

The Newsletter of the Western Australian Threatened Species & Communities Unit

The Mogumber Bush Cricket

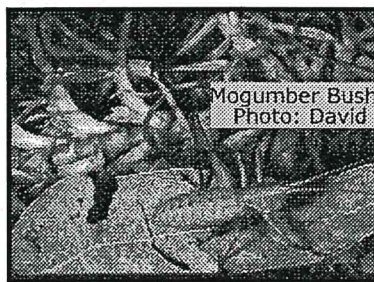
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The Mogumber Bush Katydid *Throscodectes xederooides* (also known as the Mogumber Bush Cricket) was known only from a single specimen from near Mogumber, Western Australia. It is listed as threatened pursuant to the Western Australian *Wild-life Conservation Act 1950*.

In 1997, the Mogumber Bush katydid was ranked as 'Critically Endangered' by the Western Australian Threatened Species Scientific Committee, pursuant to IUCN Red List Criteria.

In 1998, the WA Department of Conservation and Land Management (CALM) applied for matching funding from the Natural Heritage Trust to carry out a search for the species, and if warranted, prepare an Interim Recovery Plan for its protection. The Commonwealth Minister for the Environment approved funding and a Financial Agreement was entered into between Environment Australia and CALM in February 1999.



Mogumber Bush Cricket
Photo: David Rentz

CALM let a contract to The University of Western Australia's Zoology Department so that Associate Professor Win Bailey of UWA and Dr David Rentz of CSIRO Division of Entomology, Canberra, could carry out the searches for the species. Dr Rentz is the acknowledged Australian expert on this group of katydid.

Drs Rentz and Bailey carried out fieldwork in October - November 1999. You Ning Su, Graduate Student, Australian National University, Canberra, and Kar Lee Heap, The University of Western Australia assisted them.

The fieldwork showed that the Mogumber Bush Katydid was common within a small geographic range and occurred at several localities, including areas

reserved for nature conservation. Given this new information, the species no longer meets IUCN Red List Criteria for Critically Endangered, and may not warrant listing as a threatened species. The report will be considered by the WA Threatened Species Scientific Committee during 2000, who will recommend whether the species should continue to be listed.

Under the circumstances, the preparation of an Interim Recovery Plan is not necessary at this time.

The study team also searched for several other species of presumed threatened or rare bush katydids and located some, adding to information on these species.

In 1997, the Mogumber Bush katydid was ranked as 'Critically Endangered' by the Western Australian Threatened Species Scientific Committee, pursuant to IUCN Red List Criteria.

Managing the site of two Critically Endangered Orchids ~ Val English

The Northampton midget greenhood (*Pterostylis* sp. Northampton) is only known from four small populations growing in seasonally wet remnant heathland north west of Northampton in an area that has been highly cleared for agriculture. The species occurs with two other Declared Rare orchids, the elegant spider orchid (*Caladenia elegans* ms) and Hoffman's spider orchid (*Caladenia hoffmanii* subsp. *hoffmanii* ms) at one site, and with *Caladenia elegans* ms only, at another two sites.

Caladenia elegans is also Critically Endangered and unfortunately, the site this orchid shares with *Pterostylis* sp. Northampton, and *Calade-*

nia hoffmanii subsp. *hoffmanii* ms is highly threatened. The site is located in a gully that forms part of a wide road reserve sandwiched between farm land that is mostly cleared. Water running off the farmland and the road carries weed seed, fertilisers and silt, and is causing major erosion problems where the orchids occur.

Possible methods of managing this difficult site have been discussed between the adjacent land holders, the shire that manages the road reserve, CALM District staff, and WATSCU. Possibilities include purchasing buffer areas that can then be revegetated or otherwise used to control water flow into the road reserve, lining or diverting erosion

channels, and diverting the road. High cost precludes most of the options discussed so far. Currently, the highest priorities are continuing discussions with the shire and adjacent land holders with regard management of the site, weed control, searching for additional populations in more intact habitat, and research into methods of propagating the orchids with a view to possibly translocating populations into more secure sites. It remains to be seen if the challenging problems at the site can be overcome, and the habitat maintained for these two special orchids in the long term.

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Eremophila vernicosa rediscovered ~ Andrew Brown

While surveying priority areas of remnant vegetation on private land for the Marchagee Catchment Group (Coorow LCDC) in July 1999 Stephen Davies discovered over 200 plants of this previously presumed extinct species which had not been seen for over 60 years. Plants ranged from seedlings less than 10 cm high to mature individuals over 2 m tall. Plants were in flower on the 29th of July and were fruiting in November. The area has been fenced from stock for some years and is in very good condition.

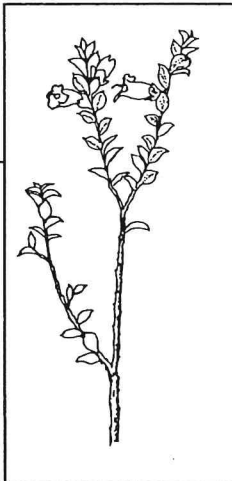
The habitat in which *Eremophila vernicosa* was rediscovered was mallee woodland over heath. Soil was reddish gravel, grading into granite rocks.

William Blackall originally collected the species in 1938, from near Kalannie some 80 km to the

east of the re-discovery area and was also thought to have made a further collection between Wubin and Dalwallinu the same year. When looking at Blackall's collecting book, Steve Davies and Neville Marchant discovered that the technician who had mounted the specimens had misread Blackall's notebook and that both specimens had in fact been collected near Kalannie. The Wubin Dalwallinu note referred to an entirely different plant altogether.

It is possible that *Eremophila vernicosa* still occurs at other sites between Kalannie and Marchagee and further surveys of remnant bushland in that area may prove fruitful.

Eremophila vernicosa is an erect



shrub to 2 m high with dark green, thick, glossy, elliptic leaves that are approximately 6 mm long and 3 mm wide. These leaves have a characteristic spiny tip that curves strongly downward. The small 1 cm long by 5 mm wide flowers are lilac-blue in colour. The outside of the floral tube and both sides of the floral lobes are covered in dense flattened hairs. This latter characteristic is not found in any other species of poverty bush (*Eremophila*). The species is commonly known as resinous poverty bush due to the thick resinous coating on the leaves.

The owners of the land on which the species has been rediscovered are to be commended as *Eremophila vernicosa* would still be on the Presumed Extinct list if it had not been for their foresight in retaining areas of remnant vegetation on their property.

