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The Newsletter of the Western Australian Threatened Species & Communities Unit

An update on some lowdown animals – underground fauna ~ John Blyth

Inside this Issue:

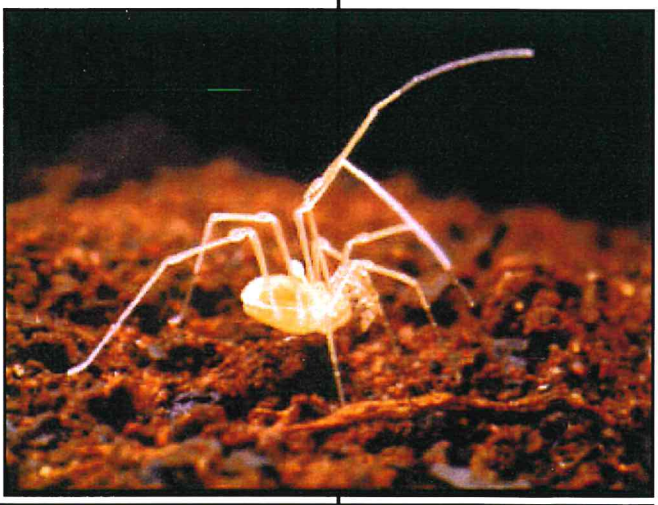
Research over the last fifteen years, especially by Dr Bill Humphreys of the Western Australian Museum, has begun to show that a remarkable and diverse fauna lives in many of these inaccessible habitats

Small invertebrate animals in the soil have been studied for many years because of their relevance to soil productivity. However, the animals that live deeper below surface soils, in underground spaces such as deep sediments along old river systems, caves, and fissures in bedrock, have been little studied in Australia.

Research over the last fifteen years, especially by Dr Bill Humphreys of the Western Australian Museum, has begun to show that a remarkable and diverse fauna lives in many of these inaccessible habitats. Both aquatic and non-aquatic troglobites (animals fully adapted to and occurring only in dark caves or below ground) have been found to be much more widespread and diverse than previously understood.

Aquatic troglobites, known as stygobites or stygofauna, are now known to occur in many underground aquifers throughout Western Australia's arid zone. These aquifers may be in caves and other spaces of karst systems, such as on Cape Range peninsula, in outcrops of a type of limestone called calcrete, as at Millstream, and in alluvial systems along river systems - all of which are known to contain stygofauna.

More than 200 localised aquifers found in calcrete occur in the State and most work on stygofauna has been conducted on calcrete aquifers. All of those investigated so far (<20) have supported assemblages of stygofaunal invertebrates different from one another. These faunal assemblages include over 100 taxa, most of which have been identified as new to science, including new genera, new families and even a class new to Australia. Several individual aquifers support many species of one higher taxa, with all of these species so far found



A harvestman (Glennhuntia glennhunti). Photo: Douglas Elford, W.A. Museum

only within that one aquifer. The mechanism of this multiple, localised speciation is unclear at present and presents a challenging scientific puzzle. The two main possibilities are multiple invasions of the aquifer, with speciation occurring in small isolated populations, and radiation within an aquifer following one invasion event. In addition, all the separate aquifers examined so far contain apparently unique stygofaunal assemblages. There could well be many hundreds of new species altogether, and on present knowledge, many of them may be endemic to individual aquifers.

The derivation of these arid zone, underground faunas is often as remarkable as their diversity. Some groups of troglobitic animals are most closely related to surface species now found only in remnant rainforest of the eastern or northern coasts of Australia, others have their closest relatives in the northern hemisphere, suggesting the underground fauna has both Gondwanan and even Pangaean relationships.

These arid zone aquifers may represent the greatest concentration of undescribed and endemic biological diversity in non-marine Western Australia. As such they deserve to be accorded the same high priority for research (taxonomic, distributional and ecological), reservation, and other forms of conservation as surface areas of outstanding endemicity, such as the Stirling Range and Mount Lesueur National Parks, have had in the past. CALM has clear legislative responsibility for the conservation of biological diversity throughout Western Australia, and will take a leading role in addressing the information and conservation needs of stygofauna and other underground species.

The composition and distribution of particular faunas are yet to be clarified sufficiently to be certain of their discrete nature, as is the degree of impact of various management activities such as dewatering to allow mining of iron ore and other minerals, water abstraction for various uses and mining for limestone.

In many parts of the arid zone of Western Australia large resource development projects that would affect calcrete and other aquifers that could contain stygofauna have already gone through approval processes. There are several more such proposals being prepared, especially in the Pilbara and Yilgarn. Collectively these projects represent very large investments and potential economic gain for the State. It is important that planning of such projects can be conducted in the knowledge of environmental constraints, including the distribution and composition of stygofaunal assemblages.

Detailed knowledge of the composition, distribution and ecology of stygofaunal assemblages is currently inadequate to provide guidelines for planning and management. CALM accepts the principle that Government should carry out regional biodiversity surveys that will provide a context for the more detailed surveys required by industry as part of environmental impact assessment. CALM has designed and costed a Pilbara regional survey, including a stygofaunal component. Funds are currently being sought for this survey. Similar surveys are needed for other regions of the State where subterranean biota occur, particularly where projects may lead to impact, such as in the Yilgarn.

At present, threatened communities and species of stygofauna have only been listed for parts of Cape Range peninsula (See story "North West Cape Karst Management Advisory Committee" in WATSNU Volume 5 Issue 2). Some non-aquatic troglobitic animals from Cape Range peninsula and the Nullarbor Plain are also listed.

For further information contact John Blyth on 94055161 or by email: johnb@calm.wa.gov.au

Translocation of *Lasiopetalum pterocarpum* ms (wing-fruited lasiopetalum) ~ Val English

Despite being located in Serpentine National Park, the only known population of the Critically Endangered wing-fruited lasiopetalum is under major threat. Half of the remaining 20 plants were burnt in a wild fire in December 2000, and the habitat of all the plants is under threat from major invasions of blackberry and watsonia.

To help improve the species' chances of survival in the long-term, a translocation proposal has been developed. The proposal involves initially establishing an additional population of at least 100 plants in an almost completely weed free environment. The new site is located in habitat that is extremely similar to that of the known population, and is 8.5 km from it. The site has the added protection of only being accessible through a locked gated but is located in the same National Park.

The planting began in June, following the good rains in May this year. A local landscaping company – Earthcare has kindly offered to provide the services of two of their employees to help with the planting and fencing. They will also be involved in follow-up monitoring of the plants to help determine the survival, growth rate, flower and seed production.

Until now, too frequent fire and weed invasion have represented the greatest threats to the long-term survival of the wing-fruited lasiopetalum. The translocated population should provide much greater security for the species in the long-term. It is located far enough away from the known population to ensure that the translocation site and the original population will not be burnt in any one fire that sweeps through the park.

For further information contact Val on 94055169 or by email: vale@calm.wa.gov.au

Regional and District Threatened Flora Management Plans— have been published!

