Department of Conservation and Land Management

WATSNU

July 2005

Volume 12, Issue 1

The Newsletter of the Species & Communities Branch for Threatened Species and Ecological Communities Conservation

Cactus dryandra (*Dryandra anatona*) Photo: Ellen Hickman

Inside this Issue:

WATSNU with WATSCU?

A restructure within Nature Conservation Division of the Department has meant some changes in the administration of threatened species and communities work within CALM.

After providing an invaluable contribution to nature conservation in this State, John Blyth retired from the Department on July 8 this year, and thus vacated the position of Acting Manager of WATSCU. As a consequence, Gordon Wyre, the A/Director of Nature Conservation took the opportunity to undertake a minor restructure of the Division to provide a more logical arrangement of staff and duties, and pre-empt the planned future relocation of all Perth-based (non-Regional) staff to Kensington.

The restructure, in summary, is:

1 WATSCU will become part of Wildlife Branch, which is to be renamed Species and Communities Branch. WATSCU as such will no longer exist, but its function, and those of its staff will remain essentially the same.

2 Ken Atkins will be the acting Manager of Species and Communities Branch based at Kensington.

3 The wildlife licensing and industry management role of Wildlife Branch will transfer to Nature Protection Branch (under the acting Manager, Dave Mell) to bring licensing and compliance together into the one area.

4 Species and Communities Branch will continue to provide advice to the licensing section on licence issues and appropriate licence conditions, as well as advice on industry management in relation to the biology and conservation of species and communities which are being utilized.

5 Environmental impact assessment will move out of Nature Protection Branch and create a new branch called Environmental Management Branch, under the acting Manager, Norm Caporn.

6 Land clearing assessment will move out of Wildlife Branch and into Environmental Management Branch so that all environmental impact assessment will be done in the same area.

The current WATSCU group will remain at Woodvale while additional accommodation is being constructed at Kensington. During this time, Val English will supervise the Woodvale staff in the role of A/Principal Ecologist. It is anticipated that the Woodvale group will move to Kensington early in the new year.

The proposed changes with regard to threatened species and communities will enable a closer relationship between policy, administration, advice and implementation. This should provide greater coordination and integration of the Department's activities in this area to ensure that we continue to provide best practice conservation of threatened species and communities in this State.

The three acting manager positions will be advertised in the near future, as will the position of Principal Ecologist vacated by John Blyth. Once these positions are filled, further positions will be able to be advertised to create more stability in these Branches, and allow better long-term planning for nature conservation outcomes.

It is hoped that all staff recognize the positive longer term benefits of these

(Continued on page 2)

A new Nature Reserve at "CAIRN HILL" ~ John Blyth and Rosemarie Rees

An area of rocky hills known as Cairn Hill, north of Moora, has recently been gazetted as an 'A' Class Nature Reserve in recognition of its very high value for biodiversity conservation. The reserve contains one of the best occurrences of the Endangered Coomberdale Chert threatened ecological community (TEC), three species of declared rare flora and seven other plant species of priority for research and conservation measures. Of the 650 ha of the TEC known to exist, about 175 ha occurs on the new reserve. This more than trebles the area of the TEC on conservation land and protects the threatened and priority flora.

The gazettal is the endpoint of a remarkable series of cooperative arrangements involving Western Australian Government Railways, the silicon mining company Simcoa Pty Ltd, the Department of Conservation and Land Management, the Environmental Protection Authority and the Department of Industry and Resources.

The important first step was the transfer of the land, held freehold by Western Australian Government Railways, to the State of Western Australia, in order that the land may be reserved for conservation. This transfer was done at no cost to CALM. However, at the time of this generous action by the Railways Company, Cairn Hill was covered by a Mining Lease held by Simcoa. Simcoa have a chert mining operation in an area close to Cairn Hill and the Coomberdale chert contains exactly the chemical and physical characteristics required by Simcoa to produce high quality silicon. The TEC and the rare and priority flora of these hills also depend upon the chemical and physical characteristics of the Coomberdale chert.

Flowering *Kunea praestans* over *Hibbertia* sp. In Cairn Hill Nature Reserve

Photo: Sheila Hamilton-Brown

Simcoa recognized this apparently inevitable conflict between a legitimate industrial use and very high conservation values. In discussion with Government agencies they sought outcomes of benefit to their company's long-term future and to conservation of the best of the Coomberdale chert community and its flora. A major action towards this aim was cooperative survey with CALM to identify areas that would be most valuable to transfer to the conservation estate in return for identification and agreement on chert areas on which the vegetation was already degraded.

As a part of this agreement Simcoa undertook not to mine Cairn Hill and to surrender its mining lease once the nature reserve was created. For these efforts the company received a Golden Gecko award in 2002. The gazettal of the new nature reserve is the culmination of generous and far-sighted planning by Western Australian Government Railways and Simcoa, and has been achieved with goodwill and trust on all sides.

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

changes to the operation of threatened species and communities conservation in the Department. Similarly, while it is anticipated that there will not be any significant impact to the regional delivery of nature conservation, there may need to be some patience and understanding by regional staff and community members.

I look forward to working with all people involved in threatened species and communities conservation, and in particular a closer working relationship with the current WATSCU staff.

Ken Atkins A/Manager Species and Communities Branch

For further information contact Ken at CALM's Kensington location on (08) 9334 0425 or email kena@calm.wa.gov.au

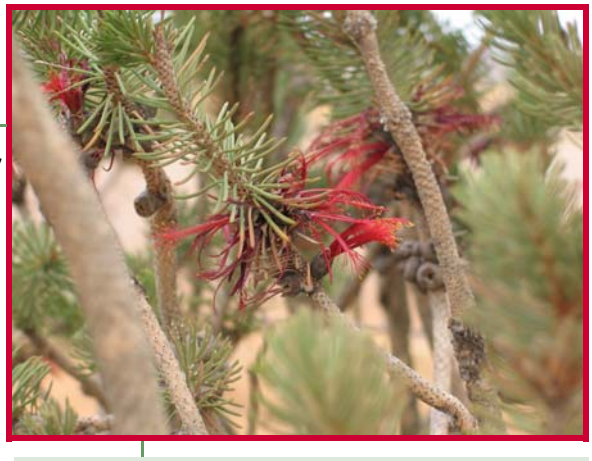
Piawaning Clawflower rediscovered again! ~ Val English

During a botanical survey in 1993 botanist Alex George collected a single specimen of a *Calothamnus* species from a degraded road reserve south of Moora. This specimen was then set aside for future analysis. In 2004, when Alex examined the specimen more closely, he was surprised to note that it was Piawaning clawflower (*Calothamnus accedens*) which was presumed to be extinct . Alex then revisited the area, but discovered that the site had been recently bulldozed. Luckily the plant can resprout, and six plants had survived and were reshooting. While surveying the surrounding roads for other populations, Alex discovered another 30 plants on another narrow road reserve nearby. Additional plants were located during subsequent visits to the adjoining farmland by the Department of Conservation and Land Management's Moora District Conservation Officer, and arrangements have been made for these landholders to fence and protect these populations.

Calothamnus accedens was originally described in 1984 by Trevor Hawkeswood. His description was based on 1980 collection from a narrow road verge near Piawaning. This population is believed to have been destroyed. The species was then listed as 'presumed extinct' until just recently, when the road reserve populations were confirmed. It is now recommended as 'critically endangered'.

In early 2005, the identity of plants in another two tiny populations, near Watheroo and Piawaning, was confirmed by Sue Patrick from CALM's Science Division. These were again on narrow road reserves, and were initially located by Andrew Crawford from CALM's Threatened Flora Seed Centre. Further survey may reveal additional populations within this extended range.

Calothamnus accedens is closely related to *Calothamnus brevifolius* and to *Calothamnus hirsutus*, however, both of these species are shorter shrubs and have smaller fruits and seeds.



Piawaning Clawflower photo: Rosemarie Rees

Calothamnus accedens was included in the 2001 Wildlife Management Program for Declared Rare and poorly known flora in the Moora District, but was listed as 'presumed extinct' at the time. The species is now a high priority for development of a recovery plan and implementation of on-ground actions such as weed control, seed collection, further survey and possibly translocation to a secure site, to help ensure its continued survival.

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

NEW RECOVERY PLAN

Gilbert's Potoroo (*Potorous gilbertii)* is one of the most critically endangered animals in Western Australia and one of Australia's most endangered species. Gilbert's Potoroo is known only from a single, very small population on Mount Gardner in Two Peoples Bay Nature Reserve near Albany.

