis, the author assumed a mature Candlebark tree has a DbH of approximately 100 cm or more. Of the 903 live trees surveyed, only 4% (42 trees) had a DbH of ≥ 100 cm and were recorded from 17 survey sites. However, 17 of the trees with a DbH of ≥ 100 cm came from just two survey sites; hence 25 of the largest trees came from only 15 survey sites, indicating that very large Candlebark trees are generally isolated occurrences. The largest Candlebark DbH measured during this research was 180 cm, followed by two trees with a DbH of 176 cm and one with a DbH of 162 cm. These four largest trees were geographically widely separated and growing amongst generally much younger trees.

Anecdotal information suggests Candlebark trees are highly susceptible to wind throw (*pers. comm.*, Tim Jury, Threatened Plant Action Group Coordinator, October 2006). This is presumably because of their tall, straight but relatively narrow trunk when young and because they occur in gully lines where gully winds can be relatively high, and where the soil may be relatively unstable.

Tree Density

Candlebark densities at intensive survey sites ranged from approximately 40 trees per hectare up to almost 1500 trees per hectare. The density of Candlebark trees with a DbH of > 10 cm ranged from 30 trees to almost 1000 trees per hectare. When all trees of all species that were present in the canopy layer at each survey site were included, the extrapolated overstorey tree densities ranged from 64 trees per hectare at two sites, to over 2500 trees per hectare. As would be expected, tree density is very high in survey sites with relatively young trees. This has implications for potential Candlebark replanting programs; namely, Candlebark tubestock should be planted at high densities.

Regeneration

At the Bushland Condition Monitoring sites, regeneration levels were assessed by comparing the number and/or ratio of juvenile trees (defined for this study as Candlebark trees with a DbH of ≤ 10 cm) with the total of all other Candlebark trees; hence it was more specifically an indicator of relatively recent regeneration. There was a wide variation in levels of recent regeneration at different survey sites, ranging from no juvenile trees at 23% of Bushland Monitoring sites; only one or two trees at 20% of sites, to at least as many juveniles as adults present at 38% of sites. At most survey sites, there was also several age classes present, as measured by DbH classes. All but two Bushland Condition Monitoring sites had between four and eight DbH classes, with six DbH classes being the most frequently recorded.

The results for both age structure (as indicated by DbH classes) and regeneration suggest that if Candlebark areas are actively weeded, stock grazing is absent and the understorey is not frequently mown, Candlebarks have the potential to regenerate

readily and regeneration is naturally continuous rather than episodic. They do not appear to need any special trigger for regeneration, such as fire or exceptionally high rainfall.

Candlebark Health

Candlebark health was largely determined by the amount of canopy dieback. The mean dieback of all Candlebark trees with a DbH > 10 cm was 23%. This compares with a mean dieback of 48% for 1200 Pink Gums surveyed by Ward (2005) in the Mount Lofty Ranges. The mean dieback of all Candlebarks with a DbH of ≤ 10 cm (189 trees) was 21%. The mean canopy dieback (including both live and dead trees) did not seem to show any clear trend between DbH classes. Levels of canopy dieback recorded were highly variable between survey sites. At Bushland Condition Monitoring sites, over 50% of Candlebark trees were observed to have 10% or less canopy dieback. Only 3% of trees were observed to have between 51–99% dieback. Dead trees comprised 8% of the total number of Candlebark trees. However, it is difficult to interpret the number of dead trees in terms of tree health, as many of the dead trees had fire scars and were likely to have been killed by bushfire rather than to have suffered premature death due to other causes. From observations made by the author during this research, it appears Candlebark may be killed outright by hot fires and rely on seed regeneration for survival of the population. This is a common mechanism for high rainfall forest trees where fire is relatively infrequent (e.g. as in Mountain Ash).

It is also possible, however, that there is a naturally high mortality rate in relatively young trees. Because of the very high densities of trees in young stands, there must be some natural thinning out process as the stand matures. The greatest number and proportion of dead trees recorded during this research had a DbH of between 10–20 cm. However, the premature death of trees may also be spread across a large tree age span, as high proportions of dead trees were also recorded in the 40–80 cm age classes. Given the limited number of dead trees surveyed in this study, further work is required to determine mortality rates amongst Candlebark trees of different age classes.

Mistletoe

Mistletoe infestation rates appear to be relatively low in Candlebarks. Of the 654 adult Candlebark trees observed for mistletoe presence at Bushland Condition Monitoring sites, only 5.8% (38 trees) contained mistletoe and 4.7% contained live mistletoe. During the research, mistletoe was recorded at 33% of Bushland Monitoring sites. However, 55% of mistletoe-infected trees came from just two survey sites. At 61% of the sites where mistletoe was recorded, only one Candlebark tree was infected. The mistletoe species is likely to be Box Mistletoe (rather than Drooping Mistletoe): the mistletoe on all Candlebark trees was not accessible to enable positive identification between these two species. In general, only relatively large mature trees were infected with mistletoe. Significantly, the highest number of mistletoe plants was recorded for a survey site where past clearance had left the remaining Candlebarks as isolated trees in a grazing paddock, and almost all the native understorey had been replaced by introduced pasture species. Mistletoe was recorded in more than one tree at only five intensive survey sites. Of these, three sites scored at the lower end of the range for the Life Form condition indicator (which incorporates the number of different native life forms and their cover).