Six Region and District Management Plans have been endorsed by the Minister for the Environment. The plans are the culmination of input from district, regional and scientific staff as well as many volunteers. These have been published in The Department's Wildlife Management Program (WMP) series. A limited number have been printed and it is our intention to place them on *NatureBase* and update them from time to time.

Declared Rare and Poorly Known Flora in the Esperance District
by Gillian F. Craig and David J. Coates (WMP 21)
Declared Rare Flora in the Katanning District
by Mal Graham and Murray Mitchell (WMP 25)
Declared Rare and Poorly Known Flora in the Geraldton District
by Susan J. Patrick (WMP. 26)
Declared Rare and Poorly Known Flora in the Moora District
by Susan J Patrick and Andrew P Brown (WMP 28)
Declared Rare and Poorly Known Flora in the Narrogin District
by Gregory S. Durell and Robert M. Buehrig (WMP No. 30)
Declared Rare and Poorly Known Flora in the Central Forest Region
by Kim Williams, Andrew Horan, Scott Wood and Andrew Webb (WMP 33)

Identifying, listing and conserving threatened ecological communities in WA ~ *Sally Black*

WATSCU has been identifying, coordinating and promoting the conservation of threatened ecological communities (TECs) since 1992. Three projects are currently in train.

- A three year project entitled 'Conserving threatened ecological communities, especially outside the Southwest Botanical Province', assisted by NHT funding, is in its final year. This project is identifying and seeking ways to conserve TECs throughout Western Australia, especially in the rangelands. The Project Officer is Sally Black.
- A three year project entitled 'Conserving threatened ecological communities in agricultural areas', also with NHT funding, has been completed. This project identified and sought ways to conserve TECs throughout the Western Australian south-western agricultural area. The Project Officer was Sheila Hamilton-Brown, and Sheila is still with WATSCU, now working on TECs in the Wheatbelt threatened by salinity, with funding from the State Salinity Action Plan.
- A third project with assistance from the NHT, also for three years, is titled "Implementing recovery plans for critically endangered ecological communities", and has a little over a year to run. The first Project Officer was Alex Agafonoff, and the current one is Robyn Phillimore.

Some readers of ***WATSNU*** may appreciate a summary of some of the definitions and procedures used in identifying and conserving TECs in Western Australia, and this information is presented below.

An *ecological community* is defined as a naturally occurring biological assemblage (ie. a group of biological entities) that occurs in a particular type of habitat. The scale at which ecological communities are defined will often depend on the level of detail in the information source, therefore no particular scale is specified.

A *threatened ecological community* (TEC) is one which is found to fit into one of the following categories: "presumed totally destroyed", "critically endangered", "endangered" or "vulnerable". Threatened ecological communities may include species assemblages that are naturally restricted or those that are or have been either widespread or locally common, but that have declined significantly in either area or condition throughout most of their range.

Nominated TECs are assessed by the Threatened Ecological Communities Scientific Committee, established by the Department in 1998. The Committee assesses all the information gathered for the nominated community and assigns it a conservation category. The nomination must demonstrate that the community is distinct and definable as a species assemblage, that there has been thoroughness of survey sufficient to determine its extent, and what threatening processes apply. Before allocating any community to one of the categories of threat, the Scientific Committee needs to be convinced that:

- the community was described so that all variants of it clearly fitted the description and were distinct from all other assemblages; locally or anywhere else;
- sufficient information about the distribution of the community was available, and that it had been searched for adequately, to be confident that no significant areas of it remained undiscovered;
- the level of modification at which the community was no longer extant or capable of being restored could be recognised; and
- sufficient information was available to allocate the community unambiguously to one of the categories of threat (if not, the community will be classified under one of the Priority categories).

Possible threatened ecological communities that do not meet survey criteria, or that are not adequately defined are added to the Department's Priority Ecological Community Lists under Priorities 1, 2 and 3. Ecological Communities that are adequately known, are rare but not threatened, or meet crite-

ria for Near Threatened, or that have been recently removed from the threatened list, are placed in Priority 4. These ecological communities require regular monitoring. Conservation Dependent ecological communities are placed in Priority 5.

A community is only added to the database and nominated to the Scientific Committee, if it is considered likely to fit the criteria for assessment as threatened. For example, of the 262 ecological communities on the list of possible TECs for the area outside the Southwest Botanical Province, only 28 have been put on the database; 21 of these are threatened, and seven were determined by the Scientific Committee not to fit criteria for any of the three categories of threatened and were assigned to one of the categories of priority ecological communities. The defining characteristics and/or extent of many of the communities on the list of possible TECs are not known and require additional research. In a small number of cases, the additional research required could be conducted at relatively modest cost, and opportunities to obtain the required funding are utilised where possible.

Once an ecological community is assessed by the Scientific Committee as threatened, the category of threat assigned must be endorsed by the Director of Nature Conservation and the WA Minister for the Environment, before the community can be declared a TEC.

There is no Western Australian legislation dealing with threatened ecological communities and the listing of TECs in WA is currently informal. However, potential impacts to threatened ecological communities are considered by regulatory agencies such as the EPA, Agriculture WA and Ministry for Planning, as well as the Department, when they evaluate applications to develop or clear land. Although WA has taken and intends to continue to take a cooperative ap- proach to conserving TECs on both public and private land, legal protection of identified TECs may be provided under Acts administered by other agencies.

TECs that occur in Western Australia may now be listed as nationally threatened under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Any person or organisation may nominate communities for listing under the EPBC Act. Currently only sixteen Western Australian TECs listed as Critically Endangered on CALM's TEC Database, are listed under the EPBC Act (as Endangered). This Act, which overrides State legislation, provides that a person must not take an action (known as a 'controlled action') that will have, or is likely to have, a significant impact on such a community without the approval of the Commonwealth Minister for the Environment and Heritage. Actions that may have impact on TECs listed under the EPBC Act must be referred to the Commonwealth for assessment. Significant penalties can apply if correct procedures are not followed and listed species or communities are damaged. Currently, TECs must fit the criteria for either Endangered or Critically Endangered to trigger the EPBC Act. Although TECs in the Vulnerable category may be listed as nationally threatened under the EPBC Act, they are not triggers for the Act at this stage.

Conservation programs for TECs may include writing recovery plans and finding resources for research and on-ground works. Many recovery actions are implemented with the involvement of recovery teams, catchment groups, wildlife enthusiasts, school groups, and the owners of land on which the TECs themselves occur. The Department approaches the conservation and management of TECs in a cooperative way through 'Recovery Plans' – documents that prescribe actions that will be taken to ensure the long-term conservation of the TEC. Where identified TECs occur on privately-owned land, the Department will, in consultation with the landowner, draft a recovery plan and seek to obtain the landowner's approval for it. The recovery plan will contain provisions that agreement will be sought from the appropriate landowners and managers prior to recovery actions being undertaken on their land.

