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Camaenid land snails in the East Kimberley ~ by Kirsten Pearce

Inside this Issue:

Twenty five of the twenty six species occur to the north of Kununurra throughout a broken limestone range (the Ningbing Range)

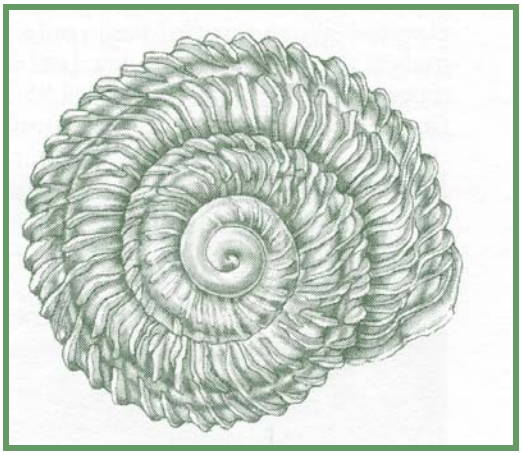
An Interim Recovery Plan (IRP) is currently being prepared for 26 species of threatened Camaenid land snails in the East Kimberley. The late Alan Solem pioneered study on these species. Norm McKenzie, CALM, and Vince Kessner, a keen amateur malacologist, both of whom worked with Alan, have continued to promote the recognition of these unique species.

Three genera, *Ningbingia, Cristilabrum* and *Turgenitubulus* each have several species represented on the *Wildlife Conservation Act* (1950) threatened species list. In addition *Mouldingia orientalis* and *Ordtrachia elegans* also appear on the listing.

Twenty five of the twenty six species occur to the north of Kununurra throughout a broken limestone range (the Ningbing Range) and several outlying isolated outcrops, all occurring over a (north – south) distance of approximately 60 kilometres. One species occurs to the south of Lake Argyle.

All of the Camaenids addressed in the IRP occur on an Upper Devonian limestone formation, which is believed to have developed over 350 million years ago, when tropical seas covered the area. Similar formations occur at well recognised sites in the Oscar and Napier Range, such as Geiki Gorge. Camaenid land snails are believed to have arrived in Australia following the collision of the Australian and South East Asian plates approximately 12 million years BC.

A number of interests have been identified in the development of the recovery plan. The land snails occur on the Ivanhoe, Lissadell and Carlton Hill pastoral leases and on unallocated crown land. These leases are overlapped by the Native Title claims and determinations of the Mirriuwung Gajjerong and Malarngowem peoples. Approximately twenty registered protected areas and sacred sites are currently recognised in the limestone areas occupied by the threatened



Shell of *Mouldingia orientalis*, Napier Range. Drawing by Linnea Lahlum from Solem (1984), *Records of WA Museum* (17).

Camaenid species. A majority of the Camaenid species affected by the IRP occur on areas of land which have been proposed to be excluded from the Carlton Hill, Lissadell, and Ivanhoe pastoral leases as part of the 2015 pastoral lease renewal process. Cave enthusiasts also visit the karst formations.

The Camaenids identified in the IRP are all recognised as ultimate examples of short-range endemism. A minimum range of 0.01km², and a maximum range of 5.6km², have been recorded for the threatened Camaenids. As the areas of habitable limestone are all believed to be occupied, it is considered unlikely that their ranges will expand with the passage of time. The range attributed to each species is somewhat misleading, as only a small proportion of the range will offer suitable habitat. They are primarily found among the talus, crevices and leaf litter of the limestone, which provide a suitably shaded and humid environment. The crevices

(Continued on page 2)

Significant Bushland purchased ~ Val English

An additional area of a Critically Endangered plant community associated with ironstone soils near Busselton has just been purchased for conservation.

The significance of the plant community on ironstone soils in this area was identified in the 1994 report '*A floristic survey of the Southern Swan Coastal Plain*' by Neil Gibson, Bronwen Keighery, Greg Keighery, Allan Burbidge and Mike Lyons. The 'Busselton Ironstone' community contains an incredibly rich flora, including nine species that are listed as Declared Rare Flora, and a suite of others of uncertain status, that are on CALM's informal 'Priority List'.

CALM staff became aware of the property in early 2003 as a consequence of a subdivision application. With the landholders' permission, several CALM staff inspected the site in early 2003. The majority of the property was in very good condition with exceptionally low weed levels, having never been grazed and historically subject to only minimal disturbance. The brief survey also identified six species of flora on CALM's 'Priority list' of poorly known flora.

In addition to the plant community on shallow ironstone soils that occupies the central portion of the property, the approximate 50 ha area was inferred to contain an additional three threatened ecological communities. These are two endangered plant communities 'shrublands on dry clay flats' and the 'southern wet shrublands'; and the vulnerable '*Eucalyptus calophylla* woodlands on heavy soils of the southern Swan Coastal Plain'. All of these are described in the 1994 report mentioned above.

There are no other areas on private land, and few on conservation lands near Busselton that are in such good condition and contain such a range of threatened ecological communities and Priority flora within such a small area.

The land was purchased by combining CALM funds, a grant from the Commonwealth Department of Environment and Heritage and funds from Cable Sands Pty Ltd.

Given that the bushland is in such good condition, this newly purchased land will require only minimal management such as maintenance of fire breaks, and minimal weed control. The purchase and future conservation management of this site is another step towards ensuring that areas of very high conservation value in the state's south west are maintained for future generations to appreciate.

For further information contact Val English, Snr Ecologist, on (08)9405 5169 or email vale@calm.wa.gov.au

(Continued from page 1)

also provide a catchment area for fallen leaves which provide food and shelter for the snails. Suitable rainfall, humidity and temperature conditions restrict the active periods of these land-snails to approximately 80 nights (non successive) each year in a rainfall zone such as at Carlton Hill. For the remainder of the year they will aestivate, sealing their shell with a layer of calcified mucus, awaiting conditions suitable to periods of activity. (Solem: 1988c).

Many occurrences are naturally protected from the primary threats of fire and cattle. Other areas however require greater levels of management. The large numbers of sites and slightly dissimilar threat assessments have prompted a broad scale/landscape management approach, whereby the limestone occurrences are to be 'managed' as an entirety, in preference to managing the range of each individual species.

Recovery actions are intended to assist land managers with fire management strategies around the limestone occurrences. Vulnerable locations will be fenced where possible to control the impact of cattle and recreational activities. Community conservation groups, and experts in fields such as fire ecology, have expressed interest in assisting in these processes.

A field trip into the area was cut short by boggy conditions brought on by unseasonable rains. It is hoped that an additional opportunity will occur to identify conditions in the central and upper Ningbing Range. Local knowledge and previous field data suggest that conditions and habitat will not be dissimilar to better known sites.

Seasonal extremes, the geography and topography of the landscape, and the numerous affected interests will provide a challenging environment in which to implement this IRP. It is hoped that the conservation measures adopted will provide an opportunity for successful intra and interdepartmental and community liaison.

Solem A. (1988c) Maximum in the Minimum: Biogeography of land snails from the Ningbing Ranges and Jeremiah Hills, northeast Kimberley, *Journal of the Malacological Society of Australia.* 9: 9-113).

Kirsten Pearce produced a draft IRP for the 26 threatened snail species during a two month contract with CALM. For further information contact John Blyth on (08)9405 5161 or email johnbl@calm.wa.gov.au

Ground water recharge project for the Aquatic Root Mat TEC of Caves of the Swan Coastal Plain ~ Leigh Sage

Emergency actions are under way for long term recovery of seven important caves supporting aquatic animals (stygofauna) known from nowhere else. Most of the caves support occurrences of the Critically Endangered "Aquatic Root Mat Community of the Swan Coastal Plain". All seven caves are located within Yanchep National Park, north of Perth. Many of the animals in these caves are ancient Gondwanan relicts, most are new to science and many are endemic to individual caves (sometimes only a few hundred metres apart). Declining ground water levels of the Gnangara Mound (Yanchep National Park is on the western edgeof the Mound) has resulted in the streams and ponds in these caves drying up, threatening the survival of the TEC and other fauna. In Crystal Cave, the only known habitat for the Critically Endangered Crystal Cave Amphipod, a small shrimp-like animal, the ground water is now more than a metre below the cave floor.

In an effort to support the TEC and threatened amphipod over the last few years' staff from CALM's Swan Coastal District and Yanchep National Park have set up small pumping systems in each pond containing the root mats or amphipod. Here ground water is pumped up into the ponds from the local groundwater using small pumps and a network of pipes. This work is essential but labour intensive and not a long-term solution to averting the decline or possible extinction of the TEC and other fauna. Following extensive trials over the last two years (see WATSNU December 2003), a large-scale project is now underway to recharge each cave with water. The project is funded by CALM, with the support of the Water Corporation, who is providing project management, and the Department of Environment. The trials have shown that it is possible to create an artificial ground water mound under each cave by pumping water taken from elsewhere onto the cave floor. This system for the seven target caves will use ground water from the western side of the National Park, and is being designed to last at least 10 years. It is hoped that in this time other measures to avert the declining levels of the Gnangara Mound will have begun to take effect. It has been found that climatic decline in annual rainfall since the 1970's, the Gnangara to Yanchep Pine plantation and private and public ground water abstraction has contributed to these dropping ground water levels. Efforts are being made to remove the pine plantation and manage ground water use in a more sustainable fashion.
Though the overall recharge project is largely to prevent the extinction of the TEC and other fauna, other positive outcomes will result. These include returning the aesthetic values of Crystal Cave (a popular tourist cave) with the return of water to the ponds and streams as well as a possible halt to Tuart decline in the area due to the falling ground water.

Other recent recovery actions to do with the TEC have included a pilot stygofauna survey and an upgrade of the current pond-pump system. The stygofauna survey, sampling from bores within a 10km radius of Loch McNess, was undertaken between April and May this year by researchers from UWA under contract to CALM. This survey is an effort to determine whether the cave invertebrates are more widespread or are truly as restricted in distribution as believed. Preliminary analysis of the samples has resulted in the discovery of five stygofauna species that are new to science. These animals are distinctly different from the cave TEC animals and may be different enough from each other to be in separate genera.
The existing pond upgrade is to ensure that the system will be robust enough to keep working while the full-scale project is under construction. Once the full-scale system is in place the existing system will remain as a backup in the event of a temporary shut down.

Photoes of Crystal Cave

By Leigh Sage

Leigh Sage is a Conservation Officer (TECs) Rare Flora for CALM's Swan Coastal District and can be contacted on on (08) 09405 0740 or email leighs@calm.wa.gov.au

Endangered Mound Springs in the Three Springs area
~ Rosemarie Rees

Organic or tumulus mound springs are areas which are elevated above the surround landscape through the build up of peat forming a mound around an area of continuous ground water discharge. In Western Australia peat formed mound springs are found in a restricted area on the swan coastal plain, at several locations in the Kimberley, and along a small section of the Dandaragan Scarp west of Three Springs.

Because they are permanently damp, mound springs have significant conservation value as mesic refuges for plants and animals in an arid landscape, and they support both endemic species and isolated outliers. Only limited research has been carried out on the mound springs in the Three Springs area but preliminary investigations of the surface water invertebrates show that the complex of springs provide habitat for a diverse array of aquatic fauna.

The 'Assemblages of organic mound spring in the Three springs area' were listed as an 'Endangered' Threatened Ecological Community (TEC) in 2001 and at that time only one of the fifteen know occurrences was within CALM managed land. Since then a shire camping reserve has been transferred to the conservation estate and CALM has recently purchased a 16 ha property containing the largest known occurrence of the Endangered TEC. The property was historically used as a water point for droving stock but the previous property owners have not grazed the area for many years and are keen to see it managed for conservation. Consequently the area is in relatively good condition and in addition to the TEC it contains populations of several priority flora including *Dryandra stricta* (P3), *Eucalyptus diminuta* ms (P3) and *Thomasia formosa* (P1).

The land purchase brings the number of occurrences of the Mound springs TEC in CALM managed reserves to four, with the remaining occurrences found on private property. WATSCU is in the process of developing an interim recovery plan for the TEC and is working with private land owners to manage the mound springs on their land.

For further information contact Rosemarie Rees Project Officer (TECs) on (08) 9405 5167 or email rosemarier@calm.wa.gov.au

Western Ground Parrots ~ some success ~ Brenda Newbey

This article has been reprinted from the *South Coast Threatened Birds News* April 2004

Until May 2003, it seemed as if Western Ground Parrots no longer existed in the Cape Arid National Park (CANP). Despite extensive searching, no sighting had been confirmed since 1989.

In CANP Ground Parrots had only been found previously in vegetation that was 15 years or more old. A vast fire in October 2002 led to there being very little Western Ground Parrot habitat of this age. The South Coast Threatened Birds Recovery Team (SCBRT) realized that this situation provided an excellent opportunity for one last search for the lost parrots because of possible concentration of them into this small area.

Joan and Tony Bush, Shapelle McNee and Brenda Newbey were contracted to undertake the search. They were aided by volunteers Anne Gadsby and Arnold Morales Park ranger Allan Rose was the other member of the team. His local knowledge saved much time and enabled us to accomplish much more than would have been possible without his help.

The plan paid off. Western Ground Parrots were back at Poison Creek Road. They were also found further east in CANP, and much further east in the Nuyts Nature Reserve, near Point Malcolm, the easternmost record ever .

The parrots were using vegetation of various fire-ages: five, six, nine, thirteen, twenty, twenty-two+. The five and six year-old vegetation that was being used was adjacent to twenty and twenty-two+ year old vegetation, and there was evidence of movement between the older and younger vegetation.

Much more remains to be done to more completely survey this area, and to determine how to incorporate management of this valuable population into the park management procedures.

Brenda Newbey is the Birds Australia representative on the SCTBRT team and has been closely associated with many threatened birds studies on the south coast. For further information contact Sarah Comer on (08)9842 4513 or email sarahc@calm.wa.gov.au

Recovery actions for 9 Critically Endangered TECs of the Swan Region ~ Leigh Sage

Funded through the Natural Heritage Trust, recovery actions have been undertaken on the nine Critically Endangered Threatened Ecological Communities (TECs) of the Swan Coastal Plain occurring in CALM's Swan Region. These actions (primarily directed by Interim Recovery Plans written for the TEC's) have included setting up monitoring transects, surveying, dieback interpretation and management, fencing, hydrological investigations, a stygofauna survey, weed control, rehabilitation works, sign development and the production of an information leaflet. This article describes several of these actions.

The author and several staff from CALM's Swan Coastal District have administered and assisted with the project since August 2003. While a large amount of the works have been undertaken on CALM land, liaison with local government, private landowners and other stakeholders has resulted in fences and many other actions being completed elsewhere for TEC occurrences.

Monitoring transects were set up in almost thirty occurrences of the 'Marri- Kingia woodlands on heavy soils' (SCP3a) and 'Marri- Grasstree woodlands and shrublands' (SCP3c). Ten metre point-intercept transects with two hundred points were used to gain a representation of each occurrence while at the same time allow as much ground to be covered as possible in Spring. It is anticipated that an initial data set from the first year's collections, stratified by reserve type and size, can be analysed to assess site health as inferred from exotic weed invasion compared to native species diversity. Further monitoring will soon be undertaken involving set photo-points.

Paired burnt and unburnt ten metre point-intercept transects (at four hundred points) were also placed in the Perth to Gingin ironstone association TEC occurrence at Timaru Nature Reserve. This reserve was burnt in a wildfire last year and gives a great opportunity to assess the fire response and subsequent weed invasion of the TEC.

Dieback interpretation has been undertaken for the majority of the nine Critical TEC occurrences. Hygiene management plans are currently being decided upon in conjunction with landowners and other stakeholders for each occurrence. These plans will be put into place along with the fire response plans for each occurrence. On- site works (eg. road and track closures, sign placements) will be carried out by staff from Swan Coastal District. This work is essential to the management and containment of *Phytophthora* dieback disease and other plant diseases in all bush remnants on the Swan Coastal Plain. Further interpretation and hygiene management to fully cover all the occurrences will be completed in the last half of 2004.

Several fences have been completed as part of the project, including three on private property and other than CALM land tenure. These fences have primarily been put up by CALM crews from Swan Coastal District.

Hydrological investigations have been undertaken at the Neaves Nature Reserve occurrence of the Organic Mound Springs TEC occurrence (along with some weed control and fencing works). This work is to investigate the nature of the springs and determine an appropriate course of action to secure their survival. Investigations will continue into 2005 with several monitoring bores soon to be constructed. Hydrological investigations are also continuing for the Aquatic Root Mat TEC (see article this issue) as well as a pilot stygofauna survey.

Neaves Nature Reserve TEC occurrence of the Organic Mound Springs

Monitoring transects installed in an occurrence of *Marri-Kingia woodlands on heavy soils*

Fencing installed at Timaru Nature Reserve

All photoes by Leigh Sage

Leigh Sage is a Conservation Officer (TECs) Rare Flora for CALM's Swan Coastal District and can be contacted on (08) 09405 0740 or email leighs@calm.wa.gov.au

Recovery of the thrombolite community of a Coastal Brackish Lake (Lake Clifton) ~ Robyn Luu

Thrombolites are a form of microbial community ('microbialites') – odd, rock-like structures formed by photosynthetic microbes that precipitate calcium carbonate (limestone). These structures provide evidence of the oldest life on Earth and are therefore of great scientific interest. Lake Clifton supports the largest known example of living non-marine microbialites in the southern hemisphere. Radiocarbon dating indicates the Lake Clifton thrombolites (microbialites with a clotted internal structure) began to form up to 1950 years ago. The Lake Clifton thrombolites are dependent on fresh groundwater flowing into the lake. Nutrients leaching in from agricultural and urban land affect the water quality in the lake, with algal blooms already being observed in Lake Clifton. Increasing threats resulted in the Lake Clifton thrombolites being listed as a Critically Endangered Threatened Ecological Community in 2000. A Recovery Team was then established and has been overseeing the writing of the Interim Recovery Plan (IRP). The plan is now completed and a number of recovery actions listed below have since been implemented.

Salinity and water depth in Lake Clifton have been monitored since 1985 by CALM. The salinity of the lake has increased significantly over the years with current levels making the lake consistently hypersaline. It is not certain what affect this will have on the thrombolites. It is thought however, that the original microbes may not be able to survive this change in salinity and therefore a change in the assemblage may occur, or the thrombolites may stop growing.

Thrombolites of Lake Clifton. Photo - Val English

An important outcome has been the modelling of Lake Clifton hydrology undertaken by CSIRO. The report concluded that the opening of the Dawesville Channel is unlikely to have had any effect on Lake Clifton salinity. The major factor that impacts the waters levels and salinity in the lake is the climatic conditions including rainfall and evaporation. In addition, pumping of groundwater in the vicinity of Lake Clifton may reduce the inflow of fresh groundwater into the lake thereby increasing salinity.

Monitoring of the thrombolites of Lake Clifton has been undertaken most years by Linda Moore, who previously undertook a PhD study on the thrombolites. This will be continued using NHT2 funds obtained through the South West Catchments Council.

A poster has been developed to inform the public about the significance of the community. Copies have been distributed to local government offices as well as to the winery adjacent to Lake Clifton. Many people who visit the winery see the posters and then go to see the thrombolites.

The Recovery Team will continue to coordinate the implementation of the Interim Recovery Plan for the Lake Clifton thrombolite community. A number of significant actions are due to be completed later this year including a review of the current literature on the evolution, hydrology and biota of the lakes comprising the Yalgorup wetland complex, of which Lake Clifton forms part.

For further information contact Robyn Luu (Project Officer) on (08)9405 5165 or email robynl@calm.wa.gov.au

Survey work on the Darling Scarp gets underway ~

Melissa Hoskins

An occurrence of Central granite shrublands – floristic community type 5, at Ellis Brook Valley Reserve
Photo: Melissa Hoskins

The investigation of floristic communities of the northern Darling Scarp is underway with the aim of determining whether any of them may be nominated as threatened ecological communities at the completion of their survey.

These investigations are following up on survey work undertaken by Adrienne Markey along the Northern Darling Scarp in 1997. The dataset generated from Markey's floristic survey was used to define the major types of floristic communities along the northern Darling Scarp, from Bullsbrook to North Dandalup. This project was completed in 1997, and since then, there has been no work undertaken to determine whether any of the floristic communities identified in the report may fit the criteria as a threatened ecological community.

The first community to be surveyed is known as type 5 – 'Central granite shrublands'. These granite heaths and shrublands are geographically restricted to a central portion of the Darling Scarp in the Perth Metropolitan Region. The community typically consists of *Xanthorrhoea acanthostachya* and *Allocasuarina humilis* over the smaller shrubs *Melaleuca* aff. *scabra*, *Baeckea camphorosmae* and, to a lesser extent, *Dryandra armata*, *Hakea incrassata* and *Hakea undulata*.

Without knowing the significance of such communities, CALM has been unable to provide satisfactory comment for various purposes such as the assessment of the likely impact of development proposals.

With increasing pressure for development on the northern Darling Scarp, remnant pieces of bushland are at risk of being destroyed by clearing or other threatening processes such as dieback or fire. Without investigation into these assemblages they may be modified or destroyed without their significance ever being identified.

The data required for this survey work is collected through short field visits to determine threats, condition, extent and other characteristics of each occurrence. Once this information has been compiled for each occurrence the data will then be presented to the TEC Scientific Advisory Committee. The group will assess the community, and place it in a category of threat as described in the new draft Policy on conserving threatened species and communities. The listing and threat category will then be submitted for endorsement by CALM's Director of Nature Conservation and the Minister for the Environment.

For further information contact Melissa Hoskins, Project Officer, TEC Database on (08) 94055 170 or email melissah@calm.wa.gov.au

Wheatbelt Community helps to recover the Endangered Wongan Cactus ~ Vanessa Clarke

A small group of local farmers, Bushcare Group members and the local Landcare Officer are working with CALM to assist in the recovery of an endangered wheatbelt plant, the Wongan Cactus

The Wongan Cactus (*Daviesia euphorbioides*) is a Critically Endangered plant found growing at a few locations in the Dowerin, Wongan-Ballidu and Goomalling Shires.

It is easily recognised by its cactus-like habit and was first collected by Charles Gardner in 1924 from Wongan Hills. The Wongan Cactus appears to prefer sandplain habitat, with heath dominated by *Casuarina* (sheoak) and *Actinostrobus* (cypress). The Wongan Cactus flowers from September to October and has masses of the typical 'egg and bacon' type flowers.

Currently the Wongan Cactus is known from 12 populations, half of which have died out over the last five years. There are currently only 72 mature plants known, most of which are located in highly degraded areas such as road and rail reserves. These plants are particularly vulnerable to grading, stock movement and herbicides and have a short life-span of about five to ten years. The Wongan Cactus is known to regenerate after fire but due to the exclusion of fire from most of its known habitat, there has been very little recruitment within known populations.

The Department of Conservation and Land Management (CALM) assisted by funds from the Natural Heritage Trust are working with members of the Wongan-Ballidu and Goomalling Bushcare Groups, the local Shires, and the local land owners to assist with the recovery of this threatened species. A control burn was recently undertaken in Berring Road, Goomalling to try to encourage the germination of a roadside population. Local farmers and community will monitor the site to see if the fire was successful in germinating any seedlings. Further work will include the translocation of young plants, raised by Kings Park nursery, to a nature reserve in Dowerin Shire.

The involvement of the local community and interest groups is especially encouraged.

Vanessa Clarke, Project Officer with WATSCU now working with CALM's Goldfields Region.

Further information can be provided by the local CALM office at Merredin (08) 9041 2488 or by contacting Gillian Stack on (08) 94055157 or gillians@calm.wa.gov.au

Group undertaking control burn. Photo: V Clarke
Present were: Lynn Phillips (Dowerin), Ian Smith (Wongan Hills), John Barnes (Goomalling), Robert Boase (Goomalling Bushcare Group), Shari Dougal (Wongan –Ballidu Bushcare Group), Julie Patten & Vanessa Clarke (CALM) and Vanessa Malcolm (Goomalling-Dowerin Community Landcare Co-ordinator)

Group undertaking fencing after the burn
Photo: V Clarke

Typical cactus-like appearance of the Wongan Cactus. Photo: V Clarke

The Campion Champions ~ Julie Patten

Campion Eremophila or *Eremophila virens* as it is officially know is one of the many endangered wheatbelt plants for which an Interim Recovery Plan (IRP) is currently being prepared under National Heritage Trust funding.

Eremophila virens is an erect, slender shrub 1.5 to 5 m high with large, broad, shiny-green leaves 5 to 9 cm long by 20 to 30 mm wide, small calyx lobes 7 to 10 mm long and green flowers. The specific name is derived from the Latin *virens* (green), referring to the unusual green flowers that are typical of the species. It is found in red or brown sandy soil near the margins of granite outcrops in the Mukinbudin-Warralakin area.

When the data was being collected for the preparation of the species' IRP, there appeared to be some large gaps in our knowledge in relation to previous survey data. Some of the populations had not been visited for ten years or more. Field work was needed to check the current status of the species and also to try and track down additional populations.

This is where one of the "Campion Champions" Mrs Mary Squire came in to the picture. Mary is well known in the eastern Wheatbelt for her native plant nursery "Mukinbudin Trees and Wildflowers" and is also one of WA's experts in growing *Eremophila* species. It was through Mary's help that three new populations of *Eremophila virens* were discovered and brought to CALM's attention. In total 48 new plants were discovered.

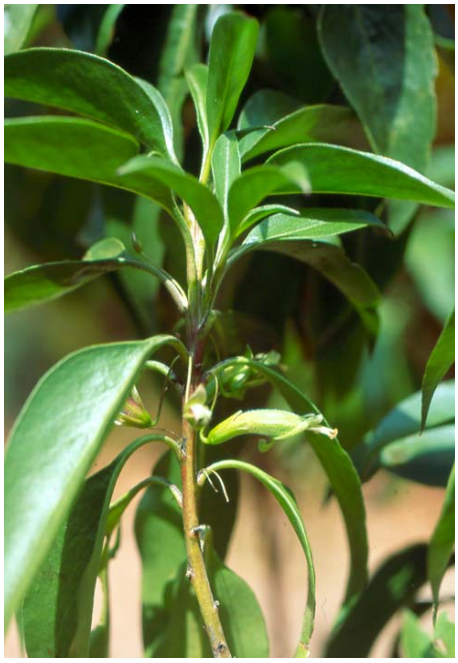
Mick Davis, another "Campion Champion" and also the Bushcare Officer for the Mount Marshall Shire bought to the attention of

Location of *Eremophila virens* in the eastern wheatbelt

CALM another population that was more extensive than the two plants noted when the roadside population was first discovered by passing CALM staff in 1993. Thirty-four plants were discovered and it is hoped that when a full survey is carried out on this private property that more plants will be discovered.

It is hoped that with the implementation of the IRP, further survey work and increased public awareness of the Endangered status of this species, that still more populations will be discovered.

Julie Patten, Project Officer WATSCU now working for CALM's Goldfields Region. For further information contact Andrew Brown on (08)9405 5166 or email: andrewbr@calm.wa.gov.au



Eremophila virens

Photo: Andrew Brown

A healthy *Eremophila virens* growing in its natural habitat

Photo: Andrew Brown

TRANSLOCATION OF FLORA AND FAUNA

Six translocation proposals have been approved since the December 2003 edition of *WATSNU.*

Species	Translocation	Proponent/s
Banded Hare-Wallaby *Lagostrophus fasciatus*	Reintroduction from Peron Captive Breeding Centre to Faure Island, WA	Colleen Sims, CALM Denham; Andre Schmitz, Australian Wildlife Conservancy
Western Ringtail Possum *Pseudocheirus occidentalis*	Remove Ringtails from Little Colin St Busselton to Leschenault Peninsula Conservation Park and Yalgorup National Park	Paul deTores, CALM
Quenda *Isoodon obesculus fusciventer*	Displaced from Forrestdale by Tonkin Highway extension to Boyagin Nature Reserve	Neil Thomas/Tony Friend, CALM
Resinous eremophila *Eremophila resinosa*	From material sourced from five plants and prepared by tissue culture techniques at Botanic Gardens and Parks Authority, Perth WA into two sites selected near the Westonia townsite and Timber Reserve.	Alan J Hitchcox, Westonia Mines Ltd
Mt Lesueur Grevillea *Grevillea batrachioides*	Opportunistic translocation due to wildfire occurring near where the only population exists.	Gina Broun, CALM
White Featherflower *Verticordia albida*	From cutting material collected from pops 1 and 2, raised at BGPA to remnant vegetation on private property west of Three Springs	Leonie Monks, Gina Broun, CALM
Cunderdin Daviesia, *Daviesia cunderdin* and Tangled Wattle *Acacia volubilis*	Three sites including: private property; Cunderdin Museum Gardens and Parklands Reserve	Leonie Monks, CALM on behalf of the Cunderdin LCDC

Scaly-leafed Featherflower (*Verticordia spicata* subsp *squamosa*) ~ Gillian Stack

Scaly-leafed featherflower is a species that requires extensive recovery work to ensure its ongoing survival. A total of only 34 mature plants are known from nine populations, one of which has been established by translocation. Scaly-leafed featherflower grows in open mallee over low scrub on deep yellow sands. This soil type has been extensively cleared for agriculture throughout the range of this species in the Three Springs-Mingenew area. The very small amount of habitat remaining is highly fragmented, and is restricted to transport corridors or privately held land. Typically, low numbers of Scaly-leafed featherflowers occur in small fragments of vegetation – there are less than three plants in seven of the nine populations. This has led to low rates of seed viability, compromising the ability of this taxon to replace ageing individuals with new recruits.

Geraldton District Conservation Officer Alanna Chant is working in partnership with the Mingenew Herbarium Group to continue a translocation of this species that they started in 2001. Scaly-leafed featherflower is extremely difficult to propagate, so only small numbers of plants are available for planting in any one year. Difficulties have also been experienced with maintenance of summer watering systems, resulting in high losses to drought. This species is likely to require ongoing translocations until numbers can be built up to the point at which the population can be self-sustaining.

One of the largest populations occurs on the otherwise bare floor of a disused sandpit. It is intended that this area will be rehabilitated in the future. Supporting habitat contributes ecological resources such as pollinators, and reduces exposure to the effects of adjoining land use. This rehabilitation will be coordinated by Moora District Conservation Officer Gina Broun.

For further information contact Gillian Stack on 08 9405 5157 or email gillians@calm.wa.gov.au

Sampling of possible new occurrences of the endangered 'Augusta microbial' ~ Melissa Hoskins

The Augusta microbial community, described as 'Rimstone pools and cave structures formed by microbial activity on marine shorelines' is classified as an 'endangered' Threatened Ecological Community. There are currently three known occurrences recorded on the Threatened Ecological Communities database for this community type, all known from Augusta.

Recent survey work by a CALM officer in Bunbury have identified numerous possible new occurrences of this community type. As a result of this work, a fieldtrip was undertaken in late March of this year to collect samples of the tufa (porous limestone deposited as a result of microbial activity). The aim was to determine the microbial community present, and then investigate whether the new occurrences are the same as those identified from Augusta. The samples were collected from nominated sites located from Black Point, east of Augusta in the south to Canal Rocks in the north. Dr Jacob John at Curtin University is currently undertaking the analysis of the samples. This work involves identifying the dominant microbes and bluegreen algae present in each sample as well as taking some basic water quality data.

The identification of these possible new occurrences as the 'Augusta microbial' TEC has the potential to greatly increase the number of known occurrences of this community type, extend its geographic range to the north by some 80 kms and result in re-evaluation of the category of threat. Alternatively, it may result in the identification of new, possibly threatened, microbial communities. The data will be presented to the TEC Scientific Advisory Committee, which will review the category of threat, and possibly, the description of the microbial community listed, using methods described in the new draft Policy on conserving threatened species and communities.

For further information contact Melissa Hoskins, Project Officer, TEC Database on (08) 94055 170 or email melissah@calm.wa.gov.au

Eucalyptus dolorosa

Photo: S.D. Hopper

INTERIM RECOVERY PLANS APPROVED

Another ten Interim Recovery Plans have recently been approved by the Acting Director of Nature Conservation. All of these IRPs are compliant with Commonwealth requirements and suitable for adoption under the *EPBC Act 1999.*

IRP 153 Thrombolite (Stromatolite-like Microbialite) Community of a Coastal Brackish Lake (Lake Clifton) Robyn Luu, David Mitchell, John Blyth

IRP 160 Hughan's featherflower, *Verticordia hughannii* Julie Patten, Kate Brunt, Robyn Luu

IRP 161 Granite Featherflower, *Verticordia staminosa* subsp. *cylindraceae var cylindraceae* Julie Patten, Kim Kershaw, Bethia Loudon

IRP 162 One-headed Smokebush, *Conospermum densiflorum* subsp. *Unicephalatum* Julie Patten, Gina Broun

IRP 163 Three Springs Daviesia, *Daviesia bursarioides* Gillian Stack, Gina Broun, Val English

IRP 164 Dandaragan Mallee, *Eucalyptus dolorosa* Gillian Stack, Gina Broun, Val English

IRP 165 Rough Emu Bush, *Eremophila scaberula* updated Robyn Luu, Val English

IRP 166 Spiral Flag, *Patersonia spirafolia* Gillian Stack, Gina Broun

IRP 167 Paynes Find Mallee, *Eucalyptus crucis* subsp. p*raecipua* Gillian Stack, Alanna Chant, Val English

IRP 168 Moresby Range Drummondita, *Drummondita ericoides* Gillian Stack, Alanna Chant, Val English

Threatened Species & Communities Recovery Team Summaries of Annual Reports 2003

The Department's Briefing paper *Conservation of Threatened Species and Threatened Ecological Communities* (updated July 1999) requires that Recovery Team Chairs are responsible for reporting on an annual basis to WATSCU on progress in relation to recovery actions specified in Recovery Plans or Interim Recovery Plans. Reports received by WATSCU are forwarded to the Department's Corporate Executive and to the Conservation Commission and the summaries are reproduced below.

Gilbert's Potoroo Recovery Team Annual Recovery Team Report for 2003

Alan Danks, For the Gilbert's Potoroo Recovery Team.

The Gilbert's Potoroo Recovery Team (GPRT) coordinates and oversees the implementation of recovery actions for the Critically Endangered Gilbert's Potoroo *Potorous gilbertii*.

Gilbert's Potoroo Recovery Team met twice in 2003. At the later meeting it was decided to convene a special meeting to discuss the cross-fostering trial project and this meeting was held at Two Peoples Bay in February 2004.

Significant recovery actions include:

Continuing monitoring by trapping, and two radio tracking projects on the Wild Population on Mt Gardner;

The captive colony at Two Peoples Bay comprised five animals at the end of 2003 and shows generally improved health since the addition of underground truffles to the diet;

A cross-fostering trial was conducted but has been discontinued following a loss of pouch young and pending the development of new methods;

Hair arch surveys, funded by Threatened Species Network and conducted by the Gilbert's Potoroo Action Group, were carried out west of Albany without any Gilbert's Potoroos being located;

Research projects included an Honours study on the effect of dieback on bush rats, which include truffles in their diet;

The Gilbert's Potoroo Action Group is very active, with around 60 members and are developing a web site;

The Recovery Plan for Gilbert's Potoroo has been completed and endorsed, and the Recovery Team has sought the upgrading of the species from Endangered to Critically Endangered under the Commonwealth EPBC Act.

Carnaby's Black-Cockatoo Recovery Team Annual Report 2003

by John Blyth and Leonie McMahon, for the Carnaby's Black Cockatoo Recovery Team

The Team met twice during the year, in July and December.

Two additions to the Recovery Team were made during the year. These were: Dr Bob Humphries, Manager of the Water Corporation's Environment Branch, in recognition of the importance of liaison between the Recovery Team and the Water Corporation's Cockatoo Care project; and Dr Stephen Davies, currently engaged in several projects with landowners and local groups for the recovery of Carnaby's Black Cockatoo.

Team members Alison Doley and Rick Dawson mark feathers of unfledged Carnaby's Cockatoo
Photo: Leonie McMahon

The Carnaby's Black Cockatoo Recovery Plan was approved by the Director for Nature Conservation, the Conservation Commission and the minister for the Environment and Heritage during the year, and now formally guides the activities of the Recovery Team.

The Carnaby's Black Cockatoo Recovery Project, being implemented by the Project Officer Ms Leonie McMahon (employed by Birds Australia (WA) and using funds this year provided by the Natural Heritage Trust and Lotteries Commission) continued to provide a major thrust for implementation of recovery actions. Many other significant steps relevant to the recovery of Carnaby's Black Cockatoo were also taken.

South Coast Threatened Birds Recovery Team Annual Recovery Team Report for 2003

(incorporating Western Ground Parrot, Noisy Scrub-bird, Western Bristlebird)

By Alan Danks For the South Coast Threatened Birds Recovery Team.

The South Coast Threatened Birds Recovery Team (SCTBRT) coordinates and oversees the implementation of recovery actions for the following 4 taxa of threatened birds: Western Ground Parrot (CR); Noisy Scrub-bird (VU); Western Bristlebird (VU); Western Whipbird (Western Heath sub-species) (VU). The Western Whipbird (Mallee Heath sub-sp) (P4) is still considered by the recovery team although it is no longer a threatened species

Work commenced on the South Coast Threatened Birds Recovery Plan. This will be a coordinated, multi-species recovery plan addressing both species-oriented recovery actions as well as aspects of area management related to recovery of the five extant taxa covered by the South Coast Threatened Birds Recovery Team.

Recovery team members worked with District and Regional staff and Fire Management Services to develop a Fire Management Strategy for the Two Peoples Bay-Manypeaks area. A burn prescription for the protection of Mt Manypeaks is being developed.

Recovery team members contributed to the production of the annual South Coast Threatened Birds Newsletter.

Recovery team members participated in the WWF ' Review of Landscape, Multi and Single Species Recovery Planning for Threatened Species (S.A. Moore & S. Wooller, 2003).

Western Swamp Tortoise Recovery Team Annual Report

by Lyndon Mutter, Gerald Kuchling,

Andrew Burbidge, Dean Burford and Stefan de Haan

Progress continued towards implementing the actions contained in the Western Swamp Tortoise Recovery Plan and implementation of most recovery actions continues to be on schedule. Highlights of the year include the following:

The capture of an unmarked juvenile Western Swamp Tortoise of 142.5g in the dam of NE-swamp at Twin Swamps Nature Reserve on 25 December 2003. This juvenile hatched 1997 or 1998. This is the first time since the early 1980s that natural recruitment into the Twin Swamps population could be demonstrated.

The capture of a hatchling of 2003 with a body mass of 23.2g on the Midland Brick land directly to the West of Ellen Brook Nature Reserve. This demonstrates that there must have been a breeding female on the block in 2002 and further underlines the suitability of this area for the Western Swamp Tortoise.

Perth Zoo currently holds 161 tortoises comprising 22 breeding males, 23 breeding females and 116 hatchlings, juveniles, subadults and non-breeding adults. Forty-two hatchlings were obtained in 2003 from eggs laid in 2002.

A 2nd captive breeding facility, at Adelaide Zoo, was set up with two, two year old tortoises transferred from Perth Zoo to Adelaide.

Groundwater was pumped to North West Swamp, Twin Swamps Nature Reserve during winter 2003, as winter rains were insufficient to fill the swamps. Ten surviving tortoises from the December 2002 fire at Mogumber spent the summer and autumn recovering at Perth Zoo and were then released at NW swamp at Mogumber in August 2003. Forty two juveniles were released into Mogumber Nature Reserve (including 10 survivors from the 2002 fire), four hatchlings and one adult were released at Twin Swamps Nature Reserve and five hatchlings were released at Ellen Brook Nature Reserve.

A rat control program at Twin Swamps Nature Reserve was continued during 2003.

Prescribed burning was undertaken in one cell of Twin Swamps Nature Reserve in spring to minimise the area of the reserve burnt in a wildfire and the risk of significant numbers of tortoises being killed.

An additional 40 artificial aestivating tunnels were installed at Mogumber and 108 tunnels were installed at Twin Swamps Nature Reserve to encourage tortoise to aestivate below ground and reduce the risk of them being killed in a wildfire situation.

A third edition of the Recovery Plan for the period January 2003 to December 2007 was prepared and approved by the Western Australian Minister for the Environment.

Westralia Airports Corporation advised the recovery team that they were not prepared to agree to a translocation to the recovery team's preferred next translocation site. The recovery team asked them to reconsider, but received no response. The Team has also investigated another possible site at Caversham, owned by the Department of Defence.

In 2003 another possible translocation site at Moore River Nature Reserve was investigated. This site shows significant promise, although some habitat manipulation would be required to make it suitable for the tortoise. More detailed investigations will be undertaken in 2004.

Western Swamp Tortoise

Photo: Gerald Kuchling

Esperance District Threatened Flora Recovery Team Annual Report 2003

by Ryan Butler, for Esperance District Threatened Flora Recovery Team

There have now been three meetings of the Recovery Team since 2002 and members have continued to contribute to survey work, recovery actions and management issues.

Much progress was made during 2003 through to January 2004 with monitoring, surveys and other works for the DRF (Critically Endangered, Endangered and Vulnerable species) and Priority species in the Esperance District, other works associated with external funding and general duties associated with the Conservation Officer (Flora) position.

Actions from Interim Recovery Plans (IRPs) or draft IRPs for the following are being implemented, *Lambertia echinata* subsp. *echinata 2001-2004*, *Daviesia microcarpa 1996-1999*, *Eremophila lactea 1999-2002*, *Myoporum turbinatum 2002-2007* and *Rhizanthella gardneri 2002-2007*.

Geraldton District Threatened Flora & Ecological Communities Recovery Team Annual Report 2003

by A M Chant for the Geraldton District Threatened Flora and Threatened Ecological Communities Recovery Team

This report covers progress made in the implementation of the Threatened Flora Management Plan for CALM's Geraldton District, Project Number 446, and Interim Recovery Plans for Declared Rare Flora (DRF) taxa and Threatened Ecological Communities, from January 2003 to January 2004.

There has been one meeting of the Recovery Team during the year and members have continued to contribute to survey work and recovery actions and in providing advice to the District Conservation Officer regarding flora conservation matters in their local areas.

A large amount of productive fieldwork has again been undertaken during the year with 27 new populations of 12 DRF taxa being surveyed by Recovery Team members and volunteers (*Caladenia bryceana* subsp *craecens* 2, *Caladenia wanosa* 1, *Conostylis dielsii* subsp *teres* 1, *Diuris drummondii* 1, *Drakaea concolor* 5, *Drummondita ericoides* 1, *Eremophila rostrata* 2, *Eremophila viscida* 1, *Eucalyptus blaxellii* 1, *Grevillea phanerophlebia* 1, *Leucopogon marginatus* 6, *Stachystemon nematophorus* 5). This has resulted in several DRF having improved conservation status and information has been gained on distribution, habitat, taxonomy and response to disturbance for several species.

Promotion of Threatened Flora conservation within the community has continued, including local newspaper articles and community and school group involvement in implementing recovery actions.

Implementation of Wildlife Management Program No. 26 Declared Rare and Poorly Known Flora in the Geraldton District has continued and Interim Recovery Plans for the following have been produced and are being implemented:

Caladenia elegans 2000 - 2003, *Pteros-*

tylis sp Northampton 2000 – 2003, *Eremophila rostrata* 2002 – 2007, *Gyrostemon reticulatus* 2002 – 2007, *Grevillea phanerophlebia* 2001 - 2004 and *Hypocalymma longifolium* 2001 - 2004, Threatened Ecological Communities - Plant Assemblages of the Moonagin System 2001 - 2006, Plant Assemblages of the Billeranga System 2001 - 2006.

Katanning District Threatened Flora Recovery Team Annual Report 2003

Bethea Loudon for the Katanning District Threatened Flora Recovery Team

Seven taxa were nominated for changes to individual ranking/status at the 2003 Threatened Species Scientific Committee (TSSC) meeting with varying results.

The Department's Threatened Flora Seed Centre (TFSC) collected seed from DRF *Verticordia staminosa* subsp. *cylindracea* var. *cylindracea, Banksia oligantha, Conostylis seorsiflora* subsp. *trichophylla, Goodenia integerrima, Acacia leptalea* and *Muehlenbeckia horrida* subsp. *Abdita* and six Priority taxa.

The Flora Conservation Officer collected seed of *Banksia oligantha* and *Verticordia staminosa* subsp. *cylindracea* var. *cylindracea.* A flora enthusiast collected seed of *Gastrolobium lehmannii* for the TFSC.

New populations:

(CR) – potential habitat of *Eremophila verticillata* found

(EN) – one possible population of *Gastrolobium lehmannii*

(VU) – two populations of *Acacia leptalea,* one population of *Verticordia staminosa* subsp. *cylindracea* var. *cylindracea*, one population of *Roycea pycnophylloides*

New populations were also found of eleven Priority Flora.

Rare flora markers were erected for a number of Priority and DRF populations.

Interim Recovery Plans (IRPs) were updated by WATSCU for *Muehlenbeckia horrida* subsp. *abdita*, *Goodenia integerrima*, *Hemigenia ramosissima* and *Dryandra mucronulata* subsp. *Retrorsa.* The IRP for *Conostylis setigera* subsp. *dasys* was written by the Katanning District Flora Conservation Officer. The Albany District wrote the IRP for *Centrolepis caespitosa.*

Goodenia integerrima

Photo: A Cochrane

A letter drop was produced by WATSCU for *Drakaea isolata* for distribution to the community and landowners through the postal system, by the Katanning District Flora Conservation Officer.

Funds were provided to a landowner to replace rundown fencing around a remnant containing *Dryandra mucronulata* subsp. *retrorsa* on his property.

David Coates and the Katanning District Flora Conservation Officer have agreed upon genetic analysis of *Verticordia staminosa* subsp. *cylindracea* to determine genetic differences, if any, between the two varieties. Work to take place in 2004.

Monitoring plots were set up to observe effects of fire on one DRF and two Priority species.

Merredin District Threatened Flora Recovery Team Annual Report 2003

Kate Brunt, For the Merredin District Threatened Flora Recovery Team

Two successful Recovery Team Meetings were held in 2003. These meeting covered a number of relevant topics and provided the Recovery Team with an update of the Program and an opportunity to provide feedback.

CALM Merredin was successful in sourcing funds for the implementation of a number of Recovery Actions through WATSCU and the Bankwest Visa Card grant. MDTFRT also successfully completed a NHT Project, achieving most of the outcomes by the deadline.

New populations of *Acacia ataxiphylla* subsp *magna, Hakea aculeata, Caladenia drakeoides, Roycea pycnophylloides, Frankenia parvula, Frankenia conferta* were located.

Most Critically Endangered populations were monitored in 2003.

A number of fencing projects were completed on private property to protect populations from grazing, including *Cyphanthera odgersii* subsp *occidentials, Emerphila viscida and Acacia ataxiphylla* subsp *magna.*

Seed collection from both DRF and Priority species occurred with the assistance of the Threatened Seed Centre.

Successful negotiation took place between the Shire of Dalwallinu and CALM to ensure the long-term protection of *Grevillea pythara* whilst ensuring road safety.

A large amount of liaison took place with Shires, Main Roads, West Net, The Water Corporation, environmental consultants and mining companies to protect populations of DRF.

IRPS have been completed for *Eremophila viscida*, *Acacia ataxiphylla* subsp *magna*, *Acacia subflexousa* subsp *capillata*, *Acacia volubilis*, *Acacia vassalli*, *Philotheca basistyla*, *Centrolepis caseiptosa*, *and Caladenia drakeoides.* Whilst the following IRP's are underway *Acacia lobulate*, *Grevillea dryandroides* subsp *capillata*, *Verticorda huganii*, *Eremophila virens.*

A number of translocation proposals were developed and planned during 2003.

Three editions of the Merredin District Threatened Flora Recovery Teams Newsletter "Diversity News" have been produced and distributed.

Narrogin District Threatened Flora Recovery Team Annual Report 2003

Kim Kershaw and Greg Durell for the Narrogin District Threatened Flora Recovery Team

CALM supports this program by providing both direct and indirect funding, including the full time employment of a Conservation Officer. $35 500 funding has been received from the Avon and Southwest Catchment Councils through NHT 2 and allocated to on-ground recovery actions. Funding has also been obtained from NHT for the development of Interim Recovery plans for several Narrogin District threatened plant species. The BGPA has provided direct costs to the program for two species recovery projects. The community has provided significant in-kind volunteer support to implement many of the recovery actions.

CALM's Narrogin District manages seven Critically Endangered flora (CE), fourteen Endangered flora (E) and twenty Vulnerable Flora (V) flora. All are Declared as Rare Flora under the *Wildlife Conservation Act* (1950). In

addition, 205 flora species are listed for the Narrogin District on CALM's Priority Flora List. Many of these require additional monitoring and survey to determine their threatened status.

Highlights of the program for 2003 were:

Continued translocation of *Grevillea scapigera* (CR) with the Hartley's site being enlarged to 0.2ha and 1,130 plants planted over two days by Botanic Gardens and Parks Authority (BGPA) staff, CALM staff and community members from the Corrigin LCC. Additional plantings were made at the Bullaring site (106 plants) and the Airstrip site (371 plants). BGPA staff conducted herbicide trials and the information gathered will assist this season's weed control program at the translocation sites.

A new population of *Grevillea scapigera* (one plant) was discovered by CALM staff near the existing population 2.

The translocation of *Symonanthus bancroftii* (CR) into two secure sites continued in partnership with the Bruce Rock Land Care District Committee and Botanic Gardens and Parks Authority (BGPA). In accordance with the approved Translocation Proposal, 57 plants were planted at Nangeen Nature Reserve and 119 plants were planted at Ardath (near Bruce Rock).

Two new populations of *Verticordia staminosa* subsp. *cylindraceae* var. *cylindraceae* (VU) were discovered in the eastern portion of the Kulin Shire, one near Pingaring and one in Reserve A 29576.

One new population of *Pityrodia scabra* (VU) was discovered in the Middle Ironcap area (eastern portion of the Kondinin Shire) in a mining rehabilitation area (waiting on confirmation from the WA Herbarium).

Mattiske Consulting PTY LTD discovered a population of *Ptilotus fasciculatus* (EN) and several Priority Species at Seagroatt Nature Reserve A 25062, in the Shire of Bruce Rock, during a vegetation mapping project for the area.

Diana Papenfus, a contract botanist, located four populations of *Roycea pycnophylloides* (VU) one population each on Reserve 27639, Lake Gounter Nature Reserve A 21253, Kwolyin Nature Reserve A 30969 and private property. New populations of *Ptilotus fasciculatus* were located on Kwolyin Nature Reserve A 30969, Kondinin Salt Marsh Nature Reserve C 26905 (a nominated potential Recovery Catchment) and one on private property. One population of *Frankenia parvula* (VU) was located on Kwolyin Nature Reserve A 30969.

Three species of flora were added to the Narrogin District Declared Rare Flora List. These are: *Stylidium coroniforme* (EN), *Pityrodia scabra* (VU), (waiting on confirmation from the WA Herbarium) and *Frankenia parvula* (VU).

Two new populations of *Caladenia williamsiea* (recommended CR - current P2) were discovered in Weam Nature Reserve Number 29322 in the Shire of Brookton. This survey work involved CALM staff from Swan Region, Mundaring and Narrogin District and flora volunteers from Perth, Brookton and Narrogin.

Another fourteen species were added to the Narrogin District Priority Flora List.

Moora District Threatened Flora Recovery Team Annual Report 2003

by Gina Broun for the Moora District Threatened Flora Recovery Team

Within Moora District there are 70 species of DRF, of which 25 are considered Critically Endangered, 21 Vulnerable and 24 are Endangered. There are a further 327 Priority species and 7 TECs, of which 6 are ranked as Endangered and the other as Vulnerable.

The Recovery Team met twice during 20003, its members having worked proactively towards conservation of threatened species and ecological communities throughout the year.

Actions included monitoring of known populations, surveying for 'new' populations, seed and propagule collection, translocation measures, community education, procuring external funds for on-ground works, obtaining ecological and biological information, industry consultation, field trials, liaison with other stakeholders and writing of IRPs.

Symonanthus bancroftii

Photo: G. Durell

At present there is one full Recovery Plan, 17 completed IRPs and 5 draft IRPs for DRF species and a further 3 for TECs that occur within the Moora District. Each of these plans stipulates criteria for the recovery of the species (or TEC), which aim to allow measurement of the success or failure of the plan and its implementation.

Wongan Ballidu Threatened Flora Recovery Team Annual Report 2003

By Paul Blechynden , Kate Roy-Chowdhury For the Wongan Ballidu Threatened Flora Recovery Team

The Wongan-Ballidu Threatened Flora Recovery Team (WBTFRT) reconvened in May 2003 after a 15-month period of abeyance caused by the temporary absence of the Assistant Conservation Officer.

Kate Roy-Chowdhury was appointed as the assistant Conservation Officer, until 30 September 2003. Gillian Stack was responsible for the completion of the Wongan Ballidu Threatened Flora Management Program.

In December 2003, the Wongan-Ballidu Threatened Flora Recovery Team held their final meeting, at which a decision was made to amalgamate the WBTFRT with the Merredin District Threatened Flora Recovery Team. This decision was reached due to the absence of funding for an assistant conservation officer and the potential that the recently formed Wongan Ballidu Bush Care group would assume many similar roles.

Albany District Rare Flora Recovery Team Eastern Stirling Range Montane Heath & Thicket Recovery Team Recovery Team Annual Report 2003

By Sarah Barrett for the South West Threatened Flora and Communities Recovery Team

Summary of Recovery Actions

Survey and monitoring

One hundred and eight taxa of threatened (44) and priority (64) flora were surveyed or monitored in 2002 (approximately 350 site visits). Forty-two new populations or sub-populations were located of threatened taxa (14 species) and 93 of priority taxa (44 species).

15 CR taxa were monitored once to twice annually (77 site visits). Several new populations of priority and threat-

ened taxa were located by Recovery Team members including a significant new population of *Caladenia bryceana* ssp *bryceana* in September. A survey of remnant vegetation on tree farms (ITC) by L. Sandiford resulted in new populations of threatened and priority flora, in particular *Centrolepis caespitosa*.

Due to survey efforts eight P2 or P3 species were downgraded to P4.

Pleurophascum occidentale, "the Two -Peoples Bay moss" has been found to be widespread and was recommended to P4. Adenanthos *cunninghamii* and *Eucalyptus bennettiae* have been recommended from DRF to P4 based on genetic studies. *Daviesia obovata* and *Dryandra pseudoplumosa* have been formally listed as DRF.

Phosphite was applied to 150 ha of *Phytophthora cinnamomi*- affected vegetation targeting threatened flora populations, many of which were in either the Eastern Stirling Range TEC or Montane Mallee TEC. All of these sites were monitored to assess the effectiveness of phosphite applications. Critically endangered (CR) threatened flora sprayed in autumn 2003 were *Banksia brownii, Dryandra anatona, Dryandra montana, Andersonia axilliflora, Daviesia glossosema, D. pseudaphylla, Leucopogon gnaphalioides* and *Persoonia micranthera.* Other threatened taxa sprayed were *Daviesia obovata, Darwinia oxylepis, D. collina, D. squarrosa, Darwinia sp Stirling, Lambertia fairallii* and *Sphenotoma drummondii.*

Thrombolite (Stromatolite-like Microbiolite) Community of a Coastal Brackish Lake (Lake Clifton) Recovery Team Annual Report 2003

By Robyn Luu for the Lake Clifton Recovery Team

The thrombolites of Lake Clifton community was assessed as Critically Endangered in February 2000.

The Thrombolite community is formed by biologically influenced precipitation of aragonite in a coastal brackish lake (Lake Clifton). It is a complex association of photosynthetic cyanobacteria and purple sulphur bacteria, eukaryotic microalgae and 'true bacteria'. Microbial structures, including thrombolite structures are formed through precipitation of calcium carbonate within the microenvironment of microbes as a result of photosynthetic and metabolic activity.

The thrombolites appear to be mainly threatened by increasing salinity and increasing nutrient levels in Lake Clifton and inflowing waters.

Since the recovery team was established in May 2002, the Lake Clifton thrombolites Recovery Team has overseen the writing of the Interim Recovery Plan (IRP). This report outlines the progress made in the finalisation of the IRP and in managing the thrombolites from January to December 2003. A number of research programs have also been initiated.

Caladenia bryceana* ssp. *bryceana

Photo: S.D. Hopper

Lake Bryde Recovery Catchment Annual Report 2003

By Matt Giraudo

Significant knowledge gaps were identified by the Technical Reference Group during 2003 and the major focus during the year has been collecting and collating bio-asset information and better understanding the hydrologic processes occurring within the catchment, whilst trialling implementation of earthworks.

Investigations included a range of hydrologic reviews, remnant vegetation inventory, assessment of vegetation health using satellite imagery, lake coring, topographical surveys, assessment of storage capacity within the catchment and green house trials to determine the salinity tolerance of *Muehlenbeckia horrida* subsp *abdita*. This information has provided a much clearer understanding of the distribution of assets within the catchment, their condition, rate of decline, and the nature of threats facing them. As a result of these investigations the project objective has been reviewed and the project is in a much better position with which to proceed into an implementation phase.

Implementation during the year has been restricted to the construction of culverts under the Pingrup – Newdegate Road and a trial of on-farm surface water management works. The trial of on-farm works highlighted a series of design and construction issues that have largely been resolved. As a result, planning of works for approx. 80% of the catchment has been undertaken and negotiations with some landholders in priority sub catchments has been undertaken. Cost sharing arrangements for surface water management works have been developed and are awaiting endorsement.

As a result of a better understanding of the distribution and condition of assets, major valley floor works have progressed to the point where detailed design can begin. Depending on the nature and extent of these works, construction could occur within 24 months. On-farm surface water management works throughout catchment have been planned at a paddock scale and could proceed immediately.

The major challenge for the project remains developing and implementing strategies to control groundwater rise on the catchment scale, as this clearly provides a serious medium–long term threat to the bio-diversity assets within the catchment.

Sedgelands in Holocene Dune Swales Recovery Team Annual Report 2003

By Val English for the Sedgelands in Holocene Dune Swales Recovery Team

The Sedgelands in Holocene Dune Swales community was assessed as a critically endangered ecological community in 1996. The community is also listed as Endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999.

The community occurs in linear damplands and occasionally sumplands (wetlands) between Holocene dunes formed over the last 7 000 years. Typical native species in the community include the shrubs *Muehlenbeckia adpressa*, *Acacia saligna* and *Xanthorrhoea preissii*, and the herbs *Baumea juncea*, *Isolepis nodosa*, and *Poa porphyroclados*.

The most typical form occurs in the Becher Suite within the Port Kennedy Scientific Park, a Class A Nature Reserve (Rockingham – Becher plain).

The sedgeland community is threatened by clearing, disease introduction, changes to hydrological processes, erosion by wind and water, disturbance due to recreational use/maintenance activities, weed invasion, grazing by rabbits, and inappropriate fire regimes.

Since June 1996, the Sedgelands in Holocene Dune Swale Recovery Team has coordinated the development and implementation of the Interim Recovery Plan. Meetings of the Recovery Team in February and August 2003 discussed a variety of issues, especially those involving areas containing the sedgeland community that are the subject of proposals for reservation or development. The Recovery Team provided advice to CALM, developers' consultants, and planning agencies including the Departments of Environment and Planning and Infrastructure, on the following development issues:

Waikiki Station planned by New MetroRail for the Perth Mandurah rail line,

Port Kennedy Golf Course;
Lot 17 Bakewell Drive;
the implications of clearing unexploded ordinance;
Kennedy Park Estate Phase 2;
Lot 40, Forty Rd, Rockingham;
Coastal Wetlands, Secret Harbour;
Lark Hill; and
Industrial Park 14 at Rockingham

Advice provided and negotiations conducted on these issues made up a significant part of the implementation of actions in the Interim Recovery Plan. The main actions pursued through such advice and negotiation were:

3.4 Minimise further clearing of the community;
3.6 Maintain hydrology and water quality;
3. 10 Minimise damage to the community from UXO searches;
3.12 Ensure any tourist developments do not impact the swale community;
3.18 Ensure maintenance of strategic firebreaks;
3.26 Negotiate for appropriate management of other occurrences in Port Kennedy, outside Port Kennedy Scientific Park;
3.31 Incorporate management strategies into planning for the Lark Hill RegionalSport and Recreation complex, and
3.32 Negotiate for appropriate management of the community at IP 14.

Toolibin Lake Recovery Team Annual Report 2003

by J. Wyland for the Toolibin Lake Recovery Team

Toolibin Lake is a wooded, seasonal wetland situated south-east of Wickepin in the Western Australian wheatbelt. Toolibin Lake is recognised as a conservation area of international significance for migatory waterbirds under the Ramsar Convention.

The Toolibin Lake Recovery Catchment Plan (Toolibin Lake Recovery Team, 1994) was prepared in response to a continued decline in vegetation health at Toolibin Lake in an increasingly saline environment. The plan was endorsed in September, 1994, and its implementation has continued since that date.

Funds were received through the State Salinity Strategy and Environment Australia to continue works during 2003, and the Recovery Team, Technical Advisory Group and CALM project staff were active throughout the year.

Brief highlights of recovery actions undertaken in 2003 are described below.

Recovery Action 3.2, Groundwater Pumping

Approximately 242 ML of groundwater has been extracted from beneath Toolibin Lake between the period of the 1st December 2002 to the 30th November 2003. Iron biofouling continued to be dealt with to reduce the impact upon pumping rates, and the Pumpmate chemical dosing system was installed on electric submersible pumps with good results.

Recovery Action 3.3, surface water control

The Toolibin catchment flowed during winter 2003. Flow was observed in all major drainage lines. However, monitoring indicated that water quality did not reach the Recovery Plan threshold of 1000mg/l and the separator gates were not closed during 2003. Approximately 631 tonnes of salt were bypassed around Toolibin Lake via the separator and diversion channel during the year.

The Department of Agriculture have been engaged to undertake a comprehensive surface hydrology assessment to define surface water movement across the catchment and to consolidate information generated from past surface water and groundwater investigations. This information will be used to review the performance of surface water management strategies and recommend additional solutions to address the threats of waterlogging and salinity in the Toolibin Lake catchment.

ecovery Action 3.5, Lake and Reserve Revegetation

Revegetation at Toolibin Lake and Dulbinning Nature Reserves continued, with direct seeding, protection of seedlings from grazing and weed control. Approximately 25 hectares were revegetated at Chadwick's Block during 2003. All seedlings were grown from seed that had been collected by CALM staff from the Toolibin Lake catchment.

Recovery Action 3.6, Catchment Revegetation.

Thirty five hectares of privately owned, agricultural land was revegetated with approximately 48 500 seedlings through cost sharing arrangements with CALM. Eight landholders participated in the revegetation programme during 2003.

Approximately 160 Ha of remnant vegetation was arranged to be fencing through cost sharing arrangements with CALM in 2003. Four landholders are participating and two of the remnants will be covenanted.

Oil Mallees

A once off, increased subsidy rate of $0.60 per oil mallee seedling was offered to landholders for 2003 for minimum orders of 25 000 seedlings. A total of 338 000 oil mallees were planted by 11 landholders through the subsidy scheme. A further 61 000 oil mallee seedlings have been planted in the catchment with private industry funding. The oil mallees have been planted in alley formation over approximately 1000ha of agricultural land.

Review of Catchment Revegetation Work

The Department of Conservation and Land Management and the Lake Toolibin Catchment Group worked together to record all revegetation works that have been carried out in the Toolibin Lake catchment. Approximately ninety percent of the catchment landholders were interviewed. Revegetated areas and areas of remnant vegetation were mapped with the assistance of landholders. Information about these areas was then recorded in a database. Preliminary results suggest that approximately 6% (3200 Ha) of the Toolibin Lake catchment has been revegetated with either commercial (including pines, oil mallees and tagaste) or biodiversity species and over 600ha of remnant vegetation on private land has been protected by fencing.

Recovery Action 3.7, Agronomic manipulation

These works are primarily under the jurisdiction of the Lake Toolibin Catchment Group (LTCG). The LTCG offers a subsidy to its members for the use of high water use pastures.

Recovery Action 3.8, Decision support system

A database to assist with the establishment and administration of Recovery Catchment revegetation schemes is in the final stages of production. It is anticipated that the database will also provide a structure for recording other recovery activities such as earthworks.

Recovery Action 3.9, Monitoring and reporting

Department staff continue to conduct comprehensive groundwater monitoring of around 250 bores across the Toolibin catchment. All data has been entered into the COMBORES database. Analysis of the data shows that there has been groundwater drawdown in many of the bores across Toolibin Lake since the commencement of the pumping programme and suggests that groundwater pumping has significantly contributed to this drawdown in many of the bores.

A ground electromagnetic survey was conducted across the floor of Toolibin Lake in November 2003 (Partridge 2003). The report noted that there had been a decrease in soil salinity across the majority of the lakebed since the 1998 survey.

The Toolibin Lake Recovery Catchment Plan was endorsed in September 1994 and its ten year term will expire in 2004. The Recovery Team and Technical Advisory Group recommended that the Recovery Plan is reviewed prior to the preparation of a new Recovery Plan. The review process began in November 2003.

Other Activities

Many other activities have been ongoing, including investigation into salt harvesting and aquaculture as ways of using groundwater pumped from Toolibin Lake.

Toolibin Lake continues to be a point of interest for a wide variety of groups. More than 300 people attended organised tours at Toolibin Lake during 2003.

Several Toolibin Lake web pages have been placed on the Departments 'Naturebase' web site. All future Toolibin Lake reports will be downloadable from these pages.

wo diversion drain crossovers on the property 'Nepowie', adjacent to Toolibin Lake Reserve were upgraded.

An honours student, Patrick Mitchell, completed his thesis on plant water uptake in response to salinity at Toolibin Lake in 2003. The results of this study have important implications for management, as they suggest that leaching of surface soil salts may only need to occur in the first metre of the soil profile for improvement in the condition of *C. obesa.*

Salinity Prize

The Toolibin Lake Recovery Catchment project was awarded the inaugural, Institute of Engineers (IAE), national Salinity Prize in 2002. Thirty thousand dollars prize money was awarded to the Recovery Team. No restrictions or guidelines were placed on the expenditure of the money by the IAE. A proposal to enhance and extend the existing Toolibin Lake recovery walk trail using the prize money was accepted by the Toolibin Lake Recovery Team during 2003.

Varanus sp. Gwalia Reserve, Kemerton

Photo: Jill Pryde

WATSNU

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