Witches' Broom

Witches' brooms are a symptom in woody plants where many twigs are densely clustered together, resulting in a mass of abnormal shoots that resemble a broom. Leaves are often small and deformed with yellow margins. This growth of abnormal shoots can be caused by various micro-organisms or insects, genetic abnormalities and by nutrient deficiencies. Witches' broom occurs widely in a range of *Eucalyptus* species and is not generally thought responsible for killing trees (DEH 2006; Playfair 2004). However, it can be an indicator that a tree is unhealthy. During the survey witches' broom was recorded for 15 trees in 11 survey sites; all incidences being in mature trees. Most infestations (and the most severe) were in the Mt George-Bridgewater-Wottons Scrub area. At one site in the Mt George area, one very large tree appeared to be almost dead due to witches' broom occupying almost the entire canopy. In the Wottons Scrub Conservation Park, Candlebark stands are near the centre of the park, but six trees with over 50% of the canopy affected by witches' broom, were present in what appeared to be an otherwise healthy stand of Candlebarks. This suggests witches' broom at this location, at least, is not an edge effect. Elsewhere during this research, only small amounts of witches' broom affecting < 1% of the canopy (namely, present on one or two small branches) were recorded in isolated trees. However, witches' broom was recorded over a wide geographic area, including Norton Summit, Ambleside, Kyeema and Mount Bold. Although data is limited, it appears that witches' broom may be a cause for concern, because, in the same way as mistletoe infestation, it seems to be an indicator of a severely weakened or stressed tree.

Native Plant Species Richness

At the survey sites native plant species richness varied widely and ranged from 3–53 species. A total of 190 distinct native taxa were recorded at survey sites. At least 151 native taxa were recorded in drainage line and/or adjoining saturated soil sites, and 140 native taxa on hill slope sites. In general open forest vegetation types (trees 10–30 m tall at maturity and with a projective foliage cover of 30–70%) have a predominantly shrubby understorey on mineral poor soils, grading to a predominantly grassy understorey on more fertile soils (Gill 1997). Candlebark-dominated vegetation types seem to be transitional between these two extremes, with high covers of shrubs, ferns and grasses. The non-drainage line survey sites, in particular, were characterised by a high diversity of understorey densities and life form composition, and the researcher could draw no firm conclusions as to whether there was a typical understorey for Candlebark vegetation types on non-drainage line sites. This may be because the survey sites were being managed in a wide variety of ways, ranging from intensive weeding to no apparent active management. The survey sites also included a wide range of successional stages from relatively young regenerating stands to mature stands and also covered a variety of soils types, aspect, elevation and rainfall.

In New South Wales, Victoria and Tasmania *Eucalyptus dalrympleana* occurs as a grassy or sclerophyllous woodland or forest on loamy or sandy soils at higher elevations (EucaLink

2006) and *Eucalyptus rubida* occurs as grassy or sclerophyllous woodland on soils of medium fertility (EucaLink 2006). The natural understorey of Candlebark in the Mount Lofty Ranges is likely to be variable, therefore, and dependent upon site factors.

Although there is insufficient data to draw definitive conclusions, it appears Bracken Fern may be a colonising species in Candlebark Open Forests. At those sites where litter cover was highest (generally in young stands), Bracken Fern was often present and at high covers (up to 50% ground cover).

Weed Invasion

Of all the condition indicators scored using the Bushland Condition Monitoring method, Candlebark survey sites collectively scored worst for weed cover and weed threat indicators, with high levels of weed cover and/or threat at most sites. This is not surprising, as Candlebark vegetation types are very prone to weed invasion because of their relatively moist and often fertile soils. In addition to a high cover of weeds, many of the weeds present are considered to be high threat environmental weeds. The Blackberry complex of species was easily the most frequent taxon recorded, being present at 78%

of rapidly and/or intensively surveyed patches. Of the ten most frequently recorded weed species, five are considered to be of high or very high threat to biodiversity and high priority for control (namely, Blackberry, Montpellier Broom, English Broom, Gorse and Bulbil Watsonia). Although many weed species were of similar frequency and cover in both drainage line and non-drainage line sites, some of the most frequent weeds showed a strong preference for moister habitats, including Spear Thistle, Clustered Dock, Phalaris and Flax-leaf Fleabane.

Regeneration of Woody Native species

The number of woody native species (other than Candlebark) that were regenerating varied widely between survey sites. Several species, however, were regenerating at the majority or all of the sites in which they were recorded, namely Mount-Lofty Ground-berry, Blackwood Wattle, Manna

Gum, Golden Wattle, Large-leaf Bush-pea and Prickly Tea-tree. Because regeneration seemed to be present in several species at many of the survey sites, it appears that regeneration of many species in Candlebark vegetation types is continuous and not dependent upon episodic triggers such as fire.

Grazing

Only three Bushland Monitoring sites were grazed by domestic stock at the time of survey. At these sites, only a relatively few native species remained, and these were species known to be unpalatable to stock. At sites not being grazed by domestic stock, very few sites showed any obvious grazing impacts, or other physical damage (e.g. due to kangaroos or other herbivores). At Bushland Condition Monitoring sites, only seven species were recorded as being grazed at two or more sites: Weeping Rice-grass, Hard Mat-rush, Sweet Bursaria, Square Twig-rush, Black-anther Flax-lily, Mount Lofty Ground-berry and Golden Wattle. Golden Wattle was most frequently recorded as grazed, but even this species was only noted as being grazed at five sites.



Regenerating Candlebark in Mt George CP Photo: S. Croft

The health and conservation status of Candlebark vegetation communities...cont.

Almost 90% of the rapid survey sites (non Bushland Monitoring sites) had not been grazed by domestic for at least five years and showed no obvious sign of native or feral grazing impact. Only 6% of rapid survey sites (five sites) were currently grazed by domestic stock. This low percentage is probably due to bias in the selection of sites, as a higher percentage of stands not surveyed are either probably grazed or regularly mown.

It appears, therefore, that native or feral animal grazing is not a significant factor in the majority of remnant Candlebark stands.

Tenure and Management Status of Surveyed Candlebark Stands

Of the 31 Candlebark stands surveyed, half (15) were Crown Land reserves (including seven NPWAct reserves and five Local Government reserves, and half (16) were on private land. Approximately half of the area of all stands surveyed were being actively managed (43 ha actively managed and 40 ha not actively managed). Of the 31 Candlebark stands surveyed, 22 were being at least partially actively managed for conservation, including 13 stands which were at least partially privately owned. This is considered to be a high percentage of the total area being actively managed, although the author is not aware of comparative figures for other vegetation types or for total remnant vegetation in the Mount Lofty Ranges. This high percentage of actively managed area may reflect the targeted management of Candlebark vegetation remnants due to this vegetation type's threatened status and because many Candlebark stands are valuable for maintaining water quality in important catchments. Because the research surveyed an estimated 60% of existing Candlebark stands and the majority of surveyed stands occurred on Crown land and/or actively managed on private land, the findings may if anything overstate the condition of Candlebark communities.

Conclusion

In remnant Candlebark stands where existing legislation (such as the *Native Vegetation Act 1991* and the *National Parks and Wildlife Act 1972*) protect stands from domestic grazing and other forms of clearance, the greatest threat to Candlebark vegetation types is weed invasion. The long-term survival of Candlebark vegetation remnants seems dependent upon high and sustained levels of management input in these areas. During this research several properties were visited which, until recently, were dominated by woody weeds that, through intensive weed control, have now reached the stage of being in Good to Excellent condition. However, being small with high edge effects and in high rainfall environments, ongoing invasion of Candlebark vegetation types by high-threat weeds is inevitable.

Although this research surveyed some Candlebark stands that, through grazing and/or mowing have been reduced largely to remnant trees over an introduced understorey with little regeneration, there are many more patches of Candlebark trees (mainly in residential garden settings) which were not surveyed. Further surveys are required to locate and document remaining Candlebark trees in now essentially park settings on private land tenures. Ideally landholders should be encouraged to conserve and rehabilitate these areas, which may be essential to maintaining the genetic viability of Candlebark. There is also a need to complete the condition assessment and mapping of Candlebark-dominated vegetation types with an intact native understorey in the Mount Lofty Ranges.

The South Australia Candlebark population is separated by several hundred kilometres from the main stands in the eastern States. For this reason, Candlebark is likely to have an unusual genetic makeup. Given the Rare status of Candlebark as a species and its Threatened vegetation type status, DNA studies are required to clarify the taxonomy of Candlebark in South Australia. This, combined with the very small area occupied by Candlebark-dominated communities in South Australia, the threat of woody weeds as noted above, and the occurrence of an understorey distinct from its Eastern States counterparts provides a strong argument for this community being nominated for listing as a nationally threatened ecological community under the *Environment Protection and Biodiversity Conservation Act 1999*.

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This article is drawn from a Masters of Environmental Studies dissertation (Croft 2006).

Sonia Croft

Annual Report 2006 - 2007

The Nature Conservation Society of South Australia Inc. (NCSSA) is a not-for-profit voluntary conservation organisation. It works to understand and protect habitat, flora and fauna, particularly of South Australia. We lobby for protection and strategic expansion of the state's reserve system, educate the community about environmental matters, and undertake scientific research and surveys.

The Nature Conservation Society has a history of over forty years as a leader in advocacy for the environment and as a respected source of scientific information and informed comment on the biodiversity of South Australia.