To obtain or provide further information on TECs or possible TECs, contact Sheila Hamilton-Brown (wheatbelt) on 9405 5167, Robyn Phillimore (Swan Coastal Plain) on 9405 5165, or Sally Black (rangelands) on 9405 5168

Wetland TECs ~ *Sheila Hamilton-Brown*

In December 2000, the Western Australia Threatened Ecological Communities Scientific Advisory Committee (WATECSAC) classified the herbaceous plant assemblages on bentonite lake beds and margins of the Watheroo-Marchagee region as Endangered. Each lake bed and margin is made up of one or more of the herbs *Triglochin mucronata, Trichanthodium exile, Asteridea athrixioides, Puccinellia stricta, Podolepis capillaris, Angianthus tomentosus* and *Pogonolepis stricta.* Half of the occurrences occur on conservation estate (Watheroo National Park and Pinjarrega Nature Reserve) with the rest on unallocated Crown land and private properties. The major threats to the lakes include salinisation, water-logging, mining ('kitty litter' and drilling mud), feral animal and human trampling, and weed invasion. The classification has yet to be endorsed by the Minister for the Environment. In the meantime, I have been liaising with both the Water and Rivers Commission and the Moore River Catchment group to determine the surface and ground water processes that may be contributing to the salinisation of the lakes, as well as encouraging landholders to fence the lakes and plant buffers. Sometime this September, Alice Reaveley (Moora Conservation Officer) and I hope to visit as many of the lakes as possible to identify the different plant assemblages on the beds and margins.

To supplement my work – currently funded by the State Salinity Strategy – I also received funding from the Wetland Conservation Project to sample and identify the plants and aquatic invertebrates in the organic mound springs of the Nebru Springs Catchment in the Shire of Three Springs. The major threats include groundwater abstraction from source aquifers, salinisation, feral animal grazing and trampling, and weed invasion. In January this year, with the help of Sharon D'Elboux (Three Springs Community Landcare Coordinator), Allan Tinker (an invaluable and enthusiastic volunteer) and farmers of the Nebru Springs Catchment, I identified 15 occurrences on private properties, a Shire and the Department's reserve - seven had been destroyed. Then in March, Adrian Pinder (Science Division), Allan and I collected water and soil samples from six sites, which are currently being sorted to identify the invertebrates present. The wetland funds have been spent, but Allan and I will conduct another sampling trip in August to collect the plants and more invertebrates from the private and reserve (arrgghh!) occurrences.

I have also been working through the list of possible TECs including the plant assemblages of the Broome Hill System, *Eucalyptus camaldulensis* wetlands, *Reedia spathacea* swamps, springs and other low-lying communities, with a view to presenting them to the SAC sometime in the year.

Bentonite Lakes
Photo: Val English

For further information contact Sheila on 94055127 or by email: sheilahb@calm.wa.gov.au

Flora Update ~ *by Robyn Phillimore and Andrew Brown*

Eremophila viscida, Varnish Bush

Varnish Bush, which is distinguished by its distinct large, shiny, sticky leaves, is historically known from a large geographical range that includes Latham, Koorda, Carnamah, Ballidu, Pindar and the Merredin area. However, extensive clearing of the Wheatbelt and very vague location details on early collections meant that many populations represented by Herbarium specimens have not been re-found.

In those areas where Varnish Bush has been located, a decline in area and quality of habitat and numbers of plants resulted in the species being ranked as Critically Endangered in 1997. Threats to these populations are numerous and include poor or no recruitment, weeds, salinity, road, track and firebreak maintenance, grazing, chemical drift, powerline maintenance and drought.

Guy Richmond discovered a large population of Varnish Bush in 1993 during research that he was conducting on six *Eremophila* species. The new population, which was found on private property near Westonia in the eastern Wheatbelt, consisted of around 1000 plants. Another *Eremophila* species (*Eremophila virens*), which is also Declared as Rare Flora, was also located at the site and some confusion over Guy's report resulted in it being reported while the population of *E. viscida* remained unknown to the Department.

In 2000, during preparations for writing an Interim Recovery Plan for the species, Robyn Phillimore (WATSCU) and Karen Bettink (Merredin Conservation Officer) conducted surveys of currently known populations and the sites of historical Herbarium collections. The large population on private property that had been discovered by Guy Richmond but had remained unknown by the Department for eight years was rediscovered. In addition, other areas on the same property containing similar habitat and soil type were also surveyed and several new areas of *Eremophila viscida* were located.

When considering the historically wide distribution of Varnish Bush it was hoped that eventually more plants would be found throughout the western wheatbelt and, in the process of surveying for a rare orchid, WATSCU's Andrew Brown located one plant of *Eremophila viscida* on private property near Pithara. The plant was located roughly half way between the two previously known areas where *E. viscida* was known to occur (Merredin and Mullewa areas). When the property owner was visited by the Department's Merredin's Wildlife Officer to inform him of the plant, the owner pointed out that he knew of other populations of *E. viscida* on his property. When surveyed it was discovered that these consisted of several hundred plants. Surveys of nearby properties will be undertaken in Spring 2001.

Currently, Varnish Bush is known from 14 populations and a total of about 700 mature plants. It is hoped with further survey during its flowering period (September to October) more new populations will be discovered and the species downlisted to Vulnerable. You can view a photo of the species on page 89 of *Western Australia's Threatened Flora*.

Roycea pycnophylloides, Saltmat

Saltmat is endemic to Western Australia where it grows on bare grey-brown clay soil in open semi-saline flats. C.A. Gardner made the first collection of the species from east of Meckering in 1945. A small currently known population that is roughly in the same area as Gardner's collection is situated on a highly degraded saline flat and is likely to become extinct in the near future. Andrew Brown and Steve Hopper discovered a second population in the Pingrup area in 1985. Because just two populations were known, the species was declared as Rare Flora in October 1996 and ranked as Critically Endangered (CR) in December 1997. The main threats to the species are increasing salinity, prolonged waterlogging, siltation, habitat degradation, road main-

tenance, vehicle disturbance, drainage and stock disturbance. The species is illustrated on page 105 of *Western Australia's Threatened Flora.*

Over the next 10 years no other populations were found and because of the highly threatened status of the species it was decided that an Interim Recovery Plan be prepared. However, surveys conducted by Mike Lyons (Research Scientist, Science Division) in 2000 and 2001 as part of a 'Botanical Survey of the Wheatbelt' have resulted in the discovery of new, large populations in the Narrogin, Merredin and Katanning districts. The large number of plants found on Nature Reserves has resulted in the species being recommended for downlisting to Vulnerable.

Although the species appears to have some salt tolerance, the threat of increasing salinity may have severe implications for all populations in the future. These populations will be monitored and their status regularly assessed.

Frankenia parvula, Drummond's Frankenia

During the same surveys that Mike Lyons found more populations of *Roycea pycnophylloides* in the Wheatbelt he also rediscovered two presumed extinct *Frankenia* species. Both had not been located for over 100 years prior to his discovery.

Mike found the first species, *Frankenia parvula*, on October 2000. Prior to this it had been seen just once when James Drummond collected it during his 1847 journey east from Perth to the Mt Caroline and Mt Stirling area.

The species, which flowers from October to December, is a small low growing shrub with creeping stems and numerous short, upright branches ending in pink flower heads that are either solitary or in of twos or threes. Its tiny 1.5-3 mm long leaves are stalked, oblong in shape and slightly hairy on the upper surface with curled under margins. Sue Patrick has illustrated the plant on page 208 of *Western Australia's Threatened Flora.*

Mike's find was made on a sandy *Melaleuca* rise near a saline drainage line on the Mortlock River.

Interestingly, when Mike returned to the Western Australian Herbarium to confirm the dentity of his specimen, he discovered that two other recent collections had been made but not identified. One was by Steve Hopper in July 1988, from north-north-east of Yellowdine and a second by Ray Cranfield in December 1997, from the Dulagin Rock area.

Frankenia conferta, Silky Frankenia

The second presumed extinct species that Mike found is *Frankenia conferta*. Prior to Mike's find, the species had been collected just twice, both by Mrs Martha Heal, who, in 1890, found it in the Avon District and at "Cummening", east of York.

Frankenia conferta is a small shrub with stems, leaves and calyx covered in short, soft hairs. Its small five petalled flowers are 6-8 mm long and are grouped in dense heads at the tops of the branches. The linear leaves, which are 2-5 mm long and about 1 mm wide, lack stalks and are clustered at the stem nodes. The margins of the leaves are recurved to cover the midrib. Each leaf pair is united by a sheath, which is edged with fine hairs.

The species is related to short-leaved frankenia (*F. brachyphylla*) and decurrent-leaved frankenia (*F. decurrens*). However, it differs from *F. brachyphylla* in its dense head-like inflorescence, which is neither solitary nor much branched, and from *F. decurrens* in the shape of the leaf lamina, which is free below the point of attachment, and does not extend down the stem. Sue Patrick has illustrated the plant on page 207 of *Western Australia's Threatened Flora.*

Mike rediscovered the species in October 2000 growing in clayey soil on a lake shore north-north-west of Ballidu. Mike described its occurrence as common.

The identity of the species was confirmed by Greg Keighery March 2001.

Nemcia lehmannii, Cranbrook Pea

On 30 November 2000 a population of the, up until then, presumed extinct species *Nemcia lehmanii* was located on private property near Cranbrook by Wendy Bradshaw

(Bushcare Support Officer). Mike Crisp confirmed the identity in February 2001 after Sarah Barrett (Albany District Conservation Officer) had sent a specimen to him. Wendy had given Sarah the specimen for identification a week earlier during a farm visit in the Tunney area. Sarah had hoped to locate this species during earlier surveys in the Stirling Range National Park so she immediately suspected that this was the long lost *Nemcia*. Sarah and Bethea Loudon (Katanning District Conservation Officer) immediately conducted a survey of the population and found there to be over 50 plants.

Originally described as a *Gastrolobium*, this non-toxic species was transferred to *Nemcia* by Mike Crisp in 1987. It was collected by Ludvic von Preiss in 1841 "in the interior", and again by James Drummond as part of his third collection in 1843-4. A single collection was made in 1875 and three more made in the years 1916-18. The species was then not seen again until the November 2000 discovery, a period of some 82 years.

Flowering in September, October *Nemcia lehmanii* is an erect shrub 1 m tall, with softly hairy branches and oblong leaves 2.5-5 cm in length that are covered with a dense covering of soft hairs on the underside. The flowers are red, purple in colour and appear in clusters in the axils of the leaves. The calyx is silky hairy with narrow lobes about as long as the tube, the upper two lobes less divided than the others. The pod is a little longer than the calyx and tapers abruptly to a point. Sue Patrick has illustrated the plant on page 211 of *Western Australia's Threatened Flora*.

Although initially given to Sarah at Albany District, the species is actually found in the Department's Katanning District and Wendy Bradshaw has shown Bethea Loudon two populations and a total of 121 plants on road reserve and private property.

Recently, a farming family informed Wendy of a third population growing on their farm. She had recognised the species following publicity about in a local newspaper. Wendy and Bethea will be taking a look at this population over the next week or two.

Given that three populations have been found over just a few months it is possible that more are awaiting discovery in the Cranbrook area.

For further information contact
Robyn on 94055165 or
Email: robynp@calm.wa.gov.au
Or
Andrew on 94055166 or
email: andrewbr@calm.wa.gov.au

Translocation update

Translocation of plants and animals has continued throughout 2001. The following Translocation Proposals have been approved so far this year:

Lancelin Island skink	Perth Zoo to Favorite Island, Jurien Bay
Black-flanked rock-wallaby	Re-introduction to Avon Valley National Park and Paruna Sanctuary
Wing-fruited Lasiopetalum	Re-introduction to Serpentine National Park
Noisy Scrub-bird	Further reintroductions to the Darling Range
McCutcheon's Grevillea	Seedlings and cuttings from adult plants and introduced to a site in the Negus Block (extension of translocation from last year)
Western Prickly Honeysuckle	Cutting material collected and introduced to Negus Block (extension of translocation from last year)
Butterfly Brachysema	From seed and cuttings to nearby reserves in the Southern Shrubland Ironstone Association near Busselton
Abba Bell	From seed and cuttings to nearby reserves in the Southern Shrubland Ironstone Association near Busselton
Laterite Petrophile	From seed and cuttings to nearby reserves in the Southern Shrubland Ironstone Association near Busselton
Phalanx Grevillea	Seed from subpopulations to a Ballidu Shire Reserve (extension of translocation from last year)
Silky Eremophila	Translocation of seedlings and seed into West Perenjori Nature Reserve and private property.

A further 23 Interim Recovery Plans approved

Twenty three Interim Recovery Plans (IRPs) have been approved by the Director of Nature Conservation including 21 for threatened flora and two for threatened ecological communities (TECs).

Threatened Flora IRPs

No.	Interim Recovery Plan	Author/s
77	Wundowlin Wattle, *Acacia sciophanes*	Rebecca Evans, Robyn Phillimore & Andrew Brown
78	Sprawling Spiky Adenanthos, *Adenanthos pungens* subsp. *effusus*	Rebecca Evans, Gillian Stack, Bethea Loudon, Mal Graham & Andrew Brown
79	Gillham's Bell, *Darwinia oxylepis*	Robyn Phillimore, Rebecca Evans and Andrew Brown
80	Late Hammer Orchid, *Drakaea confluens* ms	Robyn Phillimore and Andrew Brown
81	Lonley Hammer Orchid, *Drakaea isolata* ms	Robyn Phillimore, Gillian Stack and Andrew Brown
82	Albany Cone Bush, *Isopogon uncinatus*	Robyn Phillimore and Andrew Brown
83	Stirling Range Beard Heath, *Leucopogon gnaphalioides*	Robyn Phillimore and Andrew Brown
84	Bailey's Symonanthus, *Symonanthus bancroftii*	Kim Kershaw, Jeanette Buegge, Brett Beecham, Greg Durell & Andrew Brown
85	Butterfly-leaved brachysema, *Brachysema papilio*	Robyn Phillimore, Meredith Soutar and Val English
86	Drummond's Grass, *Deyeuxia drummondii*	Robyn Phillimore, Rebecca Evans and Andrew Brown
87	South Stirling Morning Iris, *Orthrosanthus muellerii*	Robyn Phillimore, Diana Papenfus, Felicity Bunny and Andrew Brown
88	Long-leaved Myrtle, *Hypocalymma longifolium*	Robyn Phillimore and Val English
89	Granite Tetratheca, *Tetratheca deltoidea*	Robyn Phillimore, Emma Holland, Kim Kershaw & Andrew Brown
90	Wongan Featherflower, *Verticordia staminosa* subsp. *staminosa*	Rebecca Evans & Andrew Brown
91	Maxwell's Grevillea, *Grevillea maxwellii*	Robyn Phillimore, Diana Papenfus, Felicity Bunny & Andrew Brown
93	Ironstone petrophile, *Petrophile latericola* ms	Robyn Phillimore, Meredith Soutar and Val English
94	Maroon-flowered Daviesia, *Daviesia glossosema*	Robyn Phillimore & Andrew Brown
95	White Featherflower, *Verticordia albida*	Robyn Phillimore, Diana Papenfus & Val English
96	Stirling Range Daviesia, *Daviesia pseudaphylla*	Robyn Phillimore & Andrew Brown
97	Prickly Honeysuckle, *Lambertia echinata* subsp. *echinata*	Leonie Monks, Gillian Stack, Rebecca Evans & Andrew Brown
98	Mountain Paper Heath, *Sephenotoma drummondii* (Summary of Actions)	Emma Holland, Rebecca Evans, Andrew Brown

Threatened Communities IRPs

75	Cape Range Remipede Community (Bundera Sinkhole)	Sally Black, Andrew A Burbidge, Darren Brooks, Peter Green, Bill Humphreys, Peter Kendrick, Doug Myers, Ron Shepherd and Joanne Wann
76	Camerons Cave Troglobitic Community	Sally Black, Andrew A Burbidge, Darren Brooks, Peter Green, Bill Humphreys, Peter Kendrick, Doug Myers, Ron Shepherd and Joanne Wann

Summary of recovery Team Annual Reports

Summaries of Recovery Team Annual Reports for 2000 that were presented to WATSCU for submission to the Department's Corporate Executive are reproduced below:

ALBANY DISTRICT THREATENED FLORA MANAGEMENT PLAN

by Sarah Barrett for the Albany District Threatened Flora Recovery Team

In 2000, the project was responsible for the management of 73 Declared Rare or Threatened flora in the Albany District. Of these, 13 were ranked Critically Endangered (CR), 26 Endangered (E) and 33 Vulnerable (VU). Priority was given to the management of CR species.

New populations or subpopulations were located for 12 CR, 8 EN and 8 VU taxa. Forty-six species of DRF were monitored. Some 35 poorly known Priority 1 and 2 taxa were also monitored or surveyed for new populations. Several new populations of threatened flora were located with the assistance of the local community.

The plant pathogen *Phytophthora cinnamomi* is an ongoing threat for 19 species of threatened flora. Management of *Phytophthora*, in particular aerial phosphite application and monitoring, continued to be an integral component of Threatened flora management in the Albany District during 2000. A new mineral oil surfactant, Ulvrapon, was trialed in 2000 as well as a new application rate for mountain targets. Phosphite analysis was conducted on samples from three sites.

Wildfires also had a significant impact on a large number of threatened flora species during spring – summer 2000, and in particular on the CR Eastern Stirling Range Montane Community.

Community liaison and education was conducted through newspaper articles, presentations, workshops, an interpretive panel, the establishment of a Rare Flora Garden and leaflet drops.

CENTRAL FOREST REGION THREATENED FLORA and COMMUNITIES TEAM

by K Williams and Respective Project Officers
on behalf of the Central Forest Region Threatened Flora and Communities Recovery Team

The Central Forest Region Threatened Flora and Communities Team has again had a very busy year achieving a number of milestones for which it can be pleased.

Highlights for year include;

- undertaking a translocation of *Grevillea mccutcheonii* and *Lambertia echinata subsp occidentale*, both critically endangered species to two sites within the Busselton Ironstone, critically endangered, community.
- successful *Rulingia* sp seed germination following a series of experimental burn plots to define fire characteristics needed to achieve natural regeneration in the field.
- downlisting or recommendations to downlist *Grevillea elongata* and *Boronia exilis* from Critically Endangered to Endangered following extensive field survey and population definition work undertaken by the team in 1999.
- consolidation and vesting of a number Crown reserves into one nature reserve to protect the type 3c threatened ecological community located at Waterloo, near Bunbury.
- community involvement in the Ironstone translocations, both planting and weed control and assistance with *Rulingia* seed collection.
- continuing success of volunteer involvement in the CFR Herbarium.
- updating of the regional threatened flora dataset and GIS system.
- successfully attracting $50,000 Natural Heritage Trust (NHT) funding for management of Busselton Ironstone TECs.
- discovery of a new occurrence of the P1 species *Brachyscias verecundus* at Tutunup Rd, 130 km out of range and doubling the number of known populations after many years searching.
- the commencement of a project undertaking field inspections and assessment of all known P1 oc-

Community volunteers and CALM staff just prior to planting 400+ Grevillea mccuctchoenii and Lambertia echinata subsp. occidentale in SW Capes District
Photo: Kim Williams

currences across the region. In the first year, with assistance from Science Division staff at Manjimup 12 new populations were also discovered.

Project officers can be equally pleased with progress made towards implementing the 17 interim recovery plans for critically endangered species/ communities within the region.

Unfortunately the year was not without its disappointments, the most significant being the destruction of 57 DRF plants of 6? species, which included one specimens of the CR *Petrophile latericola*, and 13 specimens of *Grevillea elongata* (then CR now EN) during a fire break maintenance operation along Tutunup Road (a Busselton Ironstone TEC). The work was arranged by a community association comprising adjoining landholders and funded by a prominent local mining company. The failure to show due regard and respect for the conservation values at risk, despite three years liaison work by SW Capes district staff. A formal investigation was undertaken and letters of warning issued.

At two other localities, community initiated actions (fire and weed spraying) resulted in the destruction of CR flora. In both cases neither the shire (vested body) or the Department were informed of the intention to undertake these management tasks.

While the involvement of the community is desirable and probably essential if we are to achieve corporate objectives of biodiversity conservation across the state, the dire status of many of our threatened species and the need to apply the precautionary principle to their management is clearly not understood or appreciated by the vast majority of the community.

Goals for 2001

- complete the DGPS'ing of boundaries defining the population extents of all critically endangered species and communities.
- in conjunction with Southern Forest Region and Swan Region improve the

corporate data systems and procedures needed to managed flora and communities.
- further progress the acquisition of the various Crown reserves along Tutannup Rd for inclusion into the conservation estate.
- work with the Shire of Busselton to develop procedures which will assist community groups and individuals to participate in a positive manner to the conservation of threatened flora and communities.
- complete the scope items pertaining to the Busselton Ironstone Natural Heritage Trust funding.
- complete the priority one species field inspection project.
- explore opportunities for collaborative projects with the South West Catchments Council (SWCC)

Swan Coastal Plain Type 3c Critically Threatened Ecological Community Yarloop (Occurrence 6), Waterloo (Occurrence 7)
by Andrew Horan, Project Officer (Bunbury)
Darren Harvey, TEC Officer (Mornington)

During 2000 the focus for ground works has again been weed control and monitoring. This work appears to have been effective thus far, however ongoing follow-up spraying will be crucial to successful control. The Gibson Swan Coastal Plain flora plots have been located and initial resurvey work begun. This needs to be done in 2001 as a priority task and may require expertise external to the Central Forest Region. Liaison has increased with stakeholders and is leading to external agencies and community groups having a greater role in the community management. This has also led to some planning for the further weed control and replanting within the currently weed infested surrounds. Fire Management Plans have progressed with the further development of the wildfire Fire Response Plans. Further work is required to fully develop a holistic Fire Management Plan that deals with long term fire use and its potential positive and negative impacts on the community. Approval to conduct mineral sands mining adjacent to the Yarloop TEC will see a greater allocation of resources to monitoring the impacts of mining operations.

CARNABY'S COCKATOO and MUIR'S CORELLA RECOVERY TEAM
by Andrew Burbidge on behalf of Carnaby's Cockatoo and Muir's Corella Recovery Teams

Recovery Plans for Carnaby's Black-Cockatoo and Muir's Corella were prepared in 1999 with the assistance of a grant from the Natural Heritage Trust.
In early 2000, Birds Australia applied to the Natural Heritage Trust for funds to commence the implementation of the Carnaby's Black-Cockatoo Recovery Plan and the Department applied to the Natural Heritage Trust for funds to commence the implementation of the Muir's Corella Recovery Plan. Both applications were successful. The Recovery Teams will meet in 2001 to coordinate these projects.

GEOCRINIA RECOVERY TEAM
by Kim Williams on behalf of the Geocrinia Recovery Team

Amongst the achievements made during the year 2000, three stand out as having or likely to have significant long term benefits to the conservation of *Geocrinia alba* and *G. vitellina*. The purchase of the 1570 ha location 83 under a joint funding arrangement between the Federal and State governments achieves one of the key objectives that the recovery team has had since its formation in 1992. The acquisition of this property and its inclusion into the conservation estate provides a security of tenure and purpose for approximately 30% of the known *G. alba* populations. The opportunity to enhance this site through more appropriate management than in the past does provide for some optimism against the continuing decline of small populations elsewhere.
The first steps towards actively increasing the number of populations was taken via a translocation of *G. vitellina* egg masses from Spearwood and Geo Creeks into Adelaide Creek. If successful this action will increase the number of subpopulations by two and extend the Extent of Occurrence

of the species from 6.3 km^2 to 8.15km^2, an approximate 30% increase. It is hoped that this is just the first in a series of translocations for both species which over the next 10 years will result in considerable conservation benefits to both of them. Though only in its infancy, the commencement of the Department's covenanting scheme has started the process of providing a greater long term protection of *G. alba* populations on private property than currently exists. The team will aim to increase the number of populations protected by covenants over coming years.

The introduction of the Commonwealth's *Environmental Protection and Biodiversity Conservation Act* 1999 is noted by the team as a welcome addition to conservation legislation. The team recognises that implementation of this Act could be significant to its operation given the large number of *G. alba* populations found on private property and the rapid pace of land use change which is still occurring in the south west corner of WA. Making property owners aware of the Act and their responsibilities is acknowledged by the team as a challenge to be tackled in the coming year.

One of the disappointments during 2000 was the increased pig activity observed during the seasons monitoring program. The transect monitoring site GV5 has been heavily disturbed by pig and kangaroo activity resulting in the apparent extinction of the site. While good numbers of *G. vitellina* persist in the creek away from the monitoring site, the loss of the transect population is regrettable. Ongoing pig control measures were redirected to this site when the disturbance was discovered. Minor pig damage was also evident at a number of other sites.

This years population monitoring program was again undertaken using the linear monitoring technique introduced in 1999. Considerable variation was recorded between the populations monitored. The reasons for this are not clear. A perceived below average winter rainfall, and/or complications of last years burns in the sites monitored may have contributed to this result. Further analysis of this year's data and continuation in subsequent years will be required.

During the year two incidents involving activities on adjoining lands, specifically dam construction for viticulture and tree farming operations, highlighted the vulnerablility of *Geocrinia* populations to potentially negative impacts from adjoining land uses. A washout of a dam spillway directed sediment and invasive grasses (kikuyru) into a creek system approximately 200m upstream from a small *G. alba* population. With cooperation from the land owner, remedial actions were instigated immediately and continue, however no frogs were recorded from this site during the season. Monitoring will need to continue over the next few years to determine the level of impact on the population.

Many properties containing *G. alba* populations also contain bluegum plantings under various sharefarm type arrangements with various companies. The first of the harvesting operations commenced in December with the majority of the plantings due for logging over the next five years. Invariably the plantations have been established right up to the riparian vegetation containing the frog populations. Liaising with the owners and logging companies over appropriate environmental standards, informing them of their obligations under the EPBC Act, and establishing techniques to monitor and quantify impact have commenced and will need continue.

GERALDTON DISTRICT THREATENED FLORA AND ECOLOGICAL COMMUNITIES RECOVERY TEAM

by A M Chant and S. Patrick for the Geraldton District Threatened Flora Recovery Team

This report covers progress made in the implementation of the Threatened Flora Management Plan for the Department's Geraldton District, NHT Project number 446, and Recovery Plans for Critically Endangered Species and Threatened Ecological Communities, from January 2000 to January 2001.

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

A large amount of productive fieldwork has been undertaken

during the year. This has resulted in several species having improved conservation status.
Wildlife Management Program No. 26 Declared Rare and Poorly Known Flora in the Geraldton District has been completed (and is now published). Edited files for this should be processed in the near future.
Interim Recovery Plans or draft plans for the following have been produced and are being implemented, *Caladenia elegans* 2000 – 2003, *Pterostylis* sp Northampton 2000 – 2003, *Verticordia spicata* subsp *squamosa* 1999 – 2002, *Eucalyptus cuprea* 1999 – 2002, *Beyeria lepidopetala* 1999 – 2001, *Caladenia bryceana* subsp. *cracens* 1998 – 2001, *Eremophila viscida* 1997 – 2000, *Conostylis micrantha* 1996 – 1999, *Eremophila nivea* 1996 – 1999 and *Leucopogon marginatus* 1998 – 2000.

LANCELIN ISLAND SKINK RECOVERY TEAM

by David Pearson
for the Lancelin Island Skink Recovery Team

This report summarises work conducted during 2000 on behalf of the Lancelin Island Skink Recovery Team. The Team did not formally meet during 2000.
The Recovery Plan for the Lancelin Island Skink was published during the year (Pearson and Jones 2000: Wildlife Management Program No. 22). A translocation proposal has also been prepared and is currently under review. It proposes to translocate skinks bred at Perth Zoo to Favorite Island in Jurien Bay in March/April 2001 (this has now been delayed to 2002).
The research phase of the project has been completed. Captive breeding of skinks at Perth Zoo for eventual translocation continued during 2000. The Zoo currently holds around 75 *C. lancelini* with a number of eggs currently being incubated.

MOORA DISTRICT THREATENED FLORA RECOVERY TEAM

by Alice Reaveley
for the Moora District Threatened Flora Recovery Team

- Monitored the populations of fifteen critically endangered species in the District.
- Discovered four new populations of the critically endangered *Eucalyptus absita* and one new population of the hybrid *Eucalyptus absita x loxophleba* awaiting confirmation from the WA Herbarium)
- Discovered nine new populations of the critically endangered *Chorizema humile.*
- Discovered one new population of the critically endangered *Synaphea quartzitica.*
- Recorded a new population of endangered *Dryandra serratuloides* subsp. *serratuloides*, previously discovered by Alex George.
- Recorded a new population of endangered *Paracaleana dixonii*, previously discovered by Stephen Hopper.
- Assisted with the planting of further plots of seedlings at the *Daviesia bursarioides* and *Acacia aprica* translocation sites.
- Conducted smoke treatment, fencing and weed control at populations of *Verticordia spicata subsp. squamoasa* with Alanna Chant (Conservation Officer in the Geraldton District).

Assisted WATSCU with determining the extent and boundaries of all DRF and priority species at Cairn Hill, the site of a Threatened Ecological Community north of Moora.

NOISY SCRUB-BIRD RECOVERY PLAN Phase 2

by Sarah Comer & Alan Danks
for the South Coast Threatened Birds Recovery Team.

Several wildfires threatened scrub-bird populations in the Mt Manypeaks area in 2000. These were contained to very small areas by suppression actions. However, a more serious wildfire late in December 2000 burnt out a large section of the Angove Water Reserve and the lakes area in the Two Peoples Bay Nature Reserve. Over 6000 ha of bush was burnt, with habitat in around 65 scrub-bird territories occupied in 2000 lost. This loss of habitat has implications for translocation work in 2001.
The establishment of a Noisy Scrub-bird population in a Western Management Zone continued this year with the translocation of a further 11 birds from the Angove-

Normans area to the Darling Range. Ten males were released at two new sites, King Jarrah West and Sixty-one Form, and one female was released in the Upper Harvey. Singing male Noisy Scrub-birds were counted in Mount Gardner, Angove-Normans, Lakes and Bald Island sub-populations between May and October 2000. The Angove-Normans population showed a significant increase from 1999 with many new territories on both private and public land. The December wildfire however removed scrub-bird habitat in 54% of territories active in 2000. For the second year in a row there has been a significant increase in the number of singing males on Bald Island. There was a small increase in the number of birds in the Lakes area, however most of these territories were also affected by the December wildfire. The number of singing males in the Mt Gardner population was slightly greater than in 1999, with 132 territorial males counted. Management of the Two Peoples Bay Nature Reserve continued under the guidelines provided by the Management Plan (CALM, 1995). The Visitors Centre had over 4000 visitors by the end of November. Regular fox baiting of the Reserve and adjoining Crown reserves was carried out throughout the year.

NORTH WEST CAPE KARST MANAGEMENT ADVISORY COMMITTEE

by Peter Kndrick for the North West Cape Karst Management Advisory Committee

Membership of the committee includes government (commonwealth, state and local), and local community members. The group meets two or three times per year, to oversee conservation actions relating to protection and management of biological values associated with subterranean karst environments on North West Cape. Focus for attention so far has been management of the listed Threatened Ecological Communities of Cameron's Cave and Bundera Sinkhole.

SEDGELANDS IN HOLOCENE DUNE SWALES RECOVERY TEAM

by Deanne Pember
for the Sedgelands in Holocene Dune Swales Recovery Team

The Sedgelands in Holocene Dune Swales community was assessed as critically endangered during 1996.
The community occurs in linear damplands and occasional sumplands (wetlands) between the Holocene dunes formed over the last 7 000 years. Typical native species in the community include the shrubs *Muehlenbeckia adpressa, Acacia saligna* and *Xanthorrhoea preissii*, and the herbs *Baumea juncea, Isolepis nodosa*, and *Poa porphyroclados.*
When conserved as a representative unit the range of different ages of the wetlands along the coastal evolutionary sequence, in association with their geomorphic history, provide important opportunities for research on wetland evolution.
The community is located in the following eight wetland sites:

- Becher Point (a suite of parallel ridges)
- Adjacent to Lake Richmond
- Between Lakes Cooloongup and Walyungup
- Lark Hill
- Yanchep National Park
- Industrial Park 14 (near the corner of Ennis and Patterson Roads in Rockingham)
- Land within the rail loop near the grain terminal on the boundary of Rockingham and Challenger
- Preston Beach (a single swale).

The most typical form occurs in the Becher Suite within the Port Kennedy Scientific Park, a Class A Nature Reserve (Rockingham – Becher plain).
The remaining examples of the critically endangered community are threatened by clearing, disease introduction, changes to hydrological processes, erosion by wind and water, disturbance due to recreational use/maintenance activities, weed invasion, grazing by rabbits, and inappropriate fire regimes.
Since June 1996, the Sedgelands in Holocene Dune Swale Recovery Team has overseen the writing of the Interim Recovery Plan.

SWAN REGION THREATENED FLORA AND COMMUNITIES RECOVERY TEAM

by The Swan Region Threatened Flora and Communities Recovery Team

The Recovery Team includes representatives from three districts, the Department's specialist branches, Botanic Gardens and Parks Authority (formerly Kings Park & Botanic Garden) and local government and community groups. The Team met once in 2000.
With significant input from volunteers Fred and Jean Hort, the region continued searches for new populations of DRF and priority species resulting in the discovery of 15 new populations of six DRF species and 106 new populations of 30 species of Priority Listed Flora Species. This includes eight Priority species where greater than 10 new populations and/or tens of thousands of plants have been found. In addition 10% of known DRF populations in the Swan Region were resurveyed during 2000.
The NHT funded project to write a threatened flora recovery plan for the Swan Region continued through 2000 and is expected to be completed towards the end of 2001.
Management of threatened flora in 2000 included carrying out actions outlined in the Interim Recovery Plans for Critically Endangered species, as well as priority activities in regard to other DRF species, such as installation of roadside markers, weed control, liaison with other agencies, monitoring of translocated populations, and establishment and monitoring of fire research plots.

The TEC, "Stromatolite like freshwater microbialite community of coastal brackish lakes (Lake Clifton)" was upgraded to Critically Endangered in 2000. Some initial liaison between government agencies commenced in 2000. There has not yet been an IRP prepared, or a Recovery Team established, for this community.
There are now 10 Critically Endangered, four Endangered and seven Vulnerable communities recorded from the Swan Region. Interim Recovery Plans were prepared for nine of the 10 Critically Endangered Communities occurring in Swan Region and separate Recovery Teams are established for three of these.
The Region commenced implementation of some of the recovery actions outlined in the IRPs for these CR TECs.

TOOLIBIN LAKE RECOVERY TEAM

by Amanda Smith for the Toolibin Lake Recovery Team

During 2000 efforts have concentrated on several major activities:

- Ongoing management of nine air displacement pumps on the western side of Toolibin Lake, including the investigation of dosing pumps with chlorine to treat iron feeding bacteria build-up, and regular pigging of the pipelines to remove build up. Permanent dosing equipment will be installed in two of the pumps and the transfer station in 2001.
- Completion by external consultants of Stage 2 of the digital model for Toolibin Lake, to determine the impact of various regimes of groundwater pumping on lakebed vegetation. A pump and water transfer system feasibility and design study was also completed in 2000. The results of these two projects have allowed for the planning of three additional pumps on the eastern side of Toolibin Lake to be installed in early 2001.
- An upgrade to the power supply to the eastern side of Toolibin Lake was completed in 2000, as was the installation of switchboards and electrical cabling from three Western Power supply points to the new pumps. Installation of water transfer pipelines from each pump to the site of the new water transfer station was also completed in 2000.
- A new telemetry system was installed in 2000, to transfer and store daily groundwater pumping volumes from the Lake to the Department's Narrogin District Office.
- An upgrade to the monitoring programmes within Toolibin Catchment was implemented. This included building two surface water monitoring weirs in the Toolibin Flats, increasing the number of piezometers monitored at the lake from 27 to 38, and the creation of five additional lakebed vegetation monitoring plots.

The program to develop local species which are commer-

cially prospective, and which meet biodiversity and land conservation needs, was continued in the Toolibin Catchment in 2000. A subsidy for oil mallees was offered, with emphasis below the 320 m contour. A subsidy for biodiversity planting, and fencing of these plantings and/or remnant vegetation, was also offered. Additional biodiversity plantings were also conducted by the Department on purchased land adjacent to the existing reserve system.

WESTERN BRISTLEBIRD RESEARCH PLAN

by Allan H. Burbidge for the WA South Coast Threatened Birds Recovery Team

During 2000:

- several areas were surveyed as part of post-fire monitoring in Fitzgerald River National Park; at one of these, recolonisation has still not occurred after seven years,
- an extensive wildfire in late December 2000 burnt a significant amount of bristlebird habitat in the Two Peoples Bay area,
- monitoring of the translocation site at Nuyts Wilderness, Walpole-Nornalup National Park, showed that at least four of the eight birds translocated in 1999 were still present, indicating that the translocation is likely to be successful, and
- a further seven birds were translocated from Two Peoples Bay to Nuyts Wilderness, Walpole-Nornalup National Park.

WESTERN SWAMP TORTOISE RECOVERY TEAM

by Andrew Burbidge, Gerald Kuchling, Lyndon Mutter and Dean Burford
for The Western Swamp Tortoise Recovery Team

Progress continued towards implementing the actions contained in the Western Swamp Tortoise Recovery Plan and that 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 many of these are juvenile animals. Monitoring data shows that in 1995 (less than five years in the past is not considered to provide reasonably reliable population estimates), 34 non-hatchling tortoises were 'Known To Be Alive', with 20 of these being adults.
- Perth Zoo currently holds 162 tortoises comprising 11 breeding males, 14 breeding females and 137 other tortoises comprising hatchlings, juveniles, sub-adults and non-breeding adults. Thirty-one hatchlings were obtained in 2000 from eggs laid in 1999.
- Groundwater was pumped to North West Swamp, Twin Swamps Nature Reserve early July until the third week of November.
- Twenty-one tortoises, bred and raised to about 100 g body weight at Perth Zoo, were released at Twin Swamps Nature Reserve, in August 1999. Monitoring of captive-bred tortoises released since 1995 shows a reasonable rate of survival; however, it will be some years before any of these animals reach maturity.
- A trial translocation of six captive-bred tortoises was carried out to swamps within land near Lake Wannamal at Mogumber, being acquired by the Department for a nature reserve. Preliminary results show that most grew satisfactorily during winter and spring 2000. Further monitoring, especially during and after aestivation, is necessary before this area can be evaluated.
- The raven 'patrol' commenced in 1998 was again carried out in 2000 during the week in which the last swamp dries at Twin Swamps Nature Reserve. Since its inception, very few juveniles have been lost to ravens. A rat control program at this nature reserve was initiated during 1999 and continues, as there is evidence of rat predation on translocated, aestivating juvenile tortoises.

Of continuing concern is the lack of a new translocation site to release captive-bred tortoises in 2002 and succeeding years. The Recovery Team's preferred site, Perth Airport, was the subject of a hydrological study by Westralia Airports Corporation during 1999 and 2000 to clarify whether future runway extensions may deleteriously affect the target swamps. We-

stralia Airports Corporation advised the recovery team that they were not prepared to agree to a translocation to this area; however, the recovery team has asked them to reconsider. The Team has investigated another possible site at Caversham, owned by the Department of Defence and will approach the Commonwealth to see if part of this area can be set aside for the swamp tortoise.

WONGAN-BALLIDU THREATENED FLORA MANAGEMENT PROGRAM

by Mike Fitzgerald for the Wongan Hills Threatened Flora Recovery Team

In 2000, the Department received NHT funding to develop a threatened flora management program for the Shire of Wongan-Ballidu. The threatened and priority flora that are endemic to this area are not covered by the Merredin District Threatened Flora Management Program, or any other area-based TFMP's.

The Shire of Wongan-Ballidu contains a major centre of floristic endemism in the Wongan Hills area. Whilst containing only 4 000ha of remnant vegetation, the area supports 17 Declared Rare Flora (DRF) and 45 Priority Flora, of which 10 DRF and 11 Priority Flora are endemic.

Wongan cactus (Daviesia euphorbioides) Photo: Stephen Hopper (Botanic Gardens & Parks Authority)

In terms of its endemic threatened flora statistics, the Wongan Hills is broadly comparable with better known regions of flora conservation in Western Australia, such as Mt Lesueur, the Stirling Range and the Fitzgerald River. However, the Hills are quite distinct from these regions in terms of their lower rainfall, much smaller area of remnant vegetation, yet still significant floristic diversity (~800 taxa).

The main emphasis in the project's first year has been data collection to support preparation of the management program. The second year of the current project will see the data collected being used to prepare a working draft management program for the endemic threatened and priority flora of the Shire of Wongan-Ballidu.

WATSNU
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Look for us on -
http://www.calm.wa.gov.au/plants_animals/watscu_splash.html/