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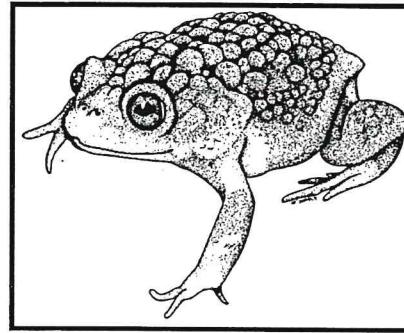
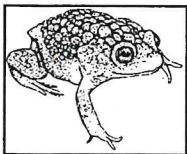
The SUNSET FROG ~ working towards the preparation of a recovery plan

The Sunset Frog, *Spicospina flammocaerulea* is known only from a small area near Denmark, Western Australia. It is listed as threatened pursuant to the Western Australian *Wildlife Conservation Act 1950* and is included in 'Part 2 - Species that are vulnerable' of 'Schedule 1 Listed Species' of the Commonwealth *Endangered Species Protection Act 1992*, having recently been transferred from 'Part 1 - Species that are Endangered'.

Concern has been expressed that the Sunset Frog is declining and that it may again meet IUCN Red List Criteria for Endangered.

The Department of Conservation and Land Management (CALM) applied for matching funding from the Natural Heritage Trust to develop information for the preparation of a recovery plan for the species. An amount of \$25,000 was approved from the Trust to be spread over two years, with the project to be completed in January 2001.

CALM contracted Dr Dale Roberts, Zoology Department, The University of Western Australia to carry out important research on the species. Dr Roberts completed a report covering scope item: Developing techniques for estimating population size and methods for rapid survey. During 1999 he also developed data towards estimating populations and examine trends in population size at the localities and defining range and conservation status using rapid survey techniques.



The Sunset Frog is now known from 13 localities, some of which are on publicly-owned land and other of which are on private property.

A Recovery Team for the Sunset Frog is planned to be set up in 2000, to oversee the preparation of a recovery plan for the species.

YORKRAKINE TRAPDOOR SPIDER ~ not extinct ~ just rare?

The Yorkrakine Trapdoor Spider *Kwonkan eboracum* was known only from a single site from near Yorkrakine Rock, Western Australia. It is listed as threatened pursuant to the Western Australian *Wildlife Conservation Act 1950* and has been nominated for listing in 'Part 1 - Species that are endangered' of 'Schedule 1 Listed Species' of the Commonwealth *Endangered Species Protection Act 1992*, via a proposal from Western Australia that it be listed in the ANZECC List of Threatened Fauna.

In 1997, the Yorkrakine Trapdoor Spider was ranked as 'Critically Endangered' by the Western Australian Threatened Species Scientific Committee, pursuant to IUCN Red List Criteria.

In 1998, the WA Department of Conservation and Land Management (CALM) applied for matching funding from the Natural Heritage Trust to carry out a search for the species, and if warranted, prepare

an Interim Recovery Plan for its protection. The Commonwealth Minister for the Environment approved funding and a Financial Agreement was entered into between Environment Australia and CALM in February 1999.

CALM arranged for the Western Australian Museum to carry out searches which were made of areas likely to contain populations of the species. Scientists who carried out fieldwork during 1999 were Dr Mark Harvey, Western Australian Museum, and Dr Barbara York Main, Zoology Department The University of Western Australia.

No populations of *Kwonkan eboracum* were located during the main survey. However, additional trapping in narrow roadside vegetation at the type locality has since revealed that the species is not extinct, although it may be extremely rare. Further work is needed to clarify the status of the population in this remnant.

RECOVERY TEAM ANNUAL REPORTS 1999

Annual Reports of the 1999 Recovery Teams have been submitted to CALM's Corporate Executive and where Natural Heritage Trust funding is provided, to Environment Australia.

Summaries of these reports are reproduced as follows:

Full reports are lodged in CALM's Wildlife Sciences Library at Woodvale

Narrogin District Threatened Flora Recovery Team

by Greg Durell and Kim Kershaw

Highlights include:

A new population of *Verticordia fimbrialepis* subsp. *fimbrialepis* (CR) was discovered.

A new population of *Dryandra ionthocarpa* (Jingaring variant) (EN) was discovered.

An experimental research germination trial was carried out on *Acacia insolita* subsp. *recurva*.

Two successful funding applications were made to World Wide Fund for Nature Australia under the 1999 Community Conservation Grants for Threatened Species and Communities on behalf of the Central South Naturalists Club. These were for surveys looking for the Presumed Extinct *Darwinia* sp. Bending and Translocation of the Critically Endangered Narrogin Bell (*Darwinia carnea*).

Five new populations of *Lasiopetalum rotundifolium* (EN) were discovered (awaiting confirmation from the WA Herbarium).

A new population of *Banksia cuneata* (CR) was discovered.

Two new populations of *Thomasia montana* (VU) were discovered (awaiting confirmation from the WA Herbarium).

Roycea pycnophylloides (CR) was found on Kondinin Salt Marsh Nature Reserve following the discovery of a specimen in the WA Herbarium.

The translocation of *Darwinia carnea* (CR) into two secure sites commenced in partnership with the Central South Naturalists Club.

Surveys for the Presumed Extinct *Darwinia* sp. Bending at Bending Nature Reserve and North Karlgarin Nature Reserve (three trips) with the Central South Naturalists Club led to the discovery of a new populations of *Acacia arcuatilis* (P2), two new populations of *Schoenus calcatus* (P3), two new populations of *Acacia inophloia* (P3), a new population of *Microcorys cephalantha* (P1), two new populations of *Acacia deflexa* (P2). A number of other possible priority flora discoveries were made but still await confirmation from the WA Herbarium.



Matchstick Banksia Recovery Team

by Greg Durell

Funding from the NHT Endangered Species Program and the Department of Conservation and Land Management continued in 1999, allowing the continuation of recovery actions for the long term viability of eleven populations of the Critically Endangered Matchstick Banksia (*Banksia cuneata*). Recovery actions included:

Maintaining existing rabbit proof fences

1080 baiting for rabbits and rabbit eradication.

Monitoring numbers and condition of all *B. cuneata* populations on an annual basis for comparison with 1994 and 1996 population studies and maintain seed in storage.

Studying *B. cuneata* seed germination and survival.

Central Forest Region Threatened Flora and Communities Recovery Team

by Kim Williams and respective
Project Officers

The Central Forest Region Threatened Flora and Communities Team has had a very busy year achieving a number of milestones for which it can be pleased. Highest amongst these is the completion of the Department's Regional corporate databases to better integrate and make accessible the information contained in the plan. Project officers can be equally pleased about the substantial progress made towards implementing the 17 Interim Recovery Plans for critically endangered species and ecological communities within the Region.

Highlights include:

- finding of four new populations of *Grevillea elongata* following intensive searching of some 189 ha of six year old plantation by 24 CALM and community volunteers;
- the discovery of one new and a large increase in the size of existing populations of *Boronia exilis* including the discovery of a new species of *Boronia*;

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- the use of differential GPS to accurately map the occurrence boundaries of both threatened communities and critically endangered flora species and subsequent incorporation of the data into regional and district operational GIS systems; and
- the development of wildfire suppression procedures for all occurrences of critically endangered species and communities within the region.

The CFR Threatened Flora and Communities Team is responsible for the management and implementation of all threatened flora conservation works including the recovery actions for the 17 flora / community Recovery Plans or Interim Recovery Plans that are currently effective in the local region. The team met in June and November 1999.