2006—2007 Summary:

This was a year of challenges and changes, but the Nature Conservation Society of South Australia has continued to make an contribution to biodiversity conservation in this state.

One of the most significant changes has been the sale in March this year of the Conservation Centre, 120 Wakefield Street, Adelaide — the building the Society and the Conservation Council of SA co-owned for approximately 23 years. The past 9 months have been a busy and demanding period of time. The Committee are currently focusing on securing suitable premises to enable the work of the Society to continue without further disruption.

In a challenging environment of Natural Resource Management we continue to secure funding and win competitive grants for NCSSA's core areas of research, education and on-ground work.

We provide a significant educational contribution to the community with NCSSA staff delivering ten workshops (330 attendees) to community groups on various flora and fauna topics; nine days of workshops (76 attendees) specifically on the Bushland Condition Monitoring methodology; and four workshops as part of the Grassy Woodland Network.

We once again ran the popular Native Grass Identification Workshop in cooperation with the *Native Grass Resources Group* in October 2006

This year the NCSSA Conservation Biology Grant again provided funding towards student projects, assisting with additional field research. This program also benefits the Society, providing general meeting speakers and articles about the completed research for publication in *Xanthopus* for 2007/08.

Our continuing focus is providing input into government policy and legislation with constructive and expert comment provided on many proposals and plans.

As always the vision and commitment of the hard-working staff, volunteers, and committee members is invaluable.

Helen Vonow

**President
Nature Conservation Society of SA**

September 2007



A. NATURE CONSERVATION HIGHLIGHTS

Nature Conservation advocacy

The work of the NCSSA Scientific Officer augments the work of the NCSSA Committee in our biodiversity advocacy role. The Scientific Officer has the essential role of the longer-term follow-up advocacy, education, and input into submissions and legislative reviews based on the work of the more specific grant projects and Committee expertise. This may involve writing reports and making submissions on environmental issues, or briefing the Committee, with further action taken by one of its members. The SO provides an important point of contact for community groups, the general public, non-government organisations (NGOs) and government officers.

Major initiatives in the past year have been in the areas of Nature Conservation and Biodiversity Protection, Public Land and Sustainable Natural Resource Management, Coast and Marine Conservation, Natural Heritage Conservation, Animal Welfare and Community Education and Awareness.

Nature Conservation and Biodiversity Protection

During the past year the Society has worked in partnership with government, environmental and community groups to facilitate the effective management and protection of South Australia's biodiversity. It worked tirelessly to ensure that all environmental legislation works to the advantage of biodiversity conservation in South Australia. A major part of the work undertaken this year has involved the *Native Vegetation Act 1991* or other biodiversity based legislation.

Public Land and Sustainable Natural Resource Management

We have played a pivotal role in assisting in the identification of biodiversity priorities to help the Government work towards the completion of a Comprehensive, Adequate and Representative Reserve System.

The Society has also worked in partnership with the Government to assist in the management of public land.

Coast and Marine Conservation

The Society has worked towards effective conservation, protection and associated management of the State's coast and marine environments. It has provided the wider community with scientific information regarding coastal environmental concerns and current legislation and government policies.

Natural Heritage Conservation

In partnership with Government, environment and community groups we assisted to adequately determine sites of significant natural heritage values within South Australia, while providing reliable scientific data to aid in natural heritage conservation.

Animal Welfare

We facilitated public education on the importance of understanding animal welfare issues in South Australia. This included assisting in education about State and Federal Government wildlife initiatives and providing scientific data to landholders to aid in the development of sustainable animal based land practices.

Scientific endeavours and good quality information

Biodiversity Extension/Bushland Condition Monitoring Project

It has been another exciting and busy year for the Team. The NCSSA has continued to provide technical advice through workshops and presentations to community groups on flora and fauna.

Over 50 people have been trained at two-day Bushland Condition Monitoring workshops on Eyre Peninsula, in the Murray Darling Basin and in the Mount Lofty Ranges. The NCSSA has provided ongoing support to community groups and organisations in the Mount Lofty Ranges to monitor their native vegetation, such that there are now over 120 active sites in this region alone.

We have been developing vegetation descriptions and benchmarks describing condition attributes of different vegetation types for the Northern Agricultural and Yorke Peninsula (NA & YP) areas, the Murray Darling Basin (MDB) and Eyre Peninsula. The NA & YP Bushland Condition Monitoring Manual is now in press, and the MDB Manual is expected to be finalised by late 2007.

The BCM method was again used as a component of the site assessment for the federal government funded "Bush Bids" program, which focused on protecting habitats along the eastern flanks of the Mount Lofty Ranges.

Your Society is working collaboratively with the Department for Water, Land and Biodiversity Conservation (DWLBC) to develop the South Australian Biodiversity Assessment tool (SABAT) to enable collection, storage and reporting on Bushland Condition Monitoring data.