Potorous gilbertii is listed as fauna that is likely to become extinct or is rare (Western Australian *Wildlife Conservation Act 1950*) and has been ranked as Critically Endangered by the WA Threatened Species Scientific Committee. It is listed as Endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). It is listed as Critically Endangered in *The 1996 Action Plan for Australian Marsupials and Monotremes* (Maxwell, Burbidge & Morris, 1996) and the 2000 IUCN Red List of Threatened Species (Hilton-Taylor, 2000) according to criteria C2b (number of mature individuals is less than 250, declining and all individuals are in a single subpopulation) and D (number of mature individuals is less than 50).

The Recovery Plan proposes eight recovery actions:

- Protect the existing wild population and habitat
- Increase understanding of ecology and population biology of Gilbert's Potoroo to underpin management strategies
- Search for new populations of Gilbert's Potoroo outside Two Peoples Bay
- Establish and maintain a captive breeding colony of Gilbert's Potoroo
- Develop techniques to enhance the reproductive potential of Gilbert's

(Continued on page 16)

Banksia community added to reserve system ~ Jill Pryde

An exceptional example of the endangered plant community '*Banksia attenuata woodlands over species rich dense shrublands'* has just been purchased by the Department for Planning and Infrastructure through the *Bush Forever* purchase scheme. The area occurs on White Road in Orange Grove and is to be managed by the Department of Conservation and Land Management as a Nature Reserve.

Two generations of conservation-minded landowners have overseen the protection and conservation of this bushland.

The purchase of this property arose from an initial approach by the Webster family. Negotiations between the family, the Department for Planning and Infrastructure, National Trust Western Australia and CALM, gave rise to the agreement for the purchase of two lots of their property to become Nature Reserve and to keep two remaining lots within the family.

The majority of the bushland is in excellent condition. There are very low weed levels and no tracks through the threatened community. The site contains threatened flora and fauna including the Wavy-leaved smokebush, *Conospermum undulatum* and the Quenda or Southern Brown Bandicoot, *Isoodon obesulus fusciventer*.

CALM's Swan Region will develop management guidelines for the reserve that will include upgrading of fencing, signage, firebreaks and some weed control including removal of Victorian Tea Tree. The family who will retain ownership of the remaining bushland at the site have expressed a desire to help watch over and manage the reserve, and this offer will be gratefully accepted.

Taking a look at the new Nature Reserve Alice Reaveley *(left)* (Swan Region), Jill Pryde *(far back)* and Mia Morley *(right)* (Species & Communities Branch) with two representative of the Webster family

Photo: Val English

Proposed new Nature Reserve on White Road, Orange Grove

Photo: Jill Pryde

For further information contact Jill on (08) 9405 5128 or email: jillp@calm.wa.gov.au

Threatened Ecological Community Notifications ~ Mia Morley

The process of notifying all private landholders in the Swan Coastal Plain of the presence of Threatened Ecological Communities (TECs) occurring on their property began in January 2005. CALM graduate recruit Mia Morley was employed on a three month contract for this purpose. The letters were sent to all non-CALM managed proprietors including private landholders, businesses and government agencies.

The process of sending out the notification letters involved updating tenure information by contacting Local Government Authorities and also with the help of Graham Hoare from CALM's GIS section, as most ownership information from the TEC database was outdated. This part of the process was decidedly challenging, as shires such as Rockingham are currently undergoing massive subdivisions and new property developments making current tenure information difficult to obtain.

Each package sent included a letter, description of the community, a map displaying the location of the community on their property and some general information on TECs.

The letters themselves outline the importance of TECs, the assistance that can be provided by CALM staff, the possible funding for conservation actions and the potential for consideration of the presence of TECs in clearing applications.

There are many positive outcomes resulting from the TEC notification process. All tenure information for private owners on the Swan Coastal Plan has now been updated on the TEC database with most including postal addresses and the date that the information has been updated. A mailing table has been set up for any future notifications to private landholders. The TEC boundary information is now up to date, as boundaries have been revised for each location after either an on-ground inspection, from records or from aerial photos. Many owners have responded to their notification letters and as a result Species and Communities Branch staff have visited several sites and have more accurate information on condition and extent.

The TEC notification process is now continuing into the regional areas of Western Australia and will hopefully prove to be as useful and yield as many positive outcomes for conservation as it has on the Swan Coastal Plain.

For further information, contact Mia on (08)9405 5170 or email miam@calm.wa.gov.au

Updating the Commonwealth list of Threatened Species ~ Rosemarie Rees

Within Australia, threatened species can be protected under both the Commonwealth's *Environment Protection and Biodiversity Conservation (EPBC) Act* and State legislation, which in Western Australia is the *Wildlife Conservation Act 1950*. However, there are currently many discrepancies between the Western Australian and Commonwealth threatened species lists.

These discrepancies can lead to inconsistency in the advice provided by State and Commonwealth departments and is confusing to industry and the general public. The discrepancies may also prevent natural resource management agencies and groups from accessing Commonwealth funding for the highest priority (critically endangered) species if they are inconsistently listed under the Commonwealth legislation.

In an attempt to address this problem the Department of Conservation and Land Management (CALM) and the Commonwealth Department of Environment and Heritage (DEH) have initiated an alignment of lists project where CALM provides advice (in the form of threatened species datasheets) to DEH so that they can assess the species under the *EPBC* Act and update their threatened species database. A part-time project officer and a full-time and part-time technical officer have been employed by CALM with money provided by DEH to work on the six month pilot project.

To-date 35 completed datasheets have been forwarded to DEH and these species will be considered for listing under the *EPBC* Act. Another 50 datasheets are nearing completion and should be forwarded to DEH by the end of the first stage of the project. DEH are considering extending the project in the new financial year to finish updating the *EPCB Act* threatened species lists.

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

Ironstone Community Recovering ~ Val English

Williamson Road Ironstone site, showing sprinkler system and plants recovering Photo: Val English

The 'Busselton Ironstone Community' is a species-rich plant community located in seasonal wetlands on ironstone and ironstone-derived soils on the Swan Coastal Plain near Busselton. This Critically Endangered community was described in the 1994 report by Gibson *et al.* 'A floristic survey of the southern Swan Coastal Plain'. Major threats to the community are dieback disease caused by *Phytophthora* species, hydrological change, too frequent fire, clearing and weed invasion. A recovery plan has been developed, and this describes the actions required to manage the main threats to the community.

One particular occurrence of this community occurs on the edge of State Forest, on Williamson Rd to the south east of Busselton. This particular occurrence is considered to be the most significant of all of the ironstone occurrences, as it contains populations of four Critically Endangered Declared Rare Flora, and a suite of Priority flora. The Critically Endangered flora are laterite petrophile (*Petrophile latericola* ms), Abba bell (*Darwinia* sp. Williamson), butterfly-leaved gastrolobium (*Gastrolobium papilio*), and western prickly honeysuckle (*Lambertia echinata* subsp. *occidentialis*). The Williamson Road area contains the only known wild populations of three of these four Critically Endangered flora.

The Williamson Road site occurs on extremely shallow soils over sheet ironstone. Deaths caused by the plant pathogens *Phytopthora* species and aerial canker, have been recorded at this site. The area is flooded every winter, and dries out completely on the surface in summer. Deep rooted species may be able to access water available underneath or in pockets within the caprock even in very dry periods. These seasonal extremes combine to create a particularly harsh environment for this plant community.

A mineral sands mine occurs within 70 m of this ironstone site. As the adjacent mine site was being dewatered to enable mining in early March 2004, an artificial recharge system was established to maintain the groundwater level and prevent plant deaths in the ironstone community.

At the end of summer in 2004, there was noticeable stress in the ironstone community and this was possibly attributed to drought or hydrological change. The vegetation at the site then appeared to recover soon after rains.

In early 2005 the adjacent mine pit was completely backfilled, and there was a rapid response in water levels. In February 2005, there was evidence of major stress in an area measuring about 100m by 60m in the ironstone community at this site. Ninety percent of the vegetation was found to severely stressed when monitored by staff from CALM's Blackwood District. Shallow rooted species such as low shrubs, and deep rooted species such as *Corymbia calophylla* (Marri) were equally affected. Healthy vegetation occurred adjacent to this area. This event had potential for a massive impact on the Critically Endangered *Gastrolobium papilio* and *Darwinia* sp. Williamson, as a large proportion of the populations occur within the zone of stress, and this site is the only known locality for the single known wild populations of each of these species. It is not known if changes in the water table and/or *Phythophthora* impacts are implicated in the stress event.

Immediate actions were commenced to determine the cause and lessen the impact on *Gastrolobium papilio* in particular, as the species is confined to a very small area. Aerial photographs and on-ground mapping were used to determine the extent of the stress event within the plant community. *Darwinia* sp. Williamson and *Gastrolobium papilio* were remapped and plant health scored to determine priority for watering. A sprinkler system was set up to water the plants in the area most affected by this stress event.

In February 2005, all foliage had browned-off and died on plants pf many species within the impacted area at the Williamson Road site. Interestingly, a large proportion of the plants had produced green foliage by May 2005, even though many of the plants had previously appeared to be dead! CALM District staff estimated that about 70-80 percent of the plants that had earlier appeared dead or highly stressed, were reshooting.

Unfortunately, however, the only known wild population of the Critically Endangered species that occurs closest to the artificial recharge system, *Gastrolobium papilio*, has not responded to watering or rainfall. When last monitored by CALM District staff, it was noted that all the plants previously mapped as near dead, or dead, had not resprouted. A significant proportion of

(Continued on page 7)

Salvage dig for *Caladenia procera* ~ Gillian Stack

The striking Carbanup king spider orchid (*Caladenia procera*) is one of the larger spider orchids, with flowering plants standing up to 70cm tall. Flowers are 5 to 9 cm across, with up to four flowers on a single plant. They are greenish lemon yellow with lines and spots of dull maroon to pink. The labellum is also greenish yellow with pale pink to fawn radiating stripes, ending in a dark maroon recurved tip.

A development proposal affecting a population of *Caladenia procera* has been given approval. Some *C. procera* plants will be protected in a reserved area, but a number of plants occur within the area targeted for development. Land clearing is planned to commence in spring, which has allowed for salvage of *C. procera* plants within the area to be developed.

A team comprised of Andrew Batty, an orchid research scientist with Botanic Gardens and Parks Authority, John Carter and Andrew Webb of CALM's Blackwood District and John Riley, Andrew Brown, Val English and Gillian Stack all of CALM's Species & Communities Branch met on-site to locate and rescue as many orchids as possible. Local naturalist Dennis Cooper also assisted with survey of the site and location of orchids.

As *C. procera* doesn't flower until September – October, no flowers were present when the first salvage attempt was made on 1-2 June 2005. Leaves had emerged from the tubers, and several members of the team were able to identify which leaves were those of *Caladenia* species. Leaves of the common *Caladenia flava* were also present, but were able to be excluded due to morphological differences. All other *Caladenia* leaves located were marked and approximately 100 plants carefully excavated and placed in pots. A number of small leaves were located, suggesting that these are young orchid plants, and that pollination, seed set, and germination had been successful recently. It is likely that some of these young plants will not flower this year.

Andrew Webb, Gillian Stack and Andrew Batty seeking orchids Photo: Val English

All the plants were watered and taken to the Botanic Gardens and Parks Authority nursery, where they will be cared for until flowering takes place and it is possible to identify which individuals are *C. procera*.

Andrew Batty hopes to make a return trip to repeat the process with any additional *Caladenia* leaves newly evident.

Once individuals have been positively identified as *C. procera*, they will be stored in pots and seed will be collected. Some of the plants will be kept until a translocation proposal has been developed and approved. In the appropriate season they will then be translocated back into the wild.

For further information Gillian can be contacted on (08)9405 5157 or email gillians@calm.wa.gov.au

(Continued from page 6)

the wild population of this species has been lost as a consequence of this stress event. Due to difficulties with counting numbers of this clumping plant, the exact proportion of the population that has died cannot be accurately determined, however.

As an added insurance against extinctions, all of the Critically Endangered taxa that occur at this site have been translocated to nearby areas of degraded ironstone. Survival has been highly variable, however, and the long-term future of these taxa is not, as yet, assured.

CALM District staff and the mining company operating adjacent to the site will continue to carefully monitor the plant community, and will respond quickly to any future stress event in this extremely significant site.

For further information Val can be contacted on (08)9405 5169 or email vale@calm.wa.gov.au

INTERIM RECOVERY PLANS APPROVED

Another 12 Interim Recovery Plans, including 10 for flora and two for TECs have been approved by CALM's Acting Director of Nature Conservation. Some of these plans have been updated to include new information.

No	Recovery Plan	author/s
183	Red Snakebush, *Hemiandra gardneri*	Gillian Stack, Gina Broun
184	Cumquat eremophila, *Eremophila denticulata* subsp. *trisulcata* ms	Mike Fitzgerald, Ryan Butler, Andrew Brown
185	Scaly-leaved Featherflower, *Verticordia spicata* subsp. *squamosa* **updated**	Gillian Stack, Alanna Chant, Gina Broun, Val English
186	Salt Myoporum, *Myoporum turbinatum* **updated**	Heather Taylor, Ryan Butler, Andrew Brown
187	Chiddarcooping Myriophyllum, *Myriophyllum lapidicola*	Julie Patten, Andrew Brown
188	Splendid Wattle, *Acacia splendens* (previously *Acacia* sp. Dandaragan)	Gillian Stack, Gina Broun, Val English
189	Scaly-Butt Mallee, *Eucalyptus leprophloia*	Gillian Stack, Gina Broun
190	Long Flowered Nancy, *Wurmbea tubulosa*	Rachel Meissner, Gillian Stack, Alanna Chant
191	Irwin's Conosylis, *Conostylis dielsii* subsp. *teres*	Alanna Chant, Gillian Stack, Val English
192	Small flowered Conostylis, *Conostylis micrantha* **updated**	Gillian Stack, Alanna Chant
193	*Melaleuca huegelii – Melaleuca systena* shrublands of limestone ridges (Swan Coastal Plain Community type 26a - Gibson *et al.* 1994) 2004-2009	Robyn Luu, Val English
194	Camaenid Land Snails of the East Kimberley 2005-2010	Kirsten Pearce

Translocation of threatened flora and fauna

Four translocation proposals have been approved since the last edition of *WATSNU*. Requests included an establishment of a seed orchard, a trial translocation and two extensions granted to previous proposals that were undertaken in previous years.

Species	Translocation details	Proponent
Leucopogon gnaphalioides *Persoonia micranthera*	Establishment of a seed orchard	Sarah Barrett, CALM South Coast Region, Albany
Potorous gilbertii, Gilbert's Potoroo (trial translocation)	Mt Gardner, Two Peoples Bay Nature Reserve to Bald Island Nature Reserve	Tony Friend, CALM Science Division
Acacia aprica *Acacia cochlocarpa* subsp *cochlocarpa* *Daviesia bursarioides* *Daviesia microcarpa,* *Dryandra ionthocarpa* subsp. *ionthocarpa* *Grevillea calliantha* *Grevillea batrachioides* *Lambertia orbifolia*	Extension of translocations undertaken between 1998 and 2002	Leonie Monks, CALM Science Division
Mt Lesueur Grevillea, *Grevillea batrachioides*	Extension to translocation undertaken in 2004	Gina Broun, CALM Moora District

Threatened Species & Communities Recovery Team Summaries of Annual Reports 2004

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 on progress in relation to recovery actions specified in Recovery Plans or Interim Recovery Plans. Reports received are forwarded to the Department's Corporate Executive and to the Conservation Commission and the summaries are reproduced below. Many of the reports received included very interesting and detailed information. Unfortunately there is not enough room here to include this detail. However full reports may be accessed in CALM's Library at Woodvale.

Geraldton District Threatened Flora & Ecological Communities Recovery Team Annual Report 2004
By A M Chant for the Geraldton District Threatened Flora and Threatened Ecological Communities Recovery Team

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. One species that was previously not known from any living plants (*Beyeria lepidopetala*) was relocated and two secure populations were surveyed. 21 new populations and subpopulations of 10 DRF taxa were surveyed (*Beyeria lepidopetala* 2 pops, *Caladenia bryceana* subsp. *cracens* 2 pops, *C. elegans* 1 pop, *C. hofmannii* 2 subpops, *Eremophila rostrata* 1 subpop, *Eremophila viscida* 3 pops, *Eucalyptus beardiana* 5 pops, *Eucalyptus blaxellii* 2 pops, *Grevillea bracteosa* 1 pop, *Wurmbea tubulosa* 2 subpops), and more extensive survey at some known populations has indicated populations are much larger than previously recorded (*Acacia imitans*, *Conostylis deilsii* subsp. *teres*, *Eucalyptus beardiana*, *Hybanthus cymulosus*, *Leucopogon marginatus*, *Stachystemon nematophorus*). This has resulted in several DRF having improved conservation status and information has been gained on distribution and habitat requirements.

Taxonomic work has been undertaken for several DRF which are recorded in disjunct populations in different habitats. This has included genetic work for *Eremophila rostrata* and *Eremophila microtheca* and morphological determination for *Stylidium coroniforme* and *Hypocalymma longifolium*, and for each determination is likely to separate them into different taxa.

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

Note:
(CR) = Critically Endangered
(EN) = Endangered
(VU) = Vulnerable

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* 2003 - 2008, *Pterostylis* sp Northampton 2003 – 2008, *Conostylis micrantha* 2004 – 2009, *C. deilsii* subsp *teres* 2004 – 2009, *Drummondita ericoides* 2003 – 2008, *Eremophila rostrata* 2002 – 2007, *Eremophila viscida* 2003 – 2008, *Gyrostemon reticulatus* 2002 – 2007, *Grevillea phanerophlebia* 2001 – 2004 and *Hypocalymma longifolium* 2001 - 2004, *Eucalyptus crucis* subsp. *praecipua* 2004 – 2009, *Stylidium coroniforme* 2003 – 2008, *Verticordia spicata* subsp *squamosa* 2004 – 2009, Threatened Ecological Communities - Plant Assemblages of the Moonagin System 2001 - 2006, Plant Assemblages of the Billeranga System 2001 - 2006.

Esperance District Threatened Flora Recovery Team Annual Report 2004
By Ryan Butler for Esperance District Threatened Flora Recovery Team

Progress has been made in the writing and implementation of 7 Interim Recovery Plans for Critically Endangered Species for the 2004-05 financial year.

There have been two meetings of the Recovery Team during this year – November 26th 2004 and April 15th 2005.

Fieldwork carried out over the last year has resulted in a DRF-Vulnerable species being nominated for downgrading to P4 and several Priority species being put up for removal from the list. Several other P1 species are currently being surveyed to determine a more suitable status.

Implementation of Wildlife Management Program No. 21 Declared Rare and Poorly Known Flora in the Esperance District has continued.

Interim Recovery Plans or Draft Plans for the following have been produced and are being implemented, *Lambertia echinata* subsp. *echinata 2001-2004*, *Daviesia microcarpa 1996-1999*, *Eremophila lactea 1999-2002*, *Myoporum turbinatum 2002-2007*, *Rhizanthella gardneri 2002-2007*, *Anigozanthos bicolor* subsp. *minor 2004-2009* and *Eremophila denticulata* subsp. *trisulcata* ms *2004-2009*.

Goldfields Threatened Flora Recovery Team Annual Report 2004
by Vanessa Clarke for the Goldfields Threatened Flora Recovery Team

Updated Interim Recovery Plans were written for *Eremophila virens* and *Myriophyllum lapidicola* in 2004. A full Recovery Plan was written for *Pityrodia scabra* over ten years ago and is due for revision in 2005, although this species is no longer recognised within this region. A full Recovery Plan is currently being written for *Tetratheca paynterae* subsp. *paynterae* ms by Portman Iron Ore Ltd (with CALM, Western Botanical and the Goldfields Threatened Flora Recovery Team) as part of a Ministerial condition for the Koolyanobbing Expansion Project.

Recovery actions have been undertaken for *Eremophila virens, Pityrodia* sp. Yilgarn (formerly *scabra*) and *Tetratheca paynterae* subsp. *paynterae* ms in 2004. These actions included monitoring and survey (*E. virens* & *P. scabra*) and survey, population demographics, genetic studies, seed collection, trial translocation and propagation trials (*T. paynterae*).

(Continued on page 10)

Moora District Threatened Flora Recovery Team Annual Report 2004
By Gina Broun for the Moora District Threatened Flora Recovery Team

Within the District there are 75 species of DRF, of which 27 are Critically Endangered, 21 Vulnerable and 27 are Endangered (IUCN red list categories). There are a further 303 Priority species and 7 TECs, of which 6 are ranked as Endangered and the other as Vulnerable.

The Recovery Team met in March and November 2004, its members having worked proactively towards conservation of threatened species and ecological communities throughout the year.

Actions included implementing a suite of recovery actions which included monitoring of known natural and translocated populations, surveying for 'new' populations, seed and propagule collection, translocation measures, genetic research, community education, liaison with land managers, delivery of DRF notification letters, procuring external funds for on-ground works, industry consultation, field trials and writing of IRPs.

At present there are 16 current IRPs for threatened flora species and 5 current IRPs for Threatened Ecological Communities that occur within the Moora District. There are a further 9 IRPs for flora species and one full Recovery Plan which are past their currency and require review. Each of these plans stipulates criteria for the recovery of the species or community, which aim to quantify the success or failure of the plan and its implementation. As the implementation of both IRPs and RPs are long term (i.e. 3 - 5 years), it is often not possible to quantify their success or failure on an annual basis. Where there have been observed increases or decreases in the number of individuals or known populations within 2004, these have been clearly stipulated within the Annual Report.

Albany District Rare Flora Recovery Team and Eastern Stirling Range Montane Heath & Thicket Recovery Team Annual Report 2004
By Sarah Barrett Albany District Rare Flora Recovery Team and Eastern Stirling Range Montane Heath & Thicket Recovery Team

The Albany District Rare Flora Recovery team met twice in 2004 on 7/4/04 and 3/12/04, field trips were incorporated into both meetings. The Eastern Stirling Montane TEC Recovery Team met once 25/8/04, this team also co-ordinates recovery actions for the 'Montane Mallee of the Stirling Range' TEC (Endangered).

Survey and monitoring

Forty to species of threatened 72 priority flora were surveyed or monitored in 2004 (approximately 315 population / site visits). Of these, 15 Critically Endangered taxa that were visited once to twice annually (80 site visits). Twenty-two new populations or sub-populations of threatened taxa (13 species) were located and 103 populations of priority taxa. These included new populations of the threatened species *Eremophila subteretifolia* at Lake Chidnup (CR), *Drakaea confluens* (CR) northwest Stirling Range National Park, *Tribonanthes purpurea* (VU) Camel Lake NR, *Chamelaucium* sp. Hamersley east of Hopetoun, *Orthrosanthos muelleri* Kamballup, *Darwinia wittwerorum* Hosteller Hills, *Lambertia fairallii* and *Banksia brownii* Yungemere Peak, *Conostylis misera* Stirling Range west of Chester Pass, *Laxmannia jamesii* Gull Rock, *Dryandra psuedoplumosa* private property, *Chordifex abortivus* City of Albany reserve.

Fencing for new populations of *O. muelleri* was completed in spring 2004 as well as fencing to link a roadside population of *Lambertia orbifolia* with remnant vegetation.

Survey for Priority 1 and 2 taxa is ongoing. *Grevillea pieroniae*, a Stirling Range endemic, was surveyed spring 2004.

Katanning District Threatened Flora Recovery Team Annual Report 2004
By Bethea Loudon for the Katanning District Threatened Flora Recovery Team

Several species were reviewed at the 2004 Threatened Species Scientific Committee (TSSC) meeting for changes to individual ranking/status: *Bentleya spinescens* downgraded to P4, *Eremophila veneta* downgraded to P4, *Acacia auratiflora* downgraded to VU, *Gastrolobium lehmannii* downgraded to VU, *Lechenaultia pulvinaris* downgraded to P4, *Caladenia melanema* upgraded to DRF- CR.

Seed was collected and stored at the Department's Threatened Flora Seed Centre (TFSC) for *Verticordia staminosa* subsp. *cylindracea* var. *cylindracea* (new population), *Adenanthos pungens* subsp. *pungens, Roycea pycnophylloides, Banksia oligantha* and *Goodenia integerrima;* as well as from the Priority taxa *Goodenia* sp. Lake King*, Pimelea halophila, Bentleya diminuta, Bossiaea cucullata, Daviesia lineata, Melaleuca sculponeata, Acacia undosa* and *Gastrolobium ovalifolium*. Seed was collected by the Flora Conservation Officer from *Drakaea isolata* and *Caladenia melanema* for research and storage at the Botanic Gardens and Parks Authority (Kings Park).

New populations located:

(EN) – one population of *Goodenia integerrima*, one of *Centrolepis caespitosa*, one of *Acacia depressa.*

(VU) – one population of *Verticordia staminosa* subsp. *cylindracea* var. *cylindracea*, one population of *Tribonanthes purpurea* and possibly one of *Diuris drummondii.*

(Priority Flora) – 5 of *Persoonia brevirhachis*, ~18 of *Grevillea newbeyi*, 5 of *Gastrolobium rigidum*, at least 3 of *Hakea brachyptera*, 7 of *Daviesia elongata* subsp. *implexa*, two of *Pimelea halophila*, 1 of *Acacia mutabilis* subsp. *incurva*, 3 of *Bossiaea divaricata*, 1 of *Grevillea prostrata*, 8 of *Daviesia uncinata*, 1 of *Eucalyptus microschema*, and 1 of *Acacia brachyphylla* var. *recurvata.*

Rare flora markers were erected for a number of Priority and DRF populations that had not been previously marked; all star picket markers delineating DRF populations replaced with the new standard Ezi-drive markers for safety reasons.

Interim Recovery Plans (IRPs) produced by Species & Communities Branch (S&CB) for *Anigozanthos bicolor* subsp. *minor, Banksia oligantha, Roycea pycnophylloides, Verticordia staminosa* subsp. *cylindracea* var. *cylindracea.* IRP's for *Conostylis seorsiflora* subsp. *trichophylla, C. rogeri* and *Acacia leptalea* are in draft. The *Adenanthos pungens* subsp. *effusus* and *Drakaea isolata* IRPs were updated. Funding to write and update these plans was provided by the Commonwealth for species listed under the Commonwealth *EPBC* Act.

Posters produced by Species & Communities Branch for *Anigozanthos bicolor* subsp. *minor* and *Banksia oligantha; Caladenia drakeoides* poster updated.

The production of a booklet of the District's DRF initiated by the Flora Conservation Officer. This booklet will be for the purposes of informing staff, community members, volunteers and other agencies assisting what the plants look like and where they grow. The final version will be an A5 size glossy laminated, spiral bound booklet containing pictures and descriptions of each species.

Funds were provided to a landowner to fence a large remnant containing *Acacia lanuginophylla* on their property.

Genetic analysis of *Verticordia staminosa* subsp. *cylindracea* was initiated to

(Continued on page 11)

Wagin Banksia *Banksia oligantha*
Photo: Bert & Babs Wells, CALM

determine the genetic difference, if any, between the two varieties.
Nature Reserve files and Wildfire Suppression Maps were updated with the locations of various populations of rare flora.
Katanning Herbarium specimens mounted and updated; Katanning District DRF database was updated for various species, species information filed.

Narrogin District Threatened Flora Recovery Team Annual Report 2004
By Marie Strelein and Greg Durell For the Narrogin District Threatened Flora Recovery Team

Threatened Flora recovery within the Narrogin District is a collaborative project between the Department of Conservation and Land Management (CALM), the Commonwealth Department of Environment and Heritage (through the NHT program) the Avon Catchment Council (ACC), the Southwest Catchment Council (SWCC), the Botanic Gardens and Parks Authority (BGPA) and the community.
CALM supports the program by providing both direct and indirect funding, including the full time employment of a Conservation Officer. Funds have 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 support 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 ten Critically Endangered flora (CR), eleven Endangered flora (EN) and sixteen Vulnerable Flora (VU) flora. All are Declared as Rare Flora under the *Wildlife Conservation Act* (*1950*). In addition, 213 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 2004 are:
A report summarising the *Darwinia carnea* (CR) translocation process from 1997 through to 2004 and assessing whether the translocation has met the aims outlined in the translocation proposal was completed in December 2004 by Leonie Monks. The report also makes recommendations for future management of the translocation sites.
Continued translocation of *Grevillea scapigera* (CR), with winter planting being carried out at the Corrigin Airstrip site and Hartley's site to improve genetic mix and add new clones. Planting was carried out by BGPA staff, CALM staff and community members from the Corrigin LCDC. BGPA staff also implemented seed predation and seed storage trials at the translocation sites. Root system and herbicide trials for better seedling establishment continue. Weeds such as **Romulea rosea*, **Arcotheca calendula* and **Gynandriris setifolia* were controlled. Plants raised from cryostored material produced good quality seed that has germinated. The resulting seedlings will be transplanted during 2005.
Further development of scientific investigations on *Rhizanthella gardneri* (CR) and its habitat requirements. A PhD student with the University of Western Australia's Ecosystem Research Group, CALM staff, local Land Conservation District Committee (LCDC) members and BGPA have been working together on this Underground Orchid Project. In the project's first year the group has progressed development of a proposal for habitat regeneration trials, constructed rabbit exclusion fencing, monitored habitat, designed and installed an information sign with assistance from local school groups and conducted genetic studies on the plant and its host. The orchid has also been propagated and one plant is expected to flower in 2005.
The translocation of *Symonanthus bancroftii* (CR) into two secure sites continued in partnership with the Bruce Rock LCDC and BGPA. In accordance with the approved Translocation Proposal, a total of 324 seedlings were planted at the Ardath translocation site. Site preparation was improved and approximately 50% of seedlings have survived compared with very low survival in the past. 1000 micro propagated seedlings are currently being produced for transplanting during 2005.
A new population of *Verticordia fimbrilepis* subsp. *fimbrilepis* (CR) was discovered in Hotham River Nature Reserve, Cuballing Shire.
A new population of *Banksia oligantha* (EN) was found on private property near Toolibin Townsite with 188 mature plants and a number of seedlings. The landholder has expressed an interest in selling this remnant for conservation purposes. The Narrogin District considers this a priority for land purchase.
A disused sandpit near a population of *Jacksonia quairading* ms (EN) in the Quairading Rifle Range Reserve was rehabilitated in April 2004. As it is a disturbance opportunist, up to 100 plants of this species now occur in the sandpit. Monitoring of this site will continue.
A new population of *Pultenaea pauciflora* (VU) was discovered on a road reserve in the Williams Shire by flora enthusiasts Greg and Maxine Marston of Boddington. The previously known populations are geographically separated, occurring near Narrogin and in Lupton's Conservation Park (Perth Hills) and this new population lies between these existing populations.
Three species of flora were added to the Narrogin District Declared Rare Flora List. These are: *Caladenia williamsiae* (CR), *Guichenotia seorsiflora* (CR), and *Muelleranthus crenulatus* (VU).

Merredin District Threatened Flora and Communities Recovery Team Annual Report 2004
By Joel Collins for the Merredin District Threatened Flora Recovery Team

The Merredin District Threatened Flora and Communities Recovery Team held one Recovery Team meeting in 2004; this was held on the 30th November at Merredin District Office
NHT funds were received through the Avon Catchment Council (ACC) for the Wheatbelt Region with Merredin District receiving funding for coordination and implementation of the rare flora management program.
Monitoring of thirteen species and two surveys were conducted during the period of August to December 2004.
Three Interim Recovery Plans were written and approved for the Merredin District.

(Continued on page 12)

Verticordia hughanii at Dowerin
Photo: Joel Collins

Successful translocation of *Acacia volubilis* and *Daviesia cunderdin* occurred on private property in the Shire of Tammin.
Propagation of species was carried out for the rare flora gardens at Dowerin and Goomalling.
Merredin District set up a Threatened Flora Display for the Wildflower Society of Western Australia State Conference held in Merredin in June 2004.

South West Region Threatened Flora and Communities Recovery Team.
by Kim Williams
The SW threatened flora and communities team again had a full year during 2004 with a number of notable events and challenging incidents keeping many of the members very busy.
Ironstone Workshop
One of the team highlights of 2004 was the Ironstone Workshop held in November. This was a two and half day field tour, seminar and workshop that reviewed approximately 8 years of recovery action progress associated with the Busselton Ironstone TEC. Each session of the workshop was well attended and included senior researchers from Science Division, S&CB, mining company reps, sub regional NRM reps and recovery team members. Priority tasks and recovery directions for the next 5 year period were identified. These were incorporated into an updated IRP for the community.
The mechanism of a "narrow focused" workshop exploring an individual community or genus of flora appeared to work very well and is under consideration by the team as an annual event.

Aquatic Root Mat Community 1-4 of Caves of the Leeuwin Naturaliste Ridge Recovery Team Annual Report 2004
by Kim Williams for the Leeuwin Naturaliste Aquatic Root Mat Community Recovery Team
2004 has seen the team progress on a number of fronts towards gaining a better understanding of the biology/ ecology of the root mat communities, the probable threats acting upon them and trialling some management options.
The team wishes to congratulate Stefan Eberhard on the completion and release of his PhD thesis "Ecology and Hydrology of a Threatened Groundwater-Dependent Ecosystem: the Jewel Cave Karst System in Western Australia".Stefan's investigations have provided new information on the extent and composition of some occurrences and direction for the team's major actions of the last year and we look forward to his continued support for many more.
The principle action undertaken by the team has been to trial prescribed burning to reduce rainfall interception by vegetation and surface leaf litter, thereby leading to increased soil water infiltration into the cave system and ergo into the pools supporting the root mat communities. This was undertaken in November 2003 in the 330 ha block of the Leeuwin Naturaliste National Park above the Easter/Jewel Tourist Cave system near Augusta. To determine change resulting from the burn, pre and post burn monitoring of cave water levels, soil moisture content and infiltration rates, leaf area index for vegetation cover, water quality parameters and fuel loads were undertaken.
While the burn achieved its fire management objectives, the outcomes in relation to cave hydrology were disappointing. The soil moisture monitoring revealed that although there was a slight increase (>5%) in the volume of water penetrating the top 0.5m of soil, at 1m depth there was no difference between the burnt and unburnt sites. Similarly the leaf area results showed no significant variation between burnt and unburnt sites. As a consequence and despite the observations of increased water droplets on the cave roof, the water levels in the cave pools did not increase. These results are best explained by the unfortunate fact that rainfall at the cave in the 12 months following the burn was the lowest on record at only 66% of the long term average. The team is now considering whether to repeat the experiment and/or modify the design to achieve a greater reduction in canopy cover and leaf litter.
Water levels at all 4 occurrences have again been monitored over 2004. All sites have continued to decline often to the lowest on record, necessitating repositioning of monitoring points, construction of deeper monitoring wells and leaving some root mat sites without water for extended periods. Levels in the easter/jewel system are estimated to be falling at a rate of 1cm per year. While definitive work to define the localised catchments is yet to be undertaken the team does not consider these declines to be linked to ground water abstraction, modified surface hydrology or competing land uses such as plantation forestry.
Another focus of the team members during 2004 has been to work within the regional natural resource management processes to embed recognition of the conservation priority of the root mat communities and other high value conservation assets within South West Regional NRM Strategy and NHT Investment Planning documents. This will result in the continuation of a modest budget to enable the team to continue with recovery actions in the 2005/06 year.
Primary tasks for the team in 2005 will be to finalise the aggregation, expansion and renaming of the community to reflect the increase in understanding arising from Stefan's work, commence investigation of local catchment issues and develop planning and land use guidelines to minimise potential impacts.

Sedgelands in Holocene Dune Swales Recovery Team Annual Report 2004
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.*
Since June 1996, the Sedgelands in Holocene Dune Swale Recovery Team coordinated the development and implementation of the Interim Recovery Plan. This report outlines the progress made in implementing the Interim Recovery Plan during January–December 2004, following the completion of the plan in May 2002.
Members of the team dealt with a series of issues in 2004 including areas that

(Continued on page 13)

contain the sedgeland community and are the subject of proposals for reservation or development.
Members of the Recovery Team have provided advice and recommendations with regard the possible reservation of areas of the community in Industrial Park 14 (IP14), Lot 17 Bakewell Drive, the next stage of the Port Kennedy Golf Course, Lark Hill, and other areas proposed for development. Negotiations are continuing.
The EPA Service Unit sought advice on the Scoping Document for IP14 from the Chair of the Team, and this was provided.
The Recovery Team have sought advice on buffers required to help maintain the hydrology of this community. This advice has been provided to decision making bodies such as the Department of Environment (DoE).

Toolibin Lake Recovery Team Annual Report 2004
by P. Lacey for the Toolibin Lake Recovery Team

Toolibin Lake is a wooded, seasonal wetland situated southeast of Wickepin in the Western Australian wheatbelt. The lake is a feature of the Toolibin Lake Nature Reserve that is managed by the Department of Conservation and Land Management. Toolibin Lake is recognised as a conservation area of international significance for migratory 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. The following information has been reproduced from the Recovery Plan:
Recovery Plan 5 principal goals
To conserve Toolibin Lake and its associated wildlife as a freshwater habitat.
To improve land use decision making and practice within the Toolibin Catchment so that land management:
Is sustainable, productive and profitable in the long term (over 100 years);
Reduces the current area of degraded land;
Favours conservation of local wildlife.
To demonstrate that, within a large catchment, it is possible to stabilise hydrological trends which if unchecked threaten land, water and biodiversity resources.
To demonstrate to other land managers in Australia methods of protecting their biodiversity, land, and water resources.
To develop mechanisms which lead to community ownership of Western Australia's natural resources including management problems and their solution.
Recovery Objective
The objective of the Recovery Plan is to ensure the long-term maintenance of Toolibin Lake and its environs as a healthy and resilient freshwater ecosystem suitable for the continued visitation and breeding success by the presently high numbers and species of waterbirds.
Recovery Approach
To achieve this objective it will be necessary to restore the catchment of Toolibin to a hydrological condition which conserves the Lake and its environs. Establishing sustainable, high water-use agriculture within the catchment is crucial to attain this goal.
Therefore strategies for recovery of Toolibin Lake require the integration of active management and rehabilitation of the lake, associated reserves, and nearby agricultural lands. The major cause of deterioration of the Lake is salinisation and waterlogging associated with a rising saline groundwater table. To enable the lake to survive and recover requires this process to be reversed to return the system to one that is a closer reflection of the historical hydrological regime. This can only be achieved through appropriate action at the level of the whole Toolibin Catchment.
While a solution at the catchment level is essential, emergency action, such as groundwater pumping, is required in the short term to maintain and improve Toolibin Lake until longer term strategies begin to take effect.

Lake Bryde November 2004 Photo: Darren Coulson

Lake Bryde Recovery Catchment Annual Report 2004
by Darren Coulson, Lake Bryde Recovery Catchment Officer

Significant delays in momentum have been experienced in the recovery catchment team during 2004, due to staff turnovers. A new Recovery Catchment Officer and Assistant Recovery Catchment Officer commenced work in June and July 2004 respectively.
Monitoring programs have been continued including groundwater depth, soil salinity, vegetation condition using multi-spectral imagery and installation of surface water flow gauges. Monitoring of the threatened ecological community of *Muelenbeckia horrida* subsp. *abdita* and *Tecticornia verrucosa* continued also. The two populations have remained stable during 2004.
The development of a rainfall – runoff model was completed along with accurate topographic surveys of major valley floor flow impediments. This information has been used for preliminary engineering design of surface water management structures on the valley floor.
Surface water management works on both crown land and private property have been the main focus of the recovery project during the reporting period. The development of valley floor surface water structures has progressed to completion of a preliminary engineering design and feasibility study undertaken by Maunsell Australia. An Environmental Impact Assessment of this preliminary engineering design is currently being completed and it is intended that the project will proceed with detailed design and construction of valley floor surface water engineering structures during 2005.
On ground works included revegetation with oil mallee species, remnant vegetation fencing, and private property surface water management engineering works, implemented as cost share agreements during 2004. The engineering works installed have been reviewed and cost share incentives will continue during 2005, however drought conditions have affected landholders ability to invest in landcare activities.
Having a full recovery team in place and a better understanding of hydrological processes, will enable the project to progress efficiently with further development of recovery strategies and

(Continued on page 14)

implementation of on-ground works.

Aquatic Root Mat Community of Caves of the Swan Coastal Plan Recovery Team Annual Report 2004
by Leigh Sage and Paul Brown for the Aquatic Root Mat Community of Caves of the Swan Coastal Plain (Yanchep) Recovery Team

The continuing decline of the Gnangara Groundwater Mound has caused the majority of the Yanchep National Park Cave streams and pools to dry. Of the approximately one hundred species associated with the Yanchep Cave Stream Tuart Root Mat Community, up to thirty species of invertebrate are only known from the Yanchep caves (though this number is to be revised following a proposed taxonomic study). It is likely that at least some of these species have become extinct. There is a strong possibility that many of the remainder will become extinct if the decline is not arrested.

Five of the six occurrences of the Critically Endangered 'Aquatic Root Mat Community of Caves of the Swan Coastal Plain (Yanchep)' have now completely dried up. Water Cave still has a pond of standing water, though this has substantially declined in the past years (Gerald Drummond, CALM, *pers comm.*). The ground water level is now over 1 metre below the floors of most caves.

The decline in groundwater levels is believed to be due to a combination of pine plantations reducing recharge, private abstraction for horticulture, public abstraction by the Water Corporation, and an extended period of dry climatic conditions.

Yanchep National Park staff have installed small in-cave watering systems in an attempt to sustain the occurrences but their health is dramatically declining. The systems have been updated several times since to improve their capacity and reduce the risk of failure.

Recent hydrological modelling indicates a natural rise in groundwater sufficient to re-establish cave streams is not likely to occur in the next ten years regardless of pine thinning, even if there is a return to wetter climatic conditions. Investigations and trials have been conducted by CALM, the Water Corporation and the Department of Environment over the last two years to develop a longer term strategy involving abstracting water from the west of the Park and piping it to each of the six occurrences for recharge to create a rise in groundwater sufficient to recreate the streams and pools supporting the community.

Annual monitoring undertaken by Dr Brenton Knott and Dr Andrew Storey of the University of WA (UWA) on behalf of the DoE (then the Waters and Rivers Commission) since the end of 2001 indicated that the health of the root mats had significantly declined, and the number and diversity of animals recorded was dramatically reduced.

The Recovery Team, established in 1997, has undertaken a number of recovery actions in 2004 for the community, based on the Interim Recovery Plan. The key strategies this year are:

To complete the fourth of the rewatering trials in Crystal Cave. Based on the positive results of the rewatering trail to prepare for the full-scale recharge scheme (the 'Yanchep Caves Recovery Project'), gain the $1.15M funding and successfully develop the main bore for the project.

To upgrade the current small in-cave watering systems and trial remote camera systems.

To commission UWA to undertake a pilot stygofauna survey and a preliminary taxonomic review of the root mat invertebrate fauna.

CALM has undertaken a strategic prescribed burning program within the National Park as outlined in the Yanchep National Park Management Plan. Unfortunately, on 26 December 2004 a large wildfire burnt 70% of the National Park and over all caves containing the root mat communities. Extensive rehabilitation and monitoring work is programmed for 2005.

CALM received an $80,000 NHT2 grant for the root mat TEC for 2003/04 and 2004/05.

Western Swamp Tortoise Recovery Plan Annual Report 2004
by Lyndon Mutter, Gerald Kuchling, Andrew Burbidge, Dean Burford, Jacqui Maguire, and Rod Martyn for the Western Swamp Tortoise Recovery Team

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 included:

Eighteen captive bred tortoises were released into the north west swamp at Mogumber Nature Reserve (including 10 survivors from the 2002 fire that had been recovering at the Perth Zoo) in August 2004. No tortoises were released at Twin Swamps or Ellenbrook Nature Reserves in 2004.

significant event was 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 in November 2004. 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.

Midland Brick have agreed to transfer the portion of their land containing existing Western Swamp Tortoise habitat for inclusion into the Ellen Brook Nature Reserve as one of their commitments for the environmental management of a clay mining project (not located near the Western Swamp Tortoise Nature Reserves). It is expected the transfer will be completed in 2005.

Perth Zoo currently holds 182 tortoises comprising 23 breeding males, 23 breeding females and 136 other tortoises comprising hatchlings, juveniles, sub-adults and non-breeding adults. Forty-six hatchlings were obtained in 2004 from eggs laid in 2003.

The Friends of the Western Swamp Tortoise Group was initiated with support from CALM, WWF and the Ellen Brook Catchment Group. The Friends Group now have a representative on the Recovery Team. The Group undertook a range of initiatives including the installation of artificial aestivating tunnels, habitat rehabilitation and revegetation works, educational activities, development of interpretational signage and materials, and promotion of the Recovery Program.

Positive negotiations were held with the Westralian Airports Corporation regarding investigating the suitability of wetland areas within a zone designated for conservation at the northern portion of Perth Airport land for translocation of tortoises. Investigations are proposed over winter 2005 to assess the suitability for translocation of tortoises and to establish whether artificial hydrological maintenance is required.

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

Groundwater was pumped to north west swamp in Twin Swamps Nature Reserve during winter 2004, as winter rains were insufficient to fill the swamps. The volume pumped was 5525kL.

A rat control program at Twin Swamps Nature Reserve was expanded in 2004 with a further 60 stations installed.

(Continued on page 15)

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 60 artificial aestivating tunnels were installed at Mogumber and 60 tunnels were installed at Twin Swamps Nature Reserve with the assistance of the Friends of the Western Swamp Tortoise to encourage tortoises to aestivate below ground and reduce the risk of being killed in a wildfire.
In 2004 another possible translocation site at Moore River Nature Reserve was investigated. This site shows significant promise, although some habitat manipulation may be required to make it suitable for the tortoise. More detailed investigations and monitoring will be undertaken in 2005 to ascertain its suitability as a translocation site and the feasibility and environmental acceptablity of undertaking any habitat modification.
There are a number of issues of concern, discussed below, for the recovery program to address over the next three years.
Areas of habitat are becoming increasingly arid, particularly at Twin Swamps Nature Reserve, where water supplementation is now required each winter to support the tortoise. The rate of bore production has decreased with a declining regional groundwater level. Some adult translocated tortoises are known to be laying eggs, but no hatchlings have been recorded at Twin Swamps to date. It is likely that hatchlings are perishing after hatching, prior to the swamps filling with winter rains. Artificial supplementation will be started earlier in the season to determine if this assists hatching survival. There is a need for a major hydrological study at Twin Swamps Nature Reserve, and consideration of future supplementation requirements.
Given the vulnerability of existing habitats, the Recovery Team considers there is a need to have five established populations to secure the species future. The lack of suitable habitat is of concern. The potential fourth site identified for translocation at Moore River Nature Reserve requires further investigation. Hydrological modification may be required. A potential fifth site at Perth Airport requires investigation. This site may also require water supplementation to sustain the tortoise. Significant management costs to establish the populations, maintain suitable habitat, and control predators are likely.
The Ellen Brook fox proof fence requires replacement and the new section of habitat being transferred to the reserve by Midland Brick will require fox proof fencing.
Monitoring and research requirements are increasing as the new translocation sites are established. This monitoring and research is critical to address issues requiring adaptive management.
To achieve recovery an increase in funding is required for the next three years. Additional funding is being sought from both the Commonwealth and State Governments for this period.

Carnaby's Black Cockatoo Recovery Team Annual Report 2004
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.
Cheryl Gole (Birds Australia) and Raquel Carter (TSN/WWF) both resigned from the Recovery Team during the year because of changes in jobs. The Recovery Team thanked them both for their hard work over several years and for substantial input to the recovery program.
The Carnaby's Black Cockatoo Recovery Project, being implemented by the Project Officer Ms Leonie McMahon (employed by Birds Australia WA), was funded for the first nine months of this year by the Lotteries Commission WA. Late in 2004, the recovery team was successful in obtaining funding to continue and expand the project for another three years through a Cross Regional NHT project with Northern Agricultural Council as the lead group.
This new project, with the likelihood of three years' funding, continues to provide a major thrust for implementation of recovery actions. However, because not all of the funds sought were granted, a major planned sub-project in Swan Region and very significant extra effort in other regions (represented by South West Catchment Council and South Coast Regional Initiative Team) will only be possible if new funds can be obtained. The Recovery Team and Project Officer are continuing to seek opportunities to fund parts of the project that are not currently funded. This new emphasis on liaising with NRM groups and other potential funders to support the project through their investment strategies and to source on-ground funding represents a significant shift in the way the project operates.

Geocrinia Recovery Team Annual Report 2004
By Kim Williams for the Geocrinias Recovery Team
During 2004 the focus of the *Geocrinia* Recovery Team continued to monitor for change in the larger *alba* populations, post fire survival of McCleod Creek populations and double checking sites recorded as absent for 3 or more years. A secondary objective enabled by the filling of long standing vacancies in the Blackwood District nature conservation team was to increase the number and skill levels of staff available to participate in recovery program.
This seasons' population monitoring resulted in 70 of the 110 sites being monitored with 53 sites recorded as having calling males present. Seventeen sites checked yielded no calls. Of note, calling was recorded at 3 sites without calling in 2003; of these, site GA-TAN-A-98 had not registered calls since 1998. No new sub-populations were found this season.
The two translocation sites (GV7a and GV7b) established in 2000 in Adelaide Creek were monitored on multiple occasions during the year. It was with disappointment that we did not observe any activity at GV7a where for the preceding three years a single male has been calling from same location (within a metre of previous records).
Site GV7b first recorded in 2003, with 5 calling males across the area where egg mass were placed reduced to 3. This was also disappointing as it was hoped that additional frogs from the translocation would have reached sexual maturity and begun to call. The loss of two individuals would not normally be of concern but the implications for the success of this population are compounded by having such a small founding number. Further translocations are required if this population is to become sustainable. This work will be undertaken in 2005. Despite these results the technical success of the egg mass methodolgy provides the impetus for using the process to attempt to re-establish some of the *G.alba* sites that have declined over the past 10 years.
Monitoring continued at the Feb 2002 McCleod Creek private property wildfire site adjacent to the Leeuwin Naturaliste National Park. Four monitoring subpopulations were burnt in the fire (GA24b, 24c, 24d and GA55a). The impact of the fire has been consistent with the outcomes of other fire events – a dramatic decline in the sea-

(Continued on page 16)

son immediately following the event followed by recovery. The rate of recovery is extremely variable both between years and between sites even within a creek system. For example site GA24d, one of the larger subpopulations in this part of McCloud Creek with average calling male count of 50+ in 1998 plummeted to 0 in 2002 after the fire, 1 in 2003 and 2 in 2004 – ie a significant impact which at the current rate of recruitment will take another 5 – 10 years to recover. However some 380m upstream site, a small site GA24b with 11 calling animals in 1999, dropped to 1 in 2002, 3 in 2003 and 4 in 2004. It is expected that this site will be at its preburn levels in the coming season. These observations raise many questions about what factors influence the rate of recovery and how they operate across small and micro scale catchments.

A feature of 2004 and in marked contrast to the past 7 years, was the absence of major disturbances (wildfires, flooding, soil disturbance) at any of the Geocrinia sites. However a potentially greater threat looms in the Water Corporations proposal to annually abstract 45 GL water from the Southern Yarragadee groundwater area near the Blackwood River approximately 10 km NE of *G.vittellina* sites. Team members have participated in various discussion sessions and meetings to provide advice to the proponents. One of the key recommendations with regard to *Geocrinia* management has been the establishment of monitoring bores close to the frog and other high value groundwater dependent ecosystems to determine the connection between ground water and surface aquifers and the implications of abstraction.

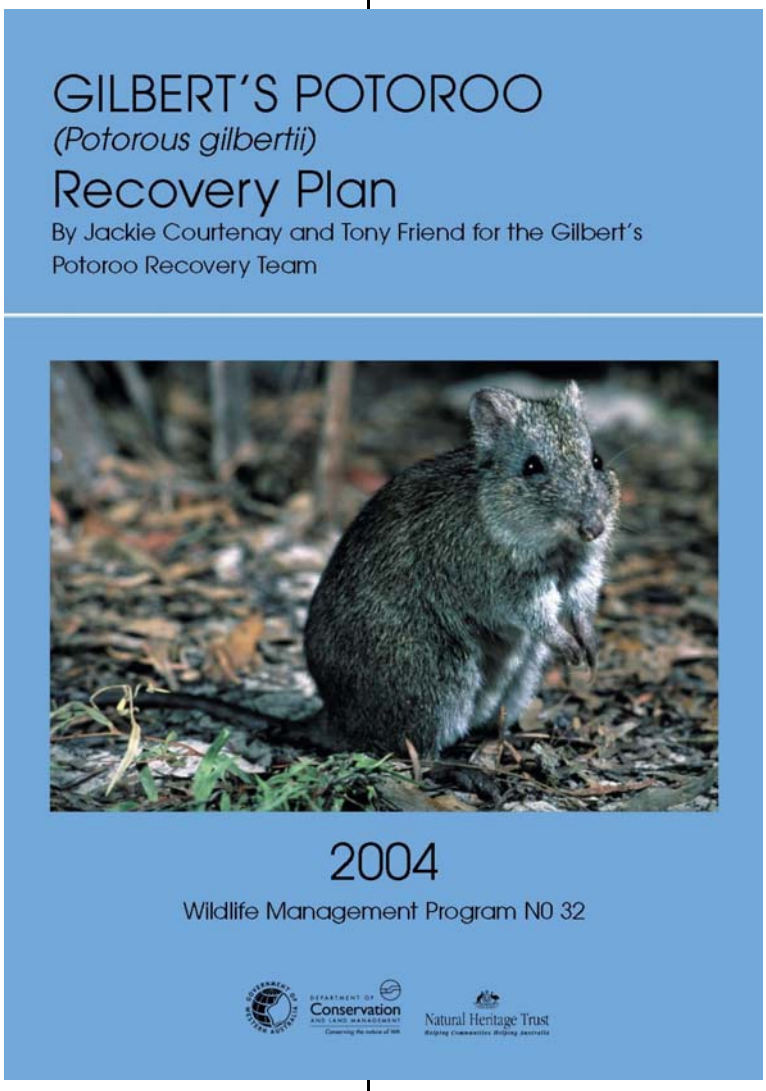
Team membership has declined during the 001-2004 period with a number of significant changes. There is no longer representation from the Shire Council, Shire Officers, Community Conservation groups, Landholders or Science Division. During 2005 approaches will be made to the Augusta Margaret River Shire concerning renewing their participation in the team. Similarly the team recognises that the absence of landholder representation is a weakness and attempts will be made to address the situation. Consideration will be given to how the team can better coordinate with and inform the local subregional Natural Resource Management organisations such as Cape to Cape Catchments Group on Geocrinia matters.

(Continued from page 3)

Potoroo

- Enhance the breeding capacity of Gilbert's Potoroo
- Extend the range of Gilbert's Potoroo through translocation of animals to suitable habitat outside Two Peoples Bay (see Translocation of flora and fauna this issue)
- Secure ongoing funding for the implementation of the Recovery Actions

The implementation of these actions will be coordinated by the Gilbert's Potoroo Recovery Team, which currently consists of representatives from CALM, the Threatened Species Network, World Wide Fund for Nature (WWF); a consultant wildlife biologist (author of the plan); Gilbert's Potoroo Action Group; Perth Zoo; Edith Cowan University's Applied Science Department; a retired veterinarian; a South Coast community member and a Research Scientist representing the Royal Zoological Society of South Australia.



Western Australian recovery plans adopted under the *EPBC* Act

A total of 31 WA Interim Recovery Plans have recently been adopted under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The process included public listing on the Department of Environment and Heritage website, calling for public comments before final approval.

Recovery Plan	date of adoption
Hughan's featherflower, *Verticordia hughannii*	12/11/2004
Granite Featherflower, *Verticordia staminosa* subsp. *cylindraceae* var *cylindraceae*	12/11/2004
One-headed Smokebush, *Conospermum densiflorum* subsp. *unicephalatum*	12/11/2004
Three Springs Daviesia, *Daviesia bursarioides*	12/11/2004
Dandaragan Mallee, *Eucalyptus dolorosa*	12/11/2004
Spiral Flag, *Patersonia spirafolia*	12/11/2004
Paynes Find Mallee, *Eucalyptus crucis* subsp. *praecipua*	12/11/2004
Moresby Range Drummondita, *Drummondita ericoides*	12/11/2004
Meelup Mallee, *Eucalyptus phylacis* **updated**	22/03/2005
Large-fruited Tammin Wattle, *Acacia ataxiphylla* subsp. *magna*	22/03/2005
Hairy-Stemmed Zig-Zag Wattle, *Acacia subflexuosa* subsp. *capillata*	22/03/2005
Tangle Wattle, *Acacia volubilis*	22/03/2005
Matted Centrolepis, *Centrolepis caespitosa*	22/03/2005
Mountain Villarsia, *Villarsia calthifolia*	22/03/2005
White-flowered Philotheca, *Philotheca basistyla*	22/03/2005
Northampton Midget Greenhood, *Pterostylis* sp. Northampton **updated**	22/03/2005
Whicher Range Dryandra, *Dryandra squarrosa* subsp. a*rgillacea*	22/03/2005
Eneabba Mallee, *Eucalyptus impensa*	22/03/2005
Swamp Starflower, *Calytrix breviseta* subsp. *breviseta* **updated**	22/03/2005
Blue Babe in-the-cradle Orchid, *Epiblema grandiflorum* var. *cyaneum* **updated**	22/03/2005
Cadda Road Mallee, *Eucalyptus balanites*	22/03/2005
Red Snakebush, *Hemiandra gardneri*	22/03/2005
Cumquat eremophila, *Eremophila denticulata* subsp. *trisulcata* ms	22/03/2005
Scaly-leaved Featherflower, *Verticordia spicata* subsp. *squamosa* **updated**	22/03/2005
Salt Myoporum, *Myoporum turbinatum* **updated**	22/03/2005
Chiddarcooping Myriophyllum, *Myriophyllum lapidicola*	22/03/2005
Splendid Wattle, *Acacia splendens* ms (prev *Acacia* sp. Dandaragan)	22/03/2005
Scaly-Butt Mallee, *Eucalyptus leprophloia*	22/03/2005
Long Flowered Nancy, *Wurmbea tubulosa*	22/03/2005
Irwin's Conosylis, *Conostylis dielsii* subsp. *teres*	22/03/2005
Small flowered Conostylis, *Conostylis micrantha* **updated**	22/03/2005

JOHN BLYTH'S RETIREMENT ~ Val English

John Blyth joined the Department of Conservation and Land Management in 1985, as Scientific Advisor to Barry Wilson (the then Director of Nature Conservation).

In 1992, John joined the WA Threatened Species and Communities Unit (WATSCU) which was set up by Dr Andrew Burbidge to coordinate the recovery of the State's most threatened species and communities. John began work on setting up procedures to identify and conserve threatened ecological communities (TECs) and spent several years overseeing the development and application of these procedures. In 2002, John became Acting Manager of WATSCU.

Recently, John spent much of his time dealing with issues surrounding the implications of many development proposals for threatened species and communities.

John will be returning to CALM in his retirement, to spend a few days a week as a Research Fellow working on the things that interest him most, including threatened birds and invertebrates.

CALM's Executive Director, Keiran McNamara with Gordon Wyre, A/ Director of Nature Conservation and Andrew Burbidge (ex Director of WATSCU) now Post Research Fellow, CALM with John Blyth at his retirement Photo: Val English

To access information on the any items listed below go to CALM's Naturebase

http://www.calm.wa.gov.au/plants_animals/watscu/index.html

- Threatened Flora Management Plans
- Listing of Threatened Species
- Listing of Threatened Ecological Communities
- Critically Endangered Flora
- Priorities for Recovery
- Scientific Research (see Science Matters)
- Recovery Planning and Implementation
- Threatened Ecological Community Criteria
- WATSNU Licencing - Flora
- Licencing - Fauna
- General Definitions

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The fungi *Colus pusillus* taken in a newly located occurrence of a TEC Photo: Val English