Moora District Threatened Flora Recovery Team

by Robyn Phillimore and Val English

Western Australia's Department of Conservation and Land Management (CALM), ranks Declared Rare Flora into the categories Critically Endangered (CR), Endangered (EN) and Vulnerable (VU), using World Conservation Union (IUCN) Red List criteria and CALM's Ranking Policy No. 50. As at January 2000, 104 plant taxa were ranked as CR, 23 of which are located in the Moora District.

Interim Recovery Plans (IRPs) have been completed for ten of the 23 CR plant taxa in the Moora District, two have been published and 11 are in draft stage. These plans have been written following assessment of known information, and consultation with land managers and scientists. During preparation, draft copies are provided to relevant staff of CALM Regions and Districts, CALM-Science, Wildlife Branch, and the Western Australian Threatened Species and Communities Unit

(WATSCU). Relevant Shires, landowners and community groups are also consulted for input. Recovery actions being implemented as the Interim Recovery Plans are developed.

The Natural Heritage Trust's Endangered Species Program has provided funding towards the implementation of the Moora District Threatened Flora Management Plan. This draft Wildlife Management Program is undergoing a final edit before CALM's Corporate Executive and Ministerial approval is sought. Publication of the Plan is expected by the end of 2000.

Geraldton District Threatened Flora Recovery Team

by Sue Patrick

The 1999 report covers progress in the implementation of the Threatened Flora Management Plan for CALM's Geraldton District, from January 1999 to January 2000.

There were two meetings of the Recovery Team during the year and members have continued to contribute to survey work.

Work has been concentrated on completion of the draft of the Wildlife Management Program. However, eight days of fieldwork by a *Landscape* Expedition has resulted in survey of four populations of priority taxa, and several other populations have been surveyed by members of the Recovery Team.

The Threatened Flora Management Program for the Geraldton District has been completed apart from editing. The final draft has accounts of 37 declared rare flora, including two presumed extinct taxa. There are 118 priority one taxa, 80 priority two taxa and 66 priority three taxa, a total of 301 taxa, of which 264 are priority taxa, many requiring further survey.

Merredin District Threatened Flora Recovery Team

by Mike Fitzgerald and Karen Bettink

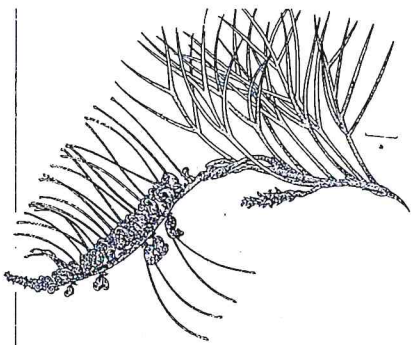
The following summarises activities throughout 1999:

- One recovery team meeting held.
- Resignation and then employment of a new Conservation Officer.
- New population of *Acacia lobulata* found by Marcelle Buist.
- Mail-out brochures developed by WATSCU distributed for *Acacia sciophanes*, *Grevillea dryandroides* subsp. *dryandroides* and *Drakonorchis drakeoides*.
- New population of *Acacia subflexuosa* subsp. *capillata* and significant numbers of new plants at existing population found by District staff.
- Anne Cochrane of CALM's Threatened Flora Seed Centre undertook a successful fire germination trial for *Cyphanthera odgersii* subsp. *occidentalis*.
- Successful recruitment of *Daviesia cunderdin* seedlings following an experimental burn by the WA Herbarium's Frank Obbens.
- Successful recruitment of seedlings from an extinct population of *Daviesia euphorbioides* using BankWest *Landscape* Visa Card funding.
- Translocation Proposal developed by Robyn Phillimore underway for *Grevillea dryandroides* subsp. *dryandroides*.
- Taxonomic name change for *Drakonorchis drakeoides*. New name is *Caladenia drakeoides*.
- Successful application for Bankwest *Landscape* Visa Card funding for habitat restoration of *Grevillea pythara*.
- Two new populations of *Myrio-*

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phyllum lapidicola were found during surveys by Andrew Brown (WATSCU) and Dave Bloomer (BGPA).

- *Biodiversity* newsletter completed by District staff.
- Partial funding for Wongan-Ballidu Threatened Flora Management Program secured from the Natural Heritage Trust.
- Continued liaison with other agencies including John Holland Contractors (representing Westrail), Wongan-Ballidu Shire, Tammin Shire and CBH.
- The revision and re-writing of an area-based recovery plan for all threatened flora in Merredin District was initiated.
- Interim Recovery Plans were developed for four taxa of Critically Endangered flora.



Toolibin Lake Recovery Team

by Amanda Smith

During 1999 efforts have concentrated on several major activities:

Ongoing management of the eight air displacement pumps on the western side of the lake, including the investigation of shock chlorination to treat iron-feeding bacteria build-up, and regular 'pigging' of the pipelines to remove build up. The drilling and casing of five new pumps to be installed in 2000 on the eastern side of the lake was also completed in 1999.

Continued work by external consultants on the digital model of Toolibin Lake, to determine the impact of various regimes of groundwater pumping on lakebed vegetation. A pump feasibility and design study was also partly completed in 1999. The results of these two projects will allow for the installation of the five additional pumps at Toolibin Lake in 2000.

The program to develop local species which are commercially prospective, and which meet biodiversity and land conservation needs, was continued in Toolibin Catchment in 1999. Infill of the Melaleuca Trial was completed, as well as a community tree planting day at Chadwicks Block, an area of farmland immediately north of the reserve system purchased under the Recovery Plan using State Salinity Action Plan funds. A subsidy for oil mallees was offered, with emphasis below the 320 m contour.

Well planned and executed revegetation and remnant protection programs continued in the catchment funded by individual landholders, Alcoa, and Natural Heritage Trust grants.

Albany District Threatened Flora and Communities Recovery Team

by Sarah Barrett

The Albany District Threatened Flora Recovery Team continues to coordinate the management actions arising from the Wildlife Management Plan for the Declared Rare and Poorly Known Flora in the Albany District (Robinson and Coates 1995) and Interim Recovery plans for individual threatened species. The Recovery Team now also coordinates the implementation of the Interim Recovery Plan for Eastern Stirling Range Montane Heath and Thicket Community, a Critically Endangered Plant Community.

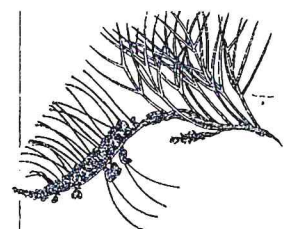
The project currently manages 73 Declared Threatened Flora in the Albany District which constitutes

22% of Western Australia's Threatened Flora. Fourteen of these are ranked Critically Endangered, 26 Endangered and 33 Vulnerable with priority management allocated to Critically Endangered species. 334 Priority taxa occur in the District and the project aims to assess the status of poorly known Priority 1 and 2 taxa.

One of the most significant threats to the flora of the District continues to be the plant pathogen *Phytophthora cinnamomi* which constitutes the major threat for some 19 of these species. Management of *Phytophthora*, in particular aerial phosphite application and monitoring, is an integral part of the Wildlife Management Plan.

Other key issues are:

- the need for ongoing monitoring of and additional survey for declared threatened species as well as Priority 1 and 2 species in the District with 918,195 ha of remnant vegetation of which 476,044 ha occurs in protected areas managed by CALM and 442,150 ha on Shire and Government reserves, vacant Crown land or private property. The remoteness and rugged terrain of parts of the Conservation Estate, such as in the Stirling Range and Fitzgerald River National Parks, can make survey and monitoring difficult.
- Inadequate knowledge of threatened flora distribution on remnant vegetation on private property
- lack of awareness and ownership in the community of Threatened Flora in the District and the threats posed to this flora.



Geocrinia Recovery Team

by Kim Williams

During 1999 the achievements of the Geocrinia Recovery Team included:

- the discovery of one new population of *G. alba*;
- confirmation of the persistence of another thought to be extinct
- the development of a new monitoring technique to determine fluctuations in the larger sized populations;
- an Honours student project investigating the biogeographical and land use history of a number of the sites for both species.

A second attempt to raise funding for the purchase of Location 83 was also commenced through an application for funds from the Natural Heritage Trust. The outcome will not be known until late in 2000.

The major disappointment during the year was again the postponement of the translocation of *G. vitellina* egg masses. A combination of staff commitments to a very busy spring fire season, the clearing of accumulated staff leave and the resource requirements of implementing the new monitoring technique resulted in us being unable to undertake the translocation. However operational staff spent time learning and refining the capture techniques required for the translocation next season.

Carnaby's Black-Cockatoo and Western Long-billed Corella Recovery Teams

by Andrew Burbidge

Carnaby's Black-Cockatoo *Calyptrorhynchus latirostris* and Western Long-billed Corella (southern subspecies) *Cacatua pastinator pastinator* (hereafter termed Muir's Corella) are listed as threatened pursuant to the Western Australian Wildlife Conservation Act 1950 and

ranked as Endangered by the WA Threatened Species Scientific Committee. Both species are included in 'Part 1 - Species that are endangered' of 'Schedule 1 Listed Species' of the Commonwealth *Endangered Species Protection Act 1992*.

In 1998, the Department of Conservation and Land Management (CALM) applied for matching funding from the Natural Heritage Trust to prepare draft Recovery Plans for both species. This application was successful.

CALM set up two recovery teams to oversee the preparation of the recovery plans. Membership is as follows:



Carnaby's Black-Cockatoo:

- Dr Andrew Burbidge (CALM Threatened Species and Communities Unit, Chair)
- Mr Michael Brooker (Birds Australia)
- Dr Belinda Cale
- Mrs Alison Doley (farmer, Kalannie)
- Mr Neil Hamilton (Perth Zoo)
- Mr Ron Johnstone (WA Museum)
- Dr Peter Mawson (CALM Wildlife Branch)
- Mr Kingsley Miller (CALM Wildlife Protection)
- Dr Denis Saunders (CSIRO Wildlife and Ecology)
- Staff in CALM's Mid-West, Wheatbelt and Swan Regions were also involved.

Muir's Corella:

- Dr Andrew Burbidge (CALM Threatened Species and Communities Unit, Chair)
- Mr Peter Keppel (CALM Southern Forest Region)
- Mr Ron Johnstone (WA Museum)
- Dr Peter Mawson (CALM Wildlife Branch)
- Ms Marion Massam (Agriculture WA)
- Mr Clive Nealon (Birds Australia)
- Dr Belinda Cale.

CALM contracted Dr Belinda Cale to work half-time during 1999 to collate background information on both species and to draft the plans in association with the recovery teams. Dr Cale worked closely with recovery team members in drafting the recovery plans. In addition to specific consultations with each member, both recovery teams met twice during 1999 to review drafts of the recovery plans and discussion strategies.

Copies of the current drafts recovery plans were provided to Environment Australia in early 2000 for information, not for adoption under the ESP Act. Final drafts will be submitted for adoption once formal CALM and WA Minister for the Environment approvals have been obtained.

Chuditch Recovery Team

by Brent Johnson and Keith Morris

This will be the eighth year of implementation of the Chuditch recovery plan. During the year financial support continued from the Natural Heritage Trust's Endangered Species Program, CALM, Perth Zoo and the Department of Defence. Financial assistance from Alcoa, through Operation Foxglove, fox baiting also continued. Monitoring the impact of prescribed burning regimes and

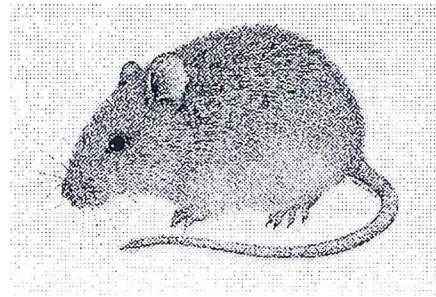
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timber harvesting on Chuditch and other threatened mammals continued in the jarrah forest of south west WA. Sampling post impact suggests that none of these disturbances have had a detrimental impact on Chuditch abundance or condition. Population monitoring continued at Mundaring, Batalling and Kingston as well as at several sites in the northern jarrah forest as part of the research associated with Operation Foxglove. Chuditch are being regularly reported at Alcoa's bauxite mining sites in the Jarrah forest. The captive breeding program continued successfully at the Perth Zoo and 47 young were weaned during the year. Monitoring of the previously reintroduced populations at Julimar, Lake Magenta and Cape Arid continued. The 1996 translocation to Lake Magenta appears to have been successful. A further translocation was undertaken to Mt Lindesay near Denmark on the south coast of WA and this was monitored. Planning was commenced for a translocation to Kalbarri National Park in 2000. A review of the conservation status of Chuditch will also be undertaken in 2000.

Djoongari Recovery Team

by Peter Speldewinde

This is the eighth year of the implementation of the Djoongari (Shark Bay Mouse) Recovery Plan. Financial support continued from the Natural Heritage Trust's Endangered Species Program, CALM and Perth Zoo. The Bernier Island population was monitored once in 1999 and maintained its distribution and abundance. The Doole Island population was monitored once, and trap success was low, probably due to the inundation of the island caused by Cyclone Vance. Heirisson Prong was not monitored in 1999. Twenty eight Djoongari were translocated from Perth Zoo to North West Island, Montebellos, in June 1999. Trap success was low when this population was monitored in October and predation by



Varanus may be a problem for establishing Djoongari populations. The captive colony at Perth Zoo currently stands at 14 individuals.

Dibbler Recovery Team

by Tony Friend

Populations of the Dibbler (*Parantechinus apicalis*) are known from Boullanger and Whitlock Islands in the Jurien Bay area off the west coast, and from the Fitzgerald River National Park on the south coast of WA. A captive-breeding colony of dillers based on a founder group from the islands has been established at Perth Zoo and breeding protocols have been successfully developed. Introduction of dillers onto a third island near Jurien through the release of 27 mostly captive-bred animals occurred during 1998 and the fledgling population was monitored during five visits in 1999. The results of monitoring indicate that the release resulted in the establishment of a breeding population there. A second release, of 41 dillers from Perth Zoo, was carried out in October 1999.

The populations on Boullanger and Whitlock Islands were also monitored during 1999, through trapping as part of a Ph.D. project. Male die-off was observed on Boullanger but not Whitlock Island, the first time this has been seen in the last two years' trapping.

The Fitzgerald River National Park population has undergone a dramatic expansion during 1999. The causes of this are unclear, but the most likely explanation is that the more intensive fox control regime introduced in 1997 has been par-

ticularly beneficial for this species. The new abundance of dillers in FRNP has allowed ecological research that was not possible before to proceed.

The captive-breeding colony, which was based on island animals, is now being switched over to breed mainland animals. This should allow mainland reintroductions proposed under CALM's Western Shield program to proceed.

Funding of the recovery plan remains problematic, however. Natural Heritage Trust funding ceases in 2000 although the Interim Recovery Plan has a year to run. In the absence of alternative funding, it will be difficult to maintain the momentum achieved in the last five years.

Gilbert's Potoroo Recovery Team

by Tony Friend

Gilbert's Potoroo is the most endangered mammal in Australia. The tiny single population is restricted to the slopes of Mount Gardner, at Two Peoples Bay. Searches for colonies in Two Peoples Bay Nature Reserve have resulted in the location of only three separate areas where potoroos can be caught regularly, and the number of wild individuals captured during 1999 was only 16.

A captive colony was established in December 1994 when the species was rediscovered. Eight animals (five adults, a juvenile and two pouch young) comprised the founder group. Five years later, the colony numbers only 11 individuals, despite rising to a maximum of 14 at one stage, and breeding has been erratic.

During 1999, however, several significant advances in knowledge that will enhance the conservation effort have been made. A new breeding manipulation has been tried successfully, utilising a group of four females with one male. Breeding occurred within weeks, although none of the same animals

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had bred in the previous two years while housed in pairs. On the basis of this success, the captive facility is being extended to allow more flexibility of accommodation. Research into methods of detecting oestrus in Gilbert's Potoroo is being carried out through collaboration between CALM and The University of Western Australia. Three potoroo deaths over two years have been attributed to kidney failure due to deposition of oxalate crystals in the kidney. Research into the causes of this syndrome, and possible reformulation of the captive diet, is being carried out through collaboration between CALM, the resident potoroo veterinarian, Agriculture WA and CSIRO Animal Nutrition.

Radio-tracking has been utilised to learn more about the habitat use and social organisation of Gilbert's Potoroo. This will provide information vital to the design of captive breeding protocols and to assist in selection of survey sites on and off Two Peoples Bay NR and of potential translocation sites. In a pilot project, two males were tracked for several nights and home range maps constructed. New nesting information was also collected. A major tracking exercise will be carried out early in 2000, funded by a BankWest *Landscape Visa Card* grant.

Genetic research has also been stepped up in 1999, with the successful application for funding from *National Geographic Magazine*. This has provided funds to support the laboratory work necessary to allow a pedigree analysis of the wild and captive populations.

Lack of funding is one of the greatest difficulties now facing the effort to save Gilbert's Potoroo. The Natural Heritage Trust has cut its financial support to the recovery program from \$81 100 in 1999/2000 to \$40 000 in 2000/2001. Corporate funding sources are being approached in an attempt to keep the program running at its current level.

Western Swamp Tortoise Recovery Team

by Andrew Burbidge

During the past year there has been continuing progress towards implementing the actions contained in the Western Swamp Tortoise Recovery Plan. Implementation of most recovery actions continues to be on or ahead schedule. Highlights of the year included:

Monitoring of the population at Ellen Brook Nature Reserve continues to suggest a gradual increase in the number of tortoises over the past decade, but most of these are juvenile animals. The increase has been sustained since the fox-proof fence was constructed around the tortoise habitat in the reserve in 1990.

Perth Zoo currently holds 157 tortoises comprising 7 breeding males, 10 breeding females and 140 other tortoises comprising hatchlings, juveniles, sub-adults and non-breeding adults. Forty-one hatchlings were obtained in 1999 from eggs laid in 1998.

Groundwater was pumped to North West Swamp, Twin Swamps Nature Reserve from early July until the third week of November. The winter of 1999 produced a higher rainfall than in 1997 or 1998; however, some pumping was still necessary.

Forty tortoises, bred and raised to about 100 g body weight at Perth Zoo, were released at Twin Swamps Nature Reserve, in August 1999.

The raven control program commenced in 1998 was again carried out in 1999 during the week in which the last swamp dries at Twin Swamps Nature Reserve. A rat control program at this nature reserve was initiated during 1999 because of concern that rats are preying on aestivating tortoises.

Of major concern is the lack of a new translocation site to release captive-bred tortoises in 2001 and

succeeding years. The Recovery Team's preferred site, Perth Airport, is now the subject of a hydrological study by Westralia Airports Corporation to clarify whether future runway extensions may deleteriously affect the target swamps. The Team is investigating other possible sites at Caversham and Wannamal.

During the year, an independent review of the implementation of the WST Recovery Plan, commissioned by the Commonwealth Minister for the Environment, reported that 'the Recovery Plan was well planned and has been implemented so successfully that many of its 2002 goals have already been achieved. Logistical and ecological problems have arisen in the course of the project, and most have been appropriately and successfully addressed. The Recovery Team has operated effectively and has provided expertise critical to the success of the program.' Following the review, the Commonwealth Government agreed to continue to fund the Plan's implementation. However, funding provided for 1999/2000 is significantly below that requested.

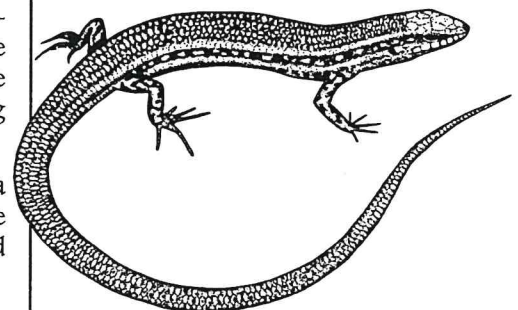
Lancelin Island Skink Recovery Plan

by David Pearson

The report summarises work carried out during 1999. The Team did not formally meet during 1999.

The research phase of the project is largely completed. Captive

(Continued on page 10)



breeding of skinks at Perth Zoo for eventual translocation has continued during 1999. The Zoo currently holds a total of 73 *Ctenotus lancelini*.

A boardwalk was constructed across Lancelin Island by CALM with assistance from the Friends of Lancelin Island. The boardwalk will present interpretative material to visitors and reduce trampling damage.

Other research on the impact of weeds and possible translocation sites is continuing.

South Coast Threatened Birds Recovery Team

Noisy Scrub-bird

by Sarah Comer and Alan Danks

The establishment of a Noisy Scrub-bird population in a Western Management Zone continued this year with the translocation of a further 11 birds to the Darling Range. All these birds were released in the Upper Harvey area. In July five males were singing in the Upper Harvey, but only three were persisting in October. Three territorial males were regularly being heard at Samson Brook, and a fourth male started giving short song late in 1999. No males have been heard singing in the Falls Brook site since early April, when a short song was heard. Effectively these results indicate a maximum of eight territorial males in the Darling Range

All areas in the Albany Management Zone were surveyed for Noisy Scrub-birds between May and November this year. This was the first total on the ground count since 1994. A total of 588 singing males were counted in the Albany Management Zone this year

The Angove-Normans population has increased significantly this year, with many new territories on private property. A significant increase in the number of territorial males on Bald Island since the last

census in 1997 indicates successful breeding in this release area. The Lakes population has declined to virtual extinction, with the only two birds remaining in this area occupying territories around the research quarters and car parks. There were small, but significant increases in the Mermaid and Waychinicup populations in 1999. Growth in the number of singing males in Manypeaks sub-population has slowed, possibly indicating that this area is approaching habitat saturation. On the other hand the Mt Gardner population declined for the third year in a row, quite possibly in response to factors other than habitat saturation. This has resulted in the decision to cease removing scrub-birds for translocation from this population.

Management of the Two Peoples Bay Nature Reserve continued under the guidelines provided by the Management Plan (CALM, 1995). The Two Peoples Bay Visitor Centre was officially opened in March, and had 2846 visitors during the year. Regular fox baiting of the Reserve and adjoining crown reserves was carried out throughout the year. There were two wildfires within the Reserve this year, fortunately both were controlled in areas that contained no extant scrub-bird territories.



Western whipbird

by Allan H. Burbidge

The Western Whipbird Research Plan has no external funding. However, one action (clarification of taxonomic status) did receive attention in 1999 with funding from CALM Science Division and Bank-West *Landscape* Visa Conservation

Card funds.

Funds were used for DNA analyses carried out by Drs Christidis and Norman at the Museum of Victoria. The work was commissioned because recent publications by Schodde and Mason indicated that the Western Australian populations could be divided into two separate species (Mallee Whipbirds in the southern wheatbelt and Heath Whipbirds at Two Peoples Bay and Manypeaks-Waychinicup). If this hypothesis is correct, it has significant implications for management and prioritisation of recovery efforts, as the Heath Whipbird would be classified as Endangered. Because of the small number of available samples, the results of the DNA analysis are preliminary. Nevertheless, they do not provide support for the contention that there are two species of whipbirds in Western Australia.

Opportunities are being sought for funding of further analyses to clarify the situation.

Western Bristlebird

by Allan H. Burbidge

Work was carried out on two main actions in 1999 including survey and translocation.

Survey:

Survey was carried by S. McNee and B. Newbey in Fitzgerald River National Park (FRNP) in October 1999, near Twertup, Fitzgerald Track, the 'new' block to the north of Fitzgerald Track, and several sites in the south-eastern part of the park.

At Twertup, only three birds were heard in 1999, compared with eight in the last census (1994). Six fewer birds were heard at Fitzgerald Track in 1999 (19 birds) than in 1998 (25 birds), but 1999 figures were similar to those for 1995-97. In the 'new' block, 15 territories were located in 1994 and 14 in 1999. Of the birds in this block in 1999, 10 were located in previously occupied sites. It is not known why counts varied between censuses.

In the south-east of the park, several sites were inspected following leads supplied by Mark True (Ranger, FRNP) and Simon Nevill. Sites were at or near No Tree Hill, East Mt Barren, Hamersley Inlet and Sepulcralis Hill. Six individual sites were surveyed and 26 calling bristlebirds heard. In particular, 15 birds were calling at East Mount Barren. This site was not previously known to hold bristlebirds, and is a major 'new' population for the Fitzgerald River NP.

A detailed report by S. McNee and B. Newbey has been lodged in the CALM Science Library at Woodvale.

Translocation:

Eight birds were translocated from Two Peoples Bay to Walpole-Nornalup National Park. Monitoring has shown that a minimum of two birds survived until at least autumn. However, the site is difficult of access and monitoring is difficult at this time of year. Further monitoring will be carried out in spring 2000.

In terms of the translocation itself, the project went very well and was marked by a high degree of collaboration and cooperation between all concerned (staff from CALM Science Division, CALM Albany District, CALM Walpole District and volunteers).

Follow up action will be determined by the Recovery Team in late winter 2000.



Search for elusive Grevillea continued ~ by Robyn Phillimore



In the last issue of *WATSNU*, Val English reported on the unsuccessful search for the threatened narrow curved-leaf grevillee (*Grevillea curviloba* subsp. *incurva*) at Eneabba. Two specimens were collected in 1992 and 1997 at two different locations near Eneabba. The location descriptions were a bit sketchy and the plants have not been rediscovered. Fortunately I was able to track down the original collector of the population south of Eneabba, which consisted of one plant. The collector, Jane Elkington, stumbled on the plant in 1992, while undertaking post-mining surveys consulting for Iluka Resources. Jane agreed to come out with us to the site to attempt to locate the plant she had recorded. Val English, Alice Reaveley (Moorra Conservation Officer), Alan Tinker (Western Flora Caravan Park), Tracey Bolland (Iluka Resources) and I, went with Jane to the site where it was originally collected. Much to my disbelief, Jane was able to spot the same plant that she collected from in 1992 within five minutes! Although the subspecies was never used for rehabilitation of mined areas, the plant was located on a track in a rehabilitation area. No regeneration had occurred suggesting that it was not in its natural habitat and the seed had accidentally been bought in, possibly through mulch.

While luck appeared on our side,

we thought we would also search for the other population found north of Eneabba in 1997. Unfortunately, this time we were not so lucky, and this population still eludes us.

For further information, contact Robyn on 94055 165 or by Email: robynp@calm.wa.gov.au

NEW STAFF

We would like to welcome three new flora conservation officers:

Alanna Chant was previously a forest ranger for CALM's Blackwood District, with duties in dieback interpretation and CALM fire and is now working for the Geraldton District.

Alice Reaveley was previously a project officer in CALM's Park Policy and Tourism branch at Kensington, assisting with the marketing of existing CALM tourist products and development of new products. She is now working in the Moorra District.

Karen Bettink previously worked as a dieback interpreter (forest ranger) in Swan and Central Forest Regions, and is now located in the Merredin District.

Conservation Officers based at CALM's District offices are a vital resource for the ongoing conservation and security of our threatened plant species and ecological communities. Without dedicated flora conservation officers located in areas with high numbers of threatened plants, recovery actions and surveys do not happen.

Threatened Ecological Communities (TECs) in the Wheatbelt:

The Search Continues ~ Sheila Hamilton-Brown

In February, Dave Rose, John Blyth and I met with the landowners of the 'Endangered' heath community on the Coomerdale chert hills (see last issue of *WATSNU*) at Moora. We offered to seek funds for fencing (75% of the threatened ecological community (TEC) is unfenced and grazed), write recovery plans and purchase land at market value. We stressed our interest in protecting the remnants for their biodiversity value and that we would only seek to work in a cooperative manner. Some landowners would only consider fencing if they were awarded compensation – in the form of 'rate relief' – for what they thought was essentially 'locking up' grazing land for the public good. We are gearing up for discussions with the Shire of Moora and the landholders on the subject of 'rate rebates' for TECs under conservation agreements.

An Interim Recovery Plan (IRP) has been drafted for the TEC – which is a first for an Endangered community – in consultation with landowners and other relevant parties.

In April, I became a member of the Geraldton Threatened Flora Recovery Team. The team will oversee recovery actions for the four TECs in the Geraldton District: the Greenough Alluvial Flats (Critically Endangered) and the plant assemblages of the Billeranga, Koolanooka and Moonagin Systems (Vulnerable). Members of the recovery team have already begun some recovery actions, for example, removing African boxthorn from the Greenough Alluvial Flats TEC.

The Bushcare component of the Natural Heritage Trust has funded this project for another year. The focus is the southern Wheatbelt

where one TEC has already been identified and assigned a conservation category: The fresh water wetland dominated by *Muehlenbeckia horrida* subsp. *abdita* and *Tecticornia verrucosa* was classified as a Critically Endangered TEC in 1998. The only known occurrences of this TEC are at Lake Bryde and East Lake Bryde and both wetlands are under threat from rising salinity. The Lake Bryde wetland system (including both wetlands) became a Natural Diversity Recovery Catchment under the State Salinity Action Plan in July 1999 and a Recovery Team has been formed (the first meeting was held in February 2000) with John Blyth a member and myself as his proxy. The team will investigate, develop and implement recovery actions that will assist in the conservation of the wetland system.

A list of possible TECs in the Wheatbelt has been sent to all relevant CALM Regions and Districts. The list is available to anyone else who wants it.

For further information, contact
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Threatened Flora Updates ~ Robyn Phillimore

Acacia sciophanes

Wundowlin wattle is known from only two localities between Mukinbudin and Bencubbin, growing in yellow sandplain in scrub of *Acacia* spp. and *Allocasuarina acutivalvis*. Wundowlin wattle is extremely rare, with only 160 plants known in the wild and hence has been ranked

Critically Endangered. In February 2000, a survey of known populations was undertaken by Marcelle Buist, (PhD student researching several *Acacia* species), Rita Tan (volunteer) and me. With Marcelle sitting on top of the vehicle and me driving, we managed to undertake a 'semi-aerial' count of the number of plants at each population, including one new population that was discovered by Marcelle in September 1999. Usually the species flowers from late September to November and April to May, but fortunately for us, the species was in very early flower and so was quite visible for counting. The total known number of plants was increased to approximately 450.

Eremophila pinnatifida

Until recently, when another population consisting of 16 plants was discovered, this species was known only from one population in the Dalwallinu townsite. Located on a road verge just north of town, the plants in the new population were smaller and healthier than the other diminishing one. In February this year, Sue Patrick and Anne Cochrane visited the original population and found around 100 seedlings, some of which were already flowering. This find was extremely significant considering the precarious nature of the species. Later, Karen Bettink and Mike Fitzgerald from CALM's Merredin District, visited the site to look at the seedlings but were unable to locate them. Then, Anne, Karen and I met on site, however, we were also unable to find them, leaving us all very concerned that perhaps something had happened. Finally, Sue and Anne returned to the site and this time were successful in finding the seedlings. They were in the same reserve as the original population but were actually a short distance away. While there Anne and Sue did some more searching and were able to find another 150 seedlings. All's well that ends well!

STATEWIDE THREATENED ECOLOGICAL COMMUNITIES ~ Sally Claymore

The project "To conserve threatened ecological communities (TECs) throughout the State (especially outside the south-west)" commenced in 1998 with funding assistance from the Natural Heritage Trust (NHT). Since then, a list of 230 possible TECs outside the south-west has been developed, and 15 of these communities have been formally assessed as threatened by CALM's Threatened Communities Scientific Advisory Committee, which meets about three times per year.

Where there has been sufficient data to assess the conservation status of possible TECs, in terms of their defining characteristics and extent, they have been entered on the TEC database. We try to avoid entering communities into the database that may be assessed as Data Deficient. Early this year, the database was distributed to several of CALM's Region and District offices in which TECs occur. For all communities entered on the TEC database, hard copy maps have been produced to delineate the location and extent of occurrences. Currently, these maps are being copied to digital form so that they can be utilised in conjunction with the database.

To date, 59 possible TECs outside the south-west have been investigated in the field. Over the coming dry season, the field survey program will include visits to the Mid-West, Pilbara and Kimberley Regions. The main purposes of field survey are to: confirm the existence, distribution, boundaries, and condition of particular communities; to assess threatening processes and management requirements; and, to liaise with stakeholders. Biological sampling of flora and fauna is often carried out to aid the clarification of definitions or descriptions of community types. In the field, stake-

holders and managers such as pastoralists, Aboriginal people, and CALM district and regional staff have provided valuable assistance in locating previously unrecorded occurrences of particular community types under investigation.

Interim Recovery Plans are being developed for the two Critically Endangered subterranean fauna communities of Cape Range peninsula, together with the North West Cape

Karst Management Advisory Committee, now established as recovery team for threatened species and communities in the area. In addition, NHT funds were sought and obtained from the Endangered Species Program to conduct emergency recovery actions for these communities. The development and implementation of these recovery has already commenced.

For further information, contact Sally Claymore on 9405 5168 or by email: sallyc@calm.wa.gov.au.

Students help manage habitat of Critically Endangered *Lasiopetalum* ~ Val English

Lasiopetalum pterocarpum ms (wing-fruited lasiopetalum) is a critically endangered shrub with oak-like leaves that is only known from one population at Serpentine. Major threats to the species are weeds, trampling by recreational users of the park, and too frequent fire. The population consists of three sub-populations separated by a few hundreds of metres.

The species is under threat from competition from blackberry and watsonia, but, fortunately, weed control was done just before a wildfire swept through part of the population in December 1999. Weed pulling and treatment with herbicides were conducted in September 1999 with the help of Environmental Management students from Joondalup TAFE, their supervisor—Bill Evans—and Alan Wright (Forester), Anne Cochrane (Threatened Flora Seed Centre) and Robyn Phillimore (Project Officer, WATSCU).

The students were supplied with wick applicators containing Roundup® Biactive purchased with funds provided by the Natural Heritage Trust (NHT) for the recovery of the species. Under careful supervision, the students spent a day apply-

ing herbicide to watsonia in the vicinity of the *Lasiopetalum pterocarpum* plants. Black plastic was also used to cover a few large blackberry bushes in the vicinity of the *Lasiopetalum* with the aim of killing parts of individual weeds to allow them to be cut back at a later stage.

Under supervision of Anne Cochrane, pairs of students also collected seed from species suitable for rehabilitating areas around the known population. Species collected included *Acacia nervosa*, *Grevillea diversifolia* and *Dryandra praemorsa*. The seed will be propagated, also using NHT funds, and plants placed in appropriate areas, especially where dense shrubs may help prevent trampling of *Lasiopetalum pterocarpum* ms.

On the following day, the students searched other likely areas for *Lasiopetalum pterocarpum*, unfortunately without success. However, another search conducted with Rebecca Evans of CALM's Swan Region at a later date revealed another 11 plants in very dense vegetation within a few hundred metres of the original plants.

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MORE CRITICALLY ENDANGERED PLANT POSTERS

Some of Western Australia's critically endangered native plants have again been featured in a new series of 19 posters produced by WATSCU. The posters provide information such as time of flowering, habitat, approximate locations, the threats to the plants and recovery actions CALM had underway. The posters can be viewed on CALM's NatureBase at http://www.calm.wa.gov.au/plants_animals/critical_flora.html.

The aim of these posters is to help people identify critically endangered species, which may lead to the discovery of new populations. The posters also will help spread the message about the need to conserve these species, especially by reducing the processes that threaten their survival.

Five of the posters were produced with funding from the BankWest *LANDSCOPE* Conservation Visa Card, and the remainder using funds from the Natural Heritage Trust.

The 19 posters are:

Cinnamon sun orchid (*Thelymitra manginii* ms)
 Curved-leafed grevillea (*Grevillea curviloba* subsp. *curviloba*)
 Green Hill thomasia (*Thomasia* sp. Green Hill)
 Lonely hammer orchid (*Drakaea isolata*)
 Mallee box (*Eucalyptus cuprea*)
 Narrow curved-leafed grevillea (*Grevillea curviloba* subsp. *incurva*)
 Phalanx grevillea (*Grevillea dryandroides* subsp. *dryandroides*)
 Prostrate flame flower (*Chorizema humile*)
 Pungent jacksonia (*Jacksonia pungens* ms)
 Rough emu bush (*Eremophila scaberula*)
 Spiky adenanthos (*Adenanthos pungens* subsp. *effusus*)
 Stirling Range dryandra (*Dryandra montana* ms)
 Three Springs Daviesia (*Daviesia bursarioides* ms)
 Trigwell's rulingia (*Rulingia* sp. Trigwell Bridge)
 White featherflower (*Verticordia albida*)
 Wing-fruited lasiopetalum (*Lasiopetalum pterocarpum*)
 Wongan cactus (*Daviesia euphorbioides*)
 Wongan featherflower (*Verticordia staminosa* subsp. *staminosa*)
 Wundowlin wattle (*Acacia sciophanes*)

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By mid-December, the watsonia and blackberry were dying back and the *Lasiopetalum* plants were in heavy seed. Fortunately, over 2 000 seeds of *Lasiopetalum pterocarpum* were collected just prior to a very hot fire that turned many of the plants and their habitat to ash. It is believed that vandals deliberately lit the fire. As local CALM fire fighters knew of the locations of the subpopulations of the *Lasiopetalum*, they were able to divert the fire away, and prevented 11 plants from being burnt.

The fire has created an excellent opportunity to get some of the blackberry and watsonia under

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Two new Recovery Plan have been published in CALM's Wildlife Management Program series:

***Djoongari (Shark Bay Mouse) Recovery Plan* by Keith Morris,
 Peter Speldewinde and Peter Orell
 for the Djoongari Recovery Team
 (Wildlife Management Program No. 17)**

and

***Lancelin Island Skink Recovery Plan* by
 David Pearson and Barbara Jones
 for the Lancelin Island Skink Recovery
 Team
 (Wildlife Management Program No. 22)**

Interim Recovery Plan ~ update

Since the last edition of *WATSNU* another 16 IRPs have been approved by the Director of Nature Conservation, and were obligated sent to Environment Australia to be submitted for adoption under the Commonwealth's *Endangered Species Protection Act 1992*.

No	Title of Interim Recovery Plan	Author/s
47	<i>Acacia rostellifera</i> low forest with scattered <i>Eucalyptus camaldulensis</i> on Greenough River Alluvial Flats	Sheila Hamilton-Brown and John Blyth
48	Unwooded fresh water wetlands of the southern Wheat-belt of Western Australia, dominated by <i>Muehlenbeckia horrida</i> subspecies <i>abdita</i> and <i>Tecticornia verrucosa</i> across the lake floor	Sheila Hamilton-Brown and John Blyth
49	Scaly-leaved Featherflower, <i>Verticordia spicata</i> subsp. <i>squamosa</i>	Robyn Phillimore and Val English
50	Quartz-loving Synaphea, <i>Synaphea quartzitica</i>	Gillian Stack and Val English
51	McCutcheon's Grevillea, <i>Grevillea maccutcheonii</i>	Robyn Phillimore and Diana Papenfus
52	Montane Thicket and heath of the South West Botanical Province, approximately 900 m above sea level	S Barrett
53	Aquatic Root Mat Communities numbers 1-4 of caves of the Leeuwin-Naturaliste Ridge	Val English
54	Ironstone Grevillea, <i>Grevillea elongata</i>	Robyn Phillimore, Gillian Stack and Val English
55	Thick-billed Grasswren (western subspecies), <i>Amytornis textilis textilis</i>	Belinda Cale (nee Brooker)
56	Community of Tumulus Springs (organic mound springs) of the Swan Coastal Plain	Val English, John Blyth
57	Shrublands and Woodlands on Muchea Limestone	Val English, John Blyth
58	Eastern shrublands and woodlands (Swan Coastal Plain community 20c)	Val English, John Blyth
59	<i>Corymbia calophylla</i> - <i>Kingia australis</i> woodlands on heavy soils	Val English, John Blyth
60	<i>Corymbia calophylla</i> - <i>Xanthorrhoea preissii</i> woodlands and shrublands	Val English, John Blyth
61	Shrublands and woodlands on Perth to Gingin ironstone	Val English, John Blyth
62	Dwellingup Synaphea, <i>Synaphea Stenoloba</i>	Rebecca Evans, Val English

(Continued from page 14)

control as soon as they emerge. Weed control and monitoring of any germination of *Lasiopetalum* seedlings that may occur as a result of the fire will be a very high priority in the next few years. It is likely that the weed control undertaken by the students will have had positive effect, and there will be a fewer numbers of major weeds near the *Lasiopetalum pterocarpum* ms population than otherwise would have appeared after the fire.

WATSNU

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