Mount Lofty Ranges Declining Woodland Bird Survey

This long term monitoring survey established in 1999, was coordinated again by Tina Bentz and administered through NCSSA for the second year. It aims to assess the evidence for declines in woodland birds through repeated surveys of 164 sites throughout the Mount Lofty Ranges.

The database was further refined for administration and reporting capabilities



Coastal Bushland Condition Monitoring at Waitpinga

with the help of Brian Knill. Max Possingham helped with data-checking. Much of the data and the many associated reports and papers are on the web for free download from <http://www.ecology.uq.edu.au/index.html?page=44639>.

South Para Revisited

The NCSSA's 2000 spring survey was in conjunction with the South Para Biodiversity Project. The survey aimed to document the flora and fauna at thirteen project sites within the region, and established a monitoring system to detect changes in biodiversity at these sites.

Tina Bentz coordinated the NCSSA revisit of four of these sites in the spring and summer of 2006. Two sites were in areas of remnant vegetation, one was in a site regenerating after grazing removal, and one site was revegetation.

In addition to the repeat monitoring of these sites for plants and birds, Bushland Condition Monitoring (BCM) sites were established at these four sites and an additional 11 new sites. A report was published which compares findings between the years.

MLR Grassy Ecosystems Extension

Bill New has continued as our Mount Lofty Ranges Eastern Flanks Grassy Ecosystems Extension Officer.

Bill provides advice and technical support to landholders and natural resource managers in the region in recognition and management of grassy

ecosystems. He also attended many site visits, field days, regional shows and established BCM sites to track changes of management activities.

A field day, by bus-tour, to the Clare district to check out native grass pasture management trials was well attended by landholders from the Eastern and Southern Mt Lofty Ranges. It raised a good level of interest in high density short duration rotational grazing of native pastures. This was jointly organised and hosted by the Mt Pleasant Natural Resource Centre.

Biodiversity Survey

It is now ten years since the Nature Conservation Society of South Australia published *Pre-European Vegetation of Adelaide: A Survey from the Gawler River to Hallett Cove* by Darrell N. Kraehenbuehl. In this landmark publication Darrell gives an historical account of the degradation of the flora of the Adelaide Plains, and provided details of the few significant remnants of native vegetation left.

It was timely that as our Spring Survey in 2006 we revisited these biodiversity jewels and assessed the changes that have occurred, particularly given the commonly held view that the last decade has seen a significant increase in

investment in biodiversity protection. Part of this survey was a "bushland condition" assessment conducted at each site.

The report is in preparation and will be available late 2007.

Community Education

NCSSA retails popular book titles *Stop Bushland Weeds* (2nd Ed.), *Pre European Vegetation of Adelaide* and *20 Walks with Nature in the Mt Lofty Ranges*, as well as our project and survey reports.

We published two survey reports this year:

Pound, L.M. (2006) *Mt. Bold Reservoir Reserve: a biological survey of Flora and Fauna*, following our 2005 Spring Survey.

Bentz, T. & Milne, T. (2007) *Revisiting South Para, Monitoring changes in vegetation, bird diversity and bushland condition*.

We sell the reference the *Bushland Condition Monitoring Manual* and train landholders/managers in its use.

We published four editions of our newsletter *Xanthopus* and continued upgrading the NCSSA website www.ncssa.asn.au

Working with the community for on-ground outcomes

Threatened Plant Action Group

During 2006-07 TPAG continued with recovery and habitat management work throughout South Australia's fragmented agricultural regions for around 60 threatened plant species and eight threatened ecological communities. Over 2800 hours of work by more than 50 volunteers was contributed toward protecting and improving the condition of critical habitat at around 65 sites.

Implemented recovery actions included: Abatement of weed and feral herbivore threats; fencing to protect habitat; plant population censuses; vegetation surveys; tube-stock revegetation; stakeholder liaison; and public education. Effective working partnerships with landholders, environmental agencies and other community groups continue to develop and four grants were obtained to assist with implementing on-ground work. Working bees and field days continue to

be highly productive with some excellent returns gained from actions undertaken to restore threatened plant habitats. TPAG continue to make a real and tangible difference in improving habitat condition and *in-situ* conservation prospects for South Australia's threatened flora.

Temperate Woodlands Officer

Partnerships with SA Water, Forestry SA, DEH and *Bush For Life* continue to deliver improved management of significant grassy woodland remnants in the Mt Lofty Ranges. Threat abatement activities continue at priority grey box and SA blue gum woodland sites in Happy Valley Reservoir Reserve. Despite the negative impact of the drought, there are encouraging signs of native plant regeneration at the six sites where control of olives, boneseed, African daisy, *Monadenia*, bridal creeper and annual weeds has occurred for six years.

This year the Vegetation Management Plans for significant grassy sites in the Forestry SA estate were reviewed, as they have been in operation for four years. Many of the suggested actions have been implemented and weed issues are gradually being addressed.

A successful Envirofund grant and support from NCSSA has allowed the MLR Grassy Woodland Network to continue through its third year providing practical advice and a theoretical background. This year workshops have concentrated on minimum disturbance weeding techniques. Themes in newsletters have included grassy woodland plant identification, native plants as weeds and accessing DEH's public mapping site.

The *Friends of Cromer Conservation Park* are going from strength to strength and are an example of what can be achieved by groups working together.

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B. OPERATIONAL HIGHLIGHTS

Membership and Volunteers

NCSSA has a current membership of just over 300 members and we welcomed 36 new members during the year.

The Society depends on a strong volunteer base with approximately 70 individual volunteers contributing about 9000 hours of time to conservation of biodiversity in this State. This includes those who assist around the office and with projects, annual survey assistants, leaders and organisers of members' walks and activities, the dedicated management Committee, and steering committees to manage each of our funded projects and major activities.

The NCSSA is one of few voluntary organisations in the state with strong biodiversity credentials and great depth in understanding biodiversity issues both scientifically and in appropriate on-ground actions to achieve conservation outcomes. Many NCSSA committee members have at least one degree in the biological sciences and have extensive field experience.

Committee members for 2006 – 2007 were Helen Vonow - President, Misch Benito - Vice President, Katie Fels - Secretary, Richard Winkler - Treasurer, Peter Tucker - Assistant Secretary, and committee members Allen McIlwee, Michelle Denny, Caroline Wilson, Spencer Burgstad, Zoe Drechsler. Allen McIlwee and Peter Tucker both resigned from the committee during the year due to relocating for their jobs. Ben Taylor, Annie Bond and Mervyn Chappel joined as co-opted committee members during the year.

Administration and staff

The society is well served by and appreciates the excellent work and commitment of its staff and project officers, all part-timers.

Our continued success in achieving competitive grants for a wide range of NCSSA

programs and projects makes this possible. The staff for 2006 – 2007 comprised:

Georgina Green our Scientific Officer who has been working with us for just over 12 months. Georgie researches, lobbies, and prepares submissions on current nature conservation issues; provides information and support to members of the organisation and to the general public. Funding through the State Government Community Service Agreement Grants supports this position [DEH SA].

Tim Milne, our Project Manager, oversees the Society's projects (currently approximately 20), ranging from small grant-funded surveys through to our large Natural Resource Management Board contracts.

Our Administrative Manager Elizabeth Lonie looks after the office, manages our human resources and handles our finances. This position is partially funded by a Federal Government Grants to Voluntary Environment and Heritage Organisations [DEH Canberra] grant.

The 2006 – 2007 Biodiversity Extension Team comprised Tim Milne, Sue Graham, Sonia Croft, Janet Pedler, Tina Bentz and Caroline Mussared.

Their great work continued on a number of projects including: South Para Vegetation Survey [SPBP]; biodiversity workshops and monitoring in the Murray Darling Basin [MDB NRM]; NYAD Field Guide to Bushland Monitoring [NYAD NRM]; Bushland Condition Monitoring Eyre Peninsula [EP NRM]; biodiversity advice and monitoring in the Mount Lofty Ranges [AMLR NRM]; and the continuation of our *Bushland Condition Monitoring* workshops.

Melissa Batt coordinated our 2006 Spring survey *Revisiting Adelaide's Pre-European Remnant Vegetation*, and presently preparing the report for publication [AMLR NRM].

Tim Jury continued in his third year as our Threatened Plant Action Group program coordinator [AMLR NRM]. He also coordinated the *Reintegrating Threatened Habitat Fragments at Muloowurtie on Yorke Peninsula* project [Envirofund].

We obtained further funding for our important Eastern Flanks Grassy Ecosystems Officer position, with Bill New promoting grassy ecosystems to the public and landholders [MDB NRM, AMLR NRM].

Penny Paton was successful in obtaining funding to continue convening the *Mount Lofty Ranges Grassy Woodland Network* and to conduct on-ground works to protect, preserve and restore grassy woodlands (Envirofund), and continues weed control and bushcare work at Happy Valley Reservoir Reserve [SAW, AMLR NRM].

Tina Bentz undertook her second year of coordinating the long-running *Mount Lofty Ranges Woodland Birds Survey* [AMLR NRM].

Meg Robertson (from Alice Springs) completed her project, *Community processes in native temperate grasslands following destocking in the Mokota Conservation Park* [DEH WCF].

Thanks to funding bodies:

Adelaide & Mount Lofty Ranges Natural Resource Management Group [AMLR NRM]
Australian Government Envirofund [Envirofund]
Department for Environment & Heritage (SA) Wildlife Conservation Fund [DEH WCF]
Department for Environment & Heritage (SA) [DEH SA]
Department of Environment and Heritage (ACT) [DEH Canberra]
Eyre Peninsula Natural Resource Management Group [EP NRM]
Murray Darling Basin Natural Resource Management Group [MDB NRM]
Northern & Yorke Agricultural Districts Natural Resource Management Group [NYAD NRM]
SA Water [SAW]
South Para Biodiversity Project [SPBP]

AUDITED FINANCIAL STATEMENTS AS OF JUNE 2007

Nature Conservation Society of SA

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Balance Sheet [Last Year Analysis]

June 2007

	This Year	Last Year
Current Assets		
Operating Accounts and Cash		
NCSSA BankSA ...840	\$9,981	\$24,083
Petty Cash Society	\$200	\$200
Total Operating Accounts and Cash	\$10,181	\$24,283
Investments		
Adelaide Bank T10	\$146,984	\$139,705
BankSA Portfolio	\$0	\$8,091
Commonwealth Cash Man Tr	\$65,436	\$101,128
Commonwealth Comm Invest	\$0	\$117,460
Investment Portfolio	\$67,039	\$64,503
Express Saver Account	\$153,407	\$0
Adelaide Bank Money Market	\$627,644	\$0
Total Investments	\$1,060,510	\$430,886
Accounts Receivable	\$3,425	\$40,496
Book stock on hand	\$23,056	\$32,813
Total Current Assets	\$1,097,171	\$528,478
Other Assets		
Loans to associated groups	\$0	\$65,990
Total Other Assets	\$0	\$65,990
Fixed Assets		
Land (NCSSA 30% share)	\$0	\$82,500
Building (NCSSA 30% share)	\$0	\$18,750
Acc'd Dep'n - Building	\$0	(\$2,776)
Furniture, Fittings & Equip	\$36,475	\$34,596
Acc'd Dep'n - Furn & Equip	(\$30,570)	(\$26,157)
Total	\$1,103,076	\$701,381
Liabilities		
Current Liabilities		
Credit Cards		
Visa 1	\$440	\$1,564
Total Credit Cards	\$440	\$1,564
Accounts Payable	\$11,075	\$6,418
Payroll Liabilities		
Annual Leave Liability	\$11,227	\$14,190
Long Service Leave Liability	\$24,275	\$15,817
PAYG Tax Liability	\$5,550	\$4,012
Superannuation Liability	\$27	\$0
Workcover Liability	\$13	\$43
OHS Liability	\$0	\$1
Total Payroll Liabilities	\$41,091	\$34,063
GST Liabilities		
GST collected from sales	\$12,740	\$14,752
Less GST paid on purchases	(\$2,406)	(\$3,070)
Total GST Liabilities	\$10,334	\$11,682
Grants & Projects in advance	\$164,571	\$127,200
Payments in arrears		
Total Current Liabilities	\$227,511	\$180,926
Long-Term Liabilities		
Suspense Account		
Total Long-Term Liabilities	\$0	\$0
Total Liabilities	\$227,511	\$180,926
Net Assets	\$875,565	\$520,454
Accumulated funds-Retained earnings		
Acc Funds-Opening Bal	\$520,454	\$494,120
Current Year Surplus/(Deficit)	\$355,111	\$26,335
Total Accumulated funds-Retained earnings	\$875,565	\$520,454

Please note that the Financial Statements produced here are a précis of the complete documents tabled at the Annual General Meeting. Full copies are available from the NCSSA Office.

NOTES TO AND FORMING PART OF THE ACCOUNTS FOR THE YEAR ENDED 30TH JUNE 2007**NOTE 1: STATEMENT OF ACCOUNTING POLICIES****General**

In the opinion of the Committee, "NCSSA" is not a reporting entity as defined by Australian Accounting Standards. Therefore the Financial Statements are Special Purpose Financial Reports that have been prepared solely to comply with the provisions of the Associations Incorporation Act 1985 and the Constitution and Rules of the Association.

The financial report has been prepared in accordance with the requirements of the following Accounting Standards: AASB 118 – Revenue

AASB 139 – Financial Instruments: Recognition and Measurement

No other Accounting Standards, Urgent Issues Group Consensus Views or other authoritative pronouncements of the Australian Accounting Standards Board have been applied.

Specific**(a) Income Recognition – Membership and donations**

Membership income and donations are only recognised when received and no allowance has been made for amounts in arrears or in advance.

(b) Grants & Contracts

Grant and contract income is spread over the period to which it relates.

(c) Non-current Assets

The carrying amounts of furniture & fittings and the Society's interests in the office building are reviewed annually and depreciated to reflect the writing off of these assets over their estimated useful life.

The land and building comprising the Conservation Centre at 120 Wakefield Street, Adelaide was sold on 2nd March 2007. The property was owned by the Conservation Council of South Australia, with the NCSSA having a 30% interest in the property. The decision to sell was taken after endorsement of the membership of both organisations in January 2007 to sell to a property developer.

The Profit and Loss statement and Balance Sheet reflect the final transactions associated with the sale. The fixed asset (land and buildings) was not depreciated for the 7 months leading up to the March 2007 sale. Hence the net book value as shown at June 2006 of \$98474 was used to calculate the society's net surplus on disposal of the property of \$348,937. The net sale value and associated surplus have been reflected in the June 2007 statements which show an increase in the current assets (Cash Investments) and Accumulated Funds at 30th June 2007 of \$348,937.

As a condition of the sale of the Conservation Centre NCSSA's loan to CCSA was repaid in full (refer note (f) below).

(d) Employee Entitlements

A liability for long service and recreation leave is recognised, and is estimated as the present value of expected future payments to be made in respect of services provided by employees up to balance date.

(e) Stock

Represents valuation of NCSSA publications. Current stock is, for recent publications, valued at the total of costs incurred in printing. \$1248 of slow-moving book stock (older project reports and publications) has been written off this year in order to more accurately reflect the real value of these assets.

(f) Loans to associated groups

As described in note (c) above On 2nd March 2007 the NCSSA released the mortgage over the land and Building comprising the Conservation Centre at 120 Wakefield Street, Adelaide to the Conservation Council of South Australia, upon repayment by the Conservation Council of South Australia of the secured loan balance at the date of settlement of \$58,616. The Society's loan to the Conservation Council of South Australia was repaid in full as one of the conditions attached to the sale of the property.

NOTE 2: RELATED PARTY DISCLOSURES

- (a) The following persons were members of the Committee of "NCSSA" during the financial year:-
 Helen Vonow (President)
 Mischelle Benito (Vice-President)
 Richard Winkler (Treasurer)
 Katie Fels (Secretary)
 Peter Tucker (Assistant Secretary) (part year)
 (General committee)
 Michelle Denny
 Caroline Wilson
 Spencer Burgstad
 Allen McIlwee (part year)
 Co-opted: Ben Taylor (part year), Mervyn Chappel (part year)
- (b) No member of the Committee, or a related entity, received any benefit or entered into any contract with the incorporated body, other than reimbursements paid to members for disbursements incurred in the normal course of business.

NOTE 3 GRANTS AND PROJECTS IN ADVANCE

As at 30th June 2007 the NCSSA is liable to fulfil projects listed below as follows;

Externally funded projects

Project	Funding body	Balance in advance/(arrears)
Community processes in native temperate grasslands following destocking	DEH, WCF	(110)
Vegetation Monitoring of Temperate Grasslands at Mokota Conservation Park in the Mid-North of South Australia	NVC	7546
Provision of 8 bushland condition monitoring sites and subsequent reporting	NORTH PARA NRM	4000
NYAD Field Guide to Bushland Monitoring	NYAD NRM	1052
Biodiversity workshops and monitoring in the Murray Darling Basin	MDB NRM	1250
Educate and promote Temperate Grassy ecosystem conservation and management in the Eastern Mt Lofty Ranges to the community	MDB NRM	(3500)
Evaluating plotless density counts as a method for rapidly assessing native vegetation	NVC	8395
Protecting MLR Grassy Woodlands with On-ground Works and Skill-building Network	Envirofund, SA Water	23602
Threatened Plant Action Group Program Coordinator	AMLR NRM, DEH	(730)
Bushland Condition Monitoring - Eyre Peninsula	EP NRM	(3657)
Reintegrating Threatened Habitat Fragments at Muloowurtie on Yorke Peninsula	Envirofund	13518
Biological Survey of cemeteries in the South-East of South Australia	NVC	10200

Total external project liabilities \$ 61565

Internal project commitments

NCSSA Conservation Biology Grant	1236
KI Native Fish survey	1500
Eastern Flanks Grassy Ecosystems Project Officer	19699
Bequest Fund	2997
Biodiversity Extension Program	57270
2006 Biological Survey - Revisiting the Pre-European Vegetation of Adelaide	8550
Improving and monitoring of on ground works through bushland condition monitoring – Biodiversity	11753

Total internal project commitments \$103006

Total Grant and Project liabilities as at 30th June 2007 = \$164571

Key: Funding bodies

AMLR NRM – Adelaide and Mount Lofty Ranges Natural Resource Management Board, Department of Environment & Heritage (SA)
 DEH, WCF – Department of Environment & Heritage (SA), Wildlife Conservation Fund
 MDB NRM – Murray Darling Basin Natural Resource Management Group
 NVC – Native Vegetation Council, Department of Water, Land and Biodiversity Conservation
 NYAD NRM – Northern and Yorke Agricultural Districts Natural Resource Management Board
 EP NRM – Eyre Peninsula Natural Resources Management Board
 Envirofund – Australian Government Envirofund, Natural Heritage Trust

UPCOMING MEETINGS

Please note different venue for the General Meeting*

Upcoming meetings:

END OF YEAR GATHERING:

Friday December 14th, 5:30pm

Botanic Park, opposite the Conservatory gates

FEBRUARY GENERAL MEETING:

Thursday February 7th 2008, 7:00pm

Venue: *Benham Lecture Theatre, University of Adelaide

"Climate change: feeling the tropical heat"

by Professor Barry W. Brook

Sir Hubert Wilkins Chair of Climate Change,
Director, Research Institute for Climate Change and Sustainability

This will be a joint meeting of the NCSSA and the Biology Society of South Australia