



Species and Communities Branch newsletter for Threatened Species and Ecological Communities conservation June 2009
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The unique wetlands of the Canning River East Branch

by Ben Ansell

Volunteer Fred Hort escorted Department of Environment and Conservation (DEC) staff around some extraordinary wetlands in March 2009. Fred Hort, and wife Jean Hort, have an amazing knowledge about our local flora and have noted that the Canning River East Branch wetlands contain a highly diverse and unusual flora.

The Canning River East Branch wetlands occur in jarrah forest near Brookton Highway and cover about 250 hectares. The areas are being considered for nomination as a possible priority ecological community. These winter-wet sites are fringed by jarrah forest and consist of a range of vegetation and soil types. This varied landscape has created a unique and diverse habitat for native flora and fauna.

So far one species of declared rare flora (*Diuris pundiei*), two priority 1 species (*Anthotium* sp. Darling Range and *Isopogon* sp. Canning Reservoir) and two priority 2 taxa (*Byblis gigantea* and *Petrophile filifolia* subsp. *laxa*) have been located within the wetlands. There are some 130 flora taxa recorded within the area to date, and the list is still growing with some plants of interest yet to be identified.



Threats to the area include disturbance by feral pigs, climate change (many native species rely on winter inundation for survival, and climate change appears to be resulting in drier seasons), dieback (*Phytophthora cinnamomi*), potential future mining works and inappropriate fire regimes.

The priority 1 *Isopogon* sp. Canning Reservoir was observed during the March 2009 visit. This species is only known from two locations and recent monitoring indicates that it is in decline.



These unique wetlands will require continued management such as pig control, and careful fire management and monitoring to ensure they maintain their significant conservation values.

For more information contact Ben Ansell on (08) 9295 9112 or email ben.ansell@dec.wa.gov.au

Above left Priority 2 species, *Byblis gigantea*, occurring at the wetland.

Above Priority 2 species, *Petrophile filifolia* subsp. *laxa* occurring at the wetland.

Below right A robber fly visiting a plant at the wetland.

Photos – Jean Hort

Below Fred Hort and DEC staff discussing aspects of the wetland.

Photo – Carol Benitez



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Sandhill dunnarts WA: survey, ecology and conservation biology

by Glen Gaikhorst, Cathy Lambert and Keith Morris

The sandhill dunnart (*Sminthopsis psammophila*) is an endangered carnivorous marsupial known from less than 100 specimens since being described in 1894 from an animal found in the Northern Territory. The species was thought to be extinct until 1969, when five animals were discovered in South Australia. The species was then discovered in Western Australia in 1985 at the Mulga Rockhole area of the Great Victoria Desert (GVD). In 1987, several animals were captured in Queen Victoria Springs Nature Reserve.

Since 2000, two week field trips have been conducted into the GVD with the aim of locating populations and collecting information on their ecology and biology. In total 11 trips have been completed with animals caught north and east of their previously known range.

With funding assistance from *Bankwest Landscape Conservation Visa Card, four areas were sampled during two survey trips in the GVD. Two of these areas were in the Plumridge Lakes Nature Reserve. Another area was to the north-east of Mulga Rockholes on the eastern edge of the yellow-orange dunal zone where there were historical captures in 1985, and the final area was about 20 kilometres east of here. No sandhill dunnarts were caught in Plumridge Lakes Nature Reserve, even though the western edge of the reserve contained some potentially suitable habitat. However, although most of the area near the 1985 Mulga Rockholes site was burnt in 1999 and is unsuitable for sandhill dunnarts, there were some small patches of habitat persisting and one juvenile male was caught here. Two young females were also caught further east of this location.

Further surveys are planned in the GVD to search for sandhill dunnart populations.



Surveys outside of the current distribution such as Plumridge Lakes Nature Reserve are also planned to search for other populations to increase the current knowledge on the species' distribution. Long-term population monitoring will also be continued to establish population size, habitat usage and density.

For more information contact Glen Gaikhorst by email glen.gaikhorst@ghd.com.au

*In 2008 the Bankwest LANDSCOPE Conservation Visa Card project officially closed.

Above Sandhill dunnart.

Below left Female sandhill dunnart with young.

Below Ningai eating a grasshopper.

Photos – Glen Gaikhorst



Toolibin Lake surface water management – Dulbining waterway

by Raymond McKnight and Marie Edgley



Toolibin Lake is located in the Western Australian Wheatbelt about 40 kilometres east of Narrogin. The catchment covers an area of 48,000 hectares and is managed as a Natural Diversity Recovery Catchment by DEC.

It is one of the last remaining inland freshwater lakes in south-western Australia with an extensive woodland community of *Casuarina obesa* and *Melaleuca strobophylla* across the lake floor. Together with Dulbining Lake to the north and Walbyring Lake to the south, this community is recognised as being a critically endangered threatened ecological community in this State, and is also listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. The community is also listed under the Ramsar Convention as a Wetland of International Importance due to its significance as a breeding habitat for native waterbirds.

A surface water management plan for Toolibin Lake was developed in 2004 and stage one of the plan (Dulbining waterway) was approved in 2006. The engineering work undertaken addresses the threats of increasingly saline surface water flows and prolonged inundation in some parts of the catchment. If left unmanaged, Toolibin Lake would not receive the quality or quantity of surface water necessary to meet its ecological requirements.

The Dulbining waterway is located in Dulbining Nature Reserve, just north of Toolibin Lake. The waterway is designed to address: inundation and severe decline in vegetation health in Dulbining Nature Reserve; salt scalding as a result of poorly defined drainage and evaporation of ponded water in parts of the reserve; and salinisation and vegetation decline on Dulbining Lake that has occurred due to extended periods of inundation.

Works have been implemented with funding received from the State Salinity Strategy, and Natural Heritage Trust (NHT) through the South West Catchment Council.

Above from left Vegetation of Lake Toolibin; waterway near the inlet at Dulbining Lake. Demonstrates the design of the waterway to flood out into the surrounding area then recede back into the waterway preventing ponding; and waterway looking east on Oval Road showing high water mark and hydrologist Lance Mudge collecting data. Photos – Ray McKnight
Equipment removing bulk material. Photo – Marie Edgley

Right Aerial view of Lake Toolibin and surrounds. Photo – Wings Photographics

Once the project is complete, the expected effects of the Dulbining waterway are:

- reduced water logging and inundation of vegetation in Dulbining Nature Reserve;
- reduced salinisation of areas from ponding of water;
- improved health of lake floor vegetation at Dulbining and Toolibin lakes;
- lower salt storage above Toolibin Lake;
- improved quality and quantity of surface water flow to the diversion gates at Toolibin Lake;
- greater capacity to manage surface flows at Toolibin Lake, if declining rainfall patterns continue; and
- improvement and possibly recovery of Dulbining Lake.

Construction began on 12 November 2007. The waterway was cleared with the vegetation and topsoil removed before removal of the subsoil. The waterway is almost six kilometres in length (including feeder drains), with the lower sections of the waterway almost completed to design specification. The full length of stage one of the waterway will be completed by the end of 2009 with most of the work completed by April 2009.

The largest task has been removing and stockpiling the soil with an estimated 40,000 cubic metres of soil being removed. Areas that receive this soil will be rehabilitated. Up to two graders, three tip trucks, a roller, a water truck and a loader are on-site each day. Contractors have been on site for more than six months during summer and autumn 2008 and summer 2009.

Significant and prolonged rainfall has been a major challenge to starting and completing on-ground works. The impact of these events on the project has been minimised through good liaison between local DEC



staff, surveyors, contractors and DEC's Wheatbelt hydrologist.

Toolibin Lake is also managed as part of the DEC's Natural Diversity Recovery Catchment Project. Recovery actions are achieved with involvement of the local community through the Toolibin Lake Catchment Group and the Facey Group. Key stakeholders are involved in decision making and provide technical advice through the Toolibin Lake Recovery Team and Technical Advisory Group. Local government authorities and private industries have also provided technical and practical expertise to achieve waterway design and construction.

Department of Agriculture and Food WA and The University of Western Australia are specifically involved in the monitoring component of this project through jointly funded surface water monitoring and surface water and ground water interaction programs.

The waterway was tested during a recent summer rainfall event when up to 50 millimetres was dumped in areas of the catchment over relatively short time. Although not totally complete, the waterway worked well with the high water mark at one centimetre above the design.

For more information contact Raymond McKnight at DEC Narrogin office on (08) 9881 9206 or email raymond.mcknight@dec.wa.gov.au

The rare stromatolite association in Lake Thetis

by Damian Buller and Wendy Chow



Top (left) Stromatolites at Lake Thetis. **(right)** Boardwalk and signage at Lake Thetis. Photos – Val English

Above (left) Algal mats at Lake Thetis. Photo – DEC **(right)** Greeting sign at Lake Thetis. Photo – Wendy Chow

Lake Thetis, located near the coastal town of Cervantes in the Shire of Dandaragan, is a small permanent, saline lake. It is one of the very few places in the world where living marine stromatolites occur and the 'stromatolite community of stratified hypersaline coastal lakes' is listed as vulnerable in Western Australia.

Stromatolites have been recorded in fossil records for over 2.7 billion years and it is thought they may have helped to create the oxygen we breathe today. Cyanobacteria and diatoms are the organisms primarily responsible for stromatolite construction. Their metabolism yields byproducts such as calcium carbonate which are used in the production of the stromatolites. The mucous that coats cyanobacterial cells is also thought to trap particles from the water column and glue them together with the calcium carbonate to form a solid structure.

The Lake Thetis stromatolites exhibit unusual columnar branching. These narrow, closely spaced and almost parallel columns are extremely rare in modern stromatolites.

Alongside the stromatolites, a diverse array of benthic microbial communities, such as algal mats, inhabit various layers of the

lake. Some of these algal mats are associated with the stromatolites while most confine themselves to a particular area such as the high foreshore areas, splash zone or the central basin of the lake.

The stromatolite community is threatened by nutrient enrichment and physical crushing. An interim recovery plan is currently being written which will provide direction to further protect this extremely valuable community for future generations.

A number of actions are being undertaken by DEC's Moora district to protect the threatened ecological community. A walk trail and board walk have recently been constructed around Lake Thetis to help ensure minimal visitor impact. This is coupled with interpretative signs that provide information about the stromatolites, flora, fauna and cultural values of the lake. Additionally, a disused rubbish pit on the northern side of the lake is currently being rehabilitated and this has eliminated threats associated with rubbish disposal.

For more information contact Wendy Chow on 9334 0372 or by email wendy.chow@dec.wa.gov.au



Mucheia limestone on property purchased by DEC. Photo – Melissa Hoskins

Purchase of rare community for conservation

by Val English

DEC is continuing with a series of purchases of land that contain a suite of rare and threatened plant communities. So far, DEC (and previously Department of Conservation and Land Management—CALM) has purchased three areas of private land that contain the rare 'Shrublands and woodlands on Muchea Limestone' threatened ecological community. The latest of these is a property on McVee Road in Gingin. This area contains an additional seven hectares of the Muchea Limestone community in very good condition and includes a buffer of banksia woodland. Land containing an approach track was also purchased, so DEC can access the site to manage it.

The McVee Road property was also noted to contain some very unusual pools when visited by CALM staff in 2001. The pools contained microbes that appeared to be causing the precipitation of iron. This was thought to be associated with the process of formation of the substrate for another threatened ecological community – the nearby 'Perth to Gingin Ironstone Association'. The land purchase provides the opportunity to study the processes occurring in these pools in more detail.

There are about 180 hectares of the Muchea Limestone community known, of which about 74 hectares has now been purchased for conservation. Another three properties totaling about 80 hectares have been acquired through other means such as through 'offsets' negotiated as part of the approvals for developments.

The McVee Road land purchase represents another extremely important addition to the conservation reserve system and will help to further improve the future prospects for this very unusual community.

For more information contact Val English on (08)9334 0409 or email val.english@dec.wa.gov.au

Radio tracking of the western swamp tortoise

by Melissa Hoskins and Gerald Kuchling

The western swamp tortoise (*Pseudemydura umbrina*) is listed in Western Australia, and under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, as critically endangered. It is one of the world's rarest tortoises with only four known populations, two of these the result of translocations. The western swamp tortoise inhabits shallow, ephemeral, winter-wet swamps on clay or sand-over-clay soils with nearby suitable aestivating refuges. Threatening processes including clearing and drainage have destroyed most of the tortoises' original habitat within its very small former range, and the existing protected habitat is marginal.

Since 1978, the Department of Fisheries and Wildlife and its successors, the Department of Conservation and Land Management (CALM) and DEC, have been acquiring property containing suitable habitat for the tortoise. This is enlarging and enhancing the reserves by adding areas to the conservation estate, and helping to ensure the tortoises' protection. The most recent purchase is a 20-hectare property near Mogumber that contains suitable habitat for the tortoise and forms a link between nearby nature reserves containing important wetlands.



DEC Research Scientist Dr Gerald Kuchling undertakes research and monitoring on the tortoise to assess populations, provide population estimates and monitor the success of translocations. Radio-tracking the tortoise populations at each of the reserves where they currently occur forms a major part of this work, with the movements of 42 tortoises currently followed. Radio-tracking occurs in summer, winter and spring with the frequency varying from monthly to

Left Dr Gerald Kuchling with a western swamp tortoise that has been radio-tracked.

Photo – DEC

daily depending on various factors such as aestivation times and nesting times. The purpose of tracking the tortoises is to obtain detailed information regarding their behaviour and habitat use, and to provide an insight into predation issues. The collection of these data adds to the current knowledge base and provides valuable assistance to guide management of western swamp tortoise populations.

A funding grant recently received by DEC through Perth Zoo's Wildlife Conservation Action (WCA) program has been used to purchase a number of radio transmitters and a new receiver to track the tortoises' movements. The Friends of Western Swamp Tortoise have also contributed funds for the recovery program. A second grant also received from funds raised through Perth Zoo's WCA has enabled DEC to acquire cameras which will be set up at nesting sites to capture information on the predation of western swamp tortoise nests and eggs this autumn.

For more information contact Dr Gerald Kuchling on (08) 9405 0753 or email gerald.kuchling@dec.wa.gov.au

Far-flung regions linked to learn about monitoring of species and communities

By Amrit Kendrick

On 25 March this year, three DEC staff and six Natural Resource Management project staff were involved in a video conference about monitoring animals, plants and communities around the State. The Species and Communities Branch Training Coordinator delivered the short course from DEC's Crawley office.

DEC's Regional Services Advisor operated the technology to link participants in DEC's Karratha office with the Esperance South Coast Development Commission, and the Albany Worklink Telecentre.

Handouts, a whiteboard and slides were used in three one-hour sessions spread over four and a half hours. Material covered included the legislative and adaptive management context for monitoring, standard operating procedures, monitoring protocols, report forms and databases. During breaks, participants completed small group assignments. During the final hour, time was allocated for a verbal evaluation of the course, and feedback was very positive.

For more information contact Amrit Kendrick on (08) 9334 0315 or email amrit.kendrick@dec.wa.gov.au



Setup of the video conference. Photo – Amrit Kendrick

Characterising Wheatbelt woodlands

by Greg Keighery and Judith Harvey

During January to March 2009 staff from Avon Base-lining project (a joint DEC Regional and Natural Resource Management project) worked with Science Division staff to characterise woodland types of the Wheatbelt. This work has used:

- an analysis undertaken for the Species and Communities Branch using floristic data from 650 sites (Science Division's Wheatbelt survey, WWF's Woodland Watch and other data);
- raw data from WWF and photographs from WWF and the Wheatbelt survey;
- GIS layers such as vegetation layers, orthophotos, geomorphology, contours and the large-scale vegetation mapping being digitised and attributed by project staff; and
- input from other experts such as those from the Science Division and private consultancies.

The aim was to identify Wheatbelt Woodland communities and sub communities based on floristic composition, distribution, substrate and geomorphology.

This is an important step towards identifying priority ecological communities. General benchmark descriptions (examples of good condition sites) will be developed and where possible illustrated by on-ground reference sites. This will provide a useful tool for future surveys, on-ground comparisons and monitoring management activities.

Already this process has identified:

- much reduced and now potentially rare woodland types (eg black and red morrell);
- apparently rare community types on unusual substrates. Some of these will be at great risk from hydrological change, for example; it is apparent that there are at least three types of flat topped yate woodlands based on understorey, one of which is largely restricted to the Wheatbelt; and
- naturally rare mallet types, such as silver mallet.

Gaps in our knowledge are also becoming apparent; there is a large number of poorly known woodlands that were inadequately sampled, eg: black wandoo (*Eucalyptus melanophitra*) woodlands, blackbutt (*E. patens*)

woodlands over *Allocasuarina spinosissima*, flooded gum (*E. rudis*) woodlands over herbs and gimlet (*E. salubris*) over *Atriplex stipitata* shrubland. This is not surprising as over 780 structural plant communities have been recognised across the Wheatbelt in the numerous reports on the region. Some of these plant communities could be of considerable conservation significance.

Future work, additional to surveys of gaps mentioned previously, would incorporate the large amount of structural vegetation mapping into this matrix and the additional surveys by WWF, WA Wildflower Society and others.

For more information contact Judith Harvey by email judith.harvey@dec.wa.gov.au

Below from left Gimlett (*Eucalyptus salubris*) on clay in Kenderup; survey quadrat being set up in powderbark wandoo (*E. accendens*) south-west of Northam; black morrel woodlands (*E. melanoxylon*) near Dundinin; and gimlett over *Melaleuca* species near Pingrup. Photos – DEC



Bush Rangers WA annual in-service conference 15 – 17 March 2009

by Monica Hunter

The staff that deal with threatened ecological communities at DEC's Species and Communities Branch conducted a session at the recent Bush Rangers in-service conference at Wollaston College. Bush Rangers WA is a voluntary nature conservation program run by DEC for secondary school-aged people. The program supports DEC's aim to work with the community to conserve Western Australia's biodiversity and natural resources.

The aim of the annual in-service conference is to bring together unit leaders and instructors from around Western Australia, many of which are high school teachers, and provide them with the opportunity to network and receive up-to-date information relating to current environmental issues and new initiatives.

The session presented by Species and

Communities Branch staff began with a presentation on defining, managing and monitoring threatened ecological communities. This was followed by a field component in the nearby Bold Park. The field component was undertaken in a priority 3 ecological community – the 'Northern Spearwood shrublands and woodlands'. The participants were involved in setting up and sampling monitoring quadrats. Participants had the opportunity to fill out survey sheets, use a GPS and identify plant species. Positive feedback was received and a number of teachers were interested in teaching students how to set up quadrats in their bushland areas as part of their own programs.

For more information about the Bush Rangers program contact Richard Weatherill on (08) 9334 0137 or email richard.weatherill@dec.wa.gov.au or visit www.dec.wa.gov.au/schools-programs/bush-rangers/index.html



Top Jill Pryde assisting Bush Ranger leaders with their bush survey sheets. **Above** Monica Hunter demonstrating how to set up a vegetation survey quadrat to Bush Ranger leaders. Photos – Wendy Chow

Surveying for marsupial moles at Neale Junction Nature Reserve

by Karl Brennan, Stewart Ford and Pat Woolley

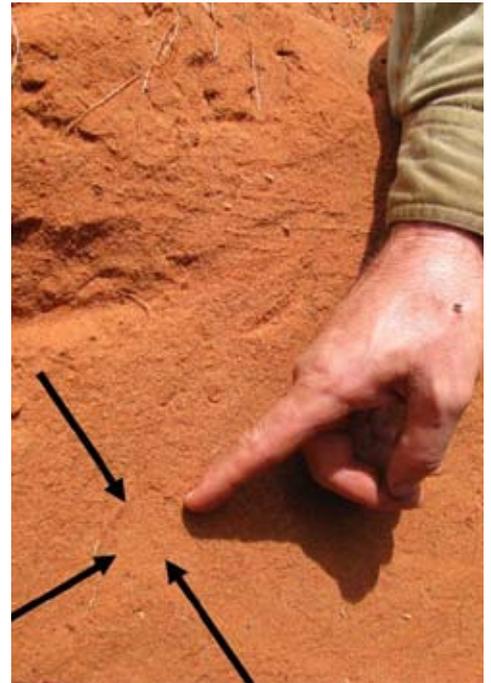
In April and October 2008 more than 80 people converged on Neale Junction Nature Reserve in the Great Victoria Desert (GVD) to undertake a large-scale biological survey. High on the list of priorities was surveying for the elusive southern marsupial mole or itjaritjari (*Notoryctes typhlops*). The itjaritjari is listed as endangered in the International Union for Conservation of Nature (IUCN) Red List, the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and the schedules of the Western Australian *Wildlife Conservation Act 1950*. A key action in the recovery plan for the itjaritjari is developing a better understanding of its geographic range and area of occupancy.

Although well known to Aboriginal people of the Western Desert, to western scientists the itjaritjari is known only from widely scattered localities. They are difficult to detect because they spend most of their lives underground. Previous research by DEC Research Scientist David Pearson and Jan Turner has shown they occur in the Queen Victoria Springs Nature Reserve on the south-western edge of the GVD, but it was not known if they occurred within the five other reserves within the GVD.

There are three primary methods to survey for moles and all are highly labour intensive. They are:

- digging soil trenches (1.2 metres long x 0.6 metres wide x 0.8 metres deep) to look for signs of tunnels (moles effectively swim through the sand back-filling their tunnels as they go);
- looking for characteristic tracks and pop holes where moles have emerged from their underground tunnels. A previous survey by Joe Benshemesh in South Australia found only one sign for approximately every 20 kilometres an observer walked; and
- identifying hair and bones left in the scats of their predators (dogs, foxes and cats). In the survey mentioned above only 1.5 per cent of all scats contained hair from moles.

Faced with the problem of highly labour intensive survey techniques needing to be deployed across the State's fifth largest terrestrial reserve (Neale Junction Nature Reserve covers 723,073 hectares) a partnership was developed between DEC's Goldfields Region, fee-paying LANDSCOPE expeditioners, traditional owners from the Pila Nguru (Spinifex People) and representatives from the Tropicana Joint Venture (AngloGold Ashanti Australia/Independence Group).



The latter was represented by staff from the AngloGold Ashanti Exploration team and a team of zoologists from Ecologia Environmental Consultants.

Evidence of the back-filled tunnels thought to be made by moles was found on nearly every sand dune where trenches were dug in Neale Junction Nature Reserve. Moreover, predator scats containing mole hair and bones were collected. Following this highly successful outcome, more surveys for moles are planned for other areas in DEC's Goldfields Region.

**For more information contact
Dr Karl Brennan, DEC's Regional Ecologist
for the Goldfields on (08) 9080 5555,
Dr Stewart Ford, Manager Vertebrate
Fauna, Ecologia on (08) 9322 1944, or
Dr Pat Woolley, La Trobe University.**

Clockwise from top left

Karl Brennan smooths back the wall of a trench to increase the ease of spotting the back-filled tunnels made by moles as they swim through the sand.

A tunnel thought to be made by a mole. Arrows indicate the tunnel's circumference.

Karl Brennan, within a partially completed trench, takes a break from digging to point out a potential mole tunnel that is already visible.

Photos – Simon Tucker

A wooden statue of an itjaritjari carved by Angelina Woods from the Spinifex Mob.

Photo – Louise Allerton

Draining excess water from the landscape – Lake Wheatfield case study

by Kimberly Oswald

Lake Wheatfield is part of the Lake Warden Wetland System in the DEC Esperance District. The wetland system is listed as a wetland of international importance under the Ramsar Convention and was also included under the Western Australian Salinity Action Plan as a Natural Diversity Recovery Catchment.

Broadscale clearing of perennial vegetation in the catchment and its replacement with annual pastures has caused the water table to rise and has increased runoff. The vegetation that surrounds the lakes and provides habitat to many of the waterbirds has declined and is under threat due to inundation. Birds like the hooded plover, that live and breed on the lake beaches can no longer do so and their numbers have decreased from over 1,500 in 1996 to less than 400 in 2008.

To combat these problems, a revegetation program coordinated by South Coast Natural Resource Management has been in place since the 1990s. It involves small landholders within the recovery catchment switching from annual to perennial crops which use up more of the ground water. But this is a long-term solution and the benefits will not occur rapidly enough to prevent further degradation of the wetlands. Modelling included in an environmental impact assessment on the wetlands approved by the Environmental Protection Authority, indicated that a combination of perennial revegetation and a system of dewatering the wetlands would be needed to reduce the detrimental impacts of the rising water level in the lake systems.

Phase 1 of the engineering interventions requires the de-watering of the excess water from Lake Wheatfield into Bandy Creek by means of a gravity-fed pipeline. The construction of the 900-metre long pipeline started on 23 February 2009 and was completed on 1 April 2009. The intention is to maintain the optimal water depth in the lake between 0.8 metre and 1.6 metre. Water discharge is estimated at a maximum of 120 litres per second. Monitoring equipment is installed to continually measure the lake depth and discharge through the pipeline.

The Esperance District Office has also recently purchased specialised water quality monitoring equipment to monitor discharge conditions in Lake Wheatfield, Bandy Creek and in Bandy Creek Harbour for specific aspects, such as total nitrogen, total phosphorus, nitrates, chlorophyll A and dissolved oxygen. These tests will reveal any fluctuations in the water quality and allow monitoring of the effects of the water being discharged from the lake into the marine environment. The monitoring will be included in the environmental impact



From above clockwise Hooded plover.
Photo – Tilo Massenbauer
White faced heron perched on a dead *Melaleuca cuticularis*.
Photo – Kimberley Oswald

Aerial photo of the wetlands system showing surrounding cleared agricultural land.
Photo – Tilo Massenbauer
Pipeline entry point at Lake Wheatfield.
Photo – Kimberley Oswald
Pipeline exit point at Bandy Creek.
Photo – John Lizamore



assessment for phase 2 of the project, which will entail a pipeline from Lake Warden to the ocean planned for 2011.

By decreasing the water levels in Lake Wheatfield it is envisaged 45 hectares of *Melaleuca cuticularis* and *M. brevifolia* shrublands and 150 hectares of summer wading waterbird habitat will be recovered. The project is funded through the National Action Plan for Salinity and Water Quality, the Natural Heritage Trust and the National Landcare Program.

For all inquiries relating to the Lake Warden Recovery Catchment please contact John Lizamore at Esperance on (08) 9083 2100 or email john.lizamore@dec.wa.gov.au



Teaching children about the conservation of threatened species and communities

by Renée Hartley

This year, school children will be given the opportunity to learn a lot more about our local threatened species and ecological communities.

In January 2009, DEC released the Back from the Brink Teacher Resource, designed for Years 5 to 10. The resource is the first to use examples from the Northern Agricultural Region to teach students about:

- threatened species and communities;
- processes threatening our biodiversity; and
- actions we can take to help conserve our natural environment for future generations.

The resource covers environmental issues faced throughout the region and positive outcomes that can be achieved by local communities. However, it is also applicable to the majority of Western Australia, and even Australia. It is broken up into five main activities which can be adjusted to suit the students' needs and learning levels. There are numerous fact sheets and links to more information. The resource is closely aligned with the curriculum and the learning outcomes are clearly referenced throughout.



The Back from the Brink Teacher Resource has already been presented to a number of schools in the Midwest and has been very well received. This resource is part of the many wonderful resources and experiences offered by DEC's EcoEducation, designed to generate interest in and action for biodiversity conservation, sustainable living and practical ways to act on conservation issues. It has been produced under the Back from the Brink project, funded by the Federal and State governments, administered by the Northern Agricultural Catchments Council and implemented by DEC.



Above left Back from the Brink Conservation Officer, Emma Richardson, demonstrating the wonder of nature and science. Photo – Renee Hartley

Above Marine Park Ranger, Lee Butcher, showing students of Jurien Bay District High School the local marine life in a touch pool. Photo – DEC

For more information on the resource or the Back from the Brink project, contact Renée Hartley or Emma Richardson on (08) 9652 1911 or email renee.hartley@dec.wa.gov.au

Recent changes to WA threatened species under the EPBC Act

by Melanie Smith

There are a significant number of discrepancies between the threatened species that are listed under the Western Australian *Wildlife Conservation Act 1950* and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). For example, some species are listed under the State legislation but not under the Commonwealth's, while others are listed under both but in a different threat category.

These discrepancies can lead to inconsistencies in the advice provided by the State and Commonwealth departments and is confusing to members of industry and the public. In an attempt to address this problem, DEC and the federal Department of Environment, Water, Heritage and the Arts (DEWHA) agreed to undertake a project to align the two lists, with funding provided by the Commonwealth.

Fifty two amendments to the EPBC Act list have been finalised through the Species Information Partnership. The most recent changes include:

Flora	<i>Acacia imitans</i>	Listed as endangered
	<i>Banksia pseudoplumosa</i>	Listed as endangered
	<i>Boronia clavata</i>	Listed as endangered
	<i>Caladenia melanema</i>	Listed as critically endangered
	<i>Caladenia procera</i>	Listed as critically endangered
	<i>Darwinia macrostegia</i>	Delisted (from vulnerable)
	<i>Daviesia obovata</i>	Listed as endangered
	<i>Grevillea brachystylis</i> subsp. Busselton (G.J.Keighery s.n. 28/8/1985)	Listed as critically endangered
	<i>Reedia spathacea</i>	Listed as critically endangered
	<i>Schoenia filifolia</i> subsp. <i>subulifolia</i>	Listed as endangered
Fauna	<i>Synemon gratiosa</i>	Listed as endangered
	<i>Neopasiphae simplicior</i>	Listed as critically endangered

Twenty other species that have been assessed by the Commonwealth Threatened Species Scientific Committee are under consideration for listing/delisting/change in category in the next six months. EPBC Act listings can be viewed on the DEWHA website: www.environment.gov.au/epbc/about/lists.html#species

For more information contact Melanie Smith on (08) 9334 0472 or email melanie.smith@dec.wa.gov.au

Promotion of threatened fauna issues

by Val English

The plight of Western Australia's threatened fauna was promoted this year in the annual 'Sculptures by the Sea' exhibition. The exhibition was open between 5 and 24 March 2009 and included 60 red plastic safety cones that depicted Western Australian fauna that are under threat of extinction. The exhibition attracted an estimated 110,000 visitors in 2008, so the inclusion of the sculpture provided an excellent avenue for the promotion of the predicament of many of the State's fauna.

The sculpture was created by Angela McHarrie and Robyn Bogdanis and was entitled 'Red List'. The title refers to the International Union for the Conservation of Nature's (IUCN's) official 'Red List' of threatened species. The 'Red List' is a comprehensive, objective global approach for evaluating the conservation status of plant and animal species. The IUCN categories and criteria are applied to assess the level of threat to Western Australian species and to help to prioritise conservation action.



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Above (Left): Butler's dunnart printed on a red plastic safety cone at the Sculptures by the Sea exhibition. **(Right)** Remipede crustacean printed on a red plastic safety cone at the Sculptures by the Sea exhibition.

Photos – Wendy Chow

Lake Clifton thrombolite community – recovery activities update

by Jill Pryde

A field day was organised on 1 April 2009 for members of the Lake Clifton Recovery Team and other people involved in research or who have an interest in the recovery and health of Lake Clifton and the thrombolite community. The Lake Clifton thrombolite community is listed as critically endangered in Western Australia. It lies south of Mandurah within Yalgorup National Park and is part of the Peel-Yalgorup wetlands of international importance listed under the Ramsar Convention. Some of the threats facing the thrombolite community include declining water levels, increasing salinity, increasing nutrients and changes in the water composition.

Members of the recovery team for the lake include representatives from the Peel Harvey Catchment Council, City of Mandurah, The University of Western Australia, Friends of Lake Clifton, CSIRO (corresponding member) and DEC.

The aim of the field day was to visit sites of interest which some members have not had the opportunity to see in the past and to provide a forum to enable informal discussion on management of threatening processes and recovery actions. Sites included the locations of the newly purchased data loggers and a rain gauge; hydrological sampling sites; and tuart revegetation trial sites set up by Katinka Ruthrof of the Tuart Health Research Group. Katinka is currently looking at the hydrological links between tuart health and health of Lake Clifton. The group was also briefed on a new project to gather information for the coastal strip (west of Old Coast Road) between Dawesville and Binningup with the aim of the Environmental Protection Authority developing a position on land use in the area.

Highlights of the 2008 year included:

- DEC's Natural Resources Branch produced a monitoring and threat assessment strategy for the thrombolite community of Lake Clifton. This will compliment existing projects.
- The Recovery Team purchased water monitoring loggers and installed a rainfall gauge on a property at the eastern edge of Lake Clifton enabling accurate measurement of local rainfall.
- Monitoring and evaluation guide developed for the Peel-Yalgorup Ramsar site by the Peel-Harvey Catchment Council (Inc.) and DEC.
- A public nomination of the Lake Clifton community for listing under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* submitted by community members of the Recovery Team to the Commonwealth Department of Environment, Water, Heritage and the Arts.

Jennifer Alexander PhD candidate, supervised by Professor Jacob John from Curtin University, received an Australian Research Council scholarship that will enable her to conduct her research program full time. Her project is entitled 'Microbial Communities and conservation of thrombolites in Lake Clifton'.

Monitoring in Bentonite Lakes

by Wendy Chow

Bentonite lakes are located in the Watheroo-Marchagee area across Watheroo National Park, Pinjarrega Nature Reserve, unallocated Crown land and private property. This series of herb-dominated lakebeds are listed as a threatened ecological community (TEC) and ranked as endangered.

This herb-dominated TEC is dependent on intermittent freshwater inundation and regular drying out of the lake bed for survival. The lake beds consist of heavy cracking clays that facilitate infiltration of water into the subsoil (bentonite) floors. Bentonite swells after inundation and this provides a sealing surface which is thought to be favorable to the growth of the herb layer.

During the months of December 2007 and February and July 2008, higher rainfall levels were recorded and subsequently during spring the herb layer germinated and flowered on the lake beds. This was the first time the TEC has been known to flower in over five years and a spring survey was carried out on several occurrences of the TEC.

Not much is known about the germination requirements of the herb layer but it is assumed that herbs require higher levels of rainfall. There is also very little information about the response of each herb species to water-logging, salinity and other disturbances (feral animals such as goats, weed invasion, fire and wind erosion). Filling these knowledge gaps is a priority.

Hydrological monitoring of the TEC has been in place since 2007. The aim of the hydrological investigations is to monitor water levels and drainage, to capture salinity measurements at particular flow points, and to estimate evaporation and rainfall. This will provide a clearer picture on salinity trends and threats to the TEC.

Trends to date suggest that surface flow and salinity is accumulating in the main Pinjarrega Nature Reserve drainage line, which is reflected in the highly degraded vegetation that occurs close to or on the drainage line which are largely dominated by *Tecticornia* (salt-adapted species) and dead stands of trees (see photo this article). This may affect occurrences of the TEC that occur in close proximity, which therefore highlights the importance of continual hydrological monitoring. Another trend indicated by the data is that evapotranspiration is greater than rainfall. This may decrease the chance of substantial recharge events which in



From top: Herb layer growing on the lake bed; Bentonite Lake; a stand of dead trees along drainage line; Bentonite Lake hydrological monitoring.

Photos – Wendy Chow



turn decreases the surface water flow events into other water bodies. It is assumed that movement of salt in Pinjarrega Nature Reserve's main drainage line rarely takes place and occurrences located away from the main drainage lines are thought to be relatively unaffected by salinity.

It is anticipated that, in future, the hydrological monitoring coupled with vegetation monitoring will give a clearer indication of how hydrology affects the TEC.

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Regional flora management program and recovery plans approved

A regional flora management program has been published and two new fauna recovery plans and four new flora interim recovery plans have recently been endorsed by DEC's Director of Nature Conservation.

The recently published regional flora management plan covers the Warren Region, and is entitled *Declared rare and poorly known flora in the Warren Region*, Wildlife Management Program No. 40 by Roger W. Hearn, Rachel Meissner, Andrew P Brown, Terry D Macfarlane and Tony R Annel. The development and publication of this plan was assisted by funding from the Commonwealth's Endangered Species Program (this preceded the more recent Natural Heritage Trust funding programs). There are currently 12 published flora management programs for DEC regions and districts.

The fauna recovery plans are:

No/series no.	Title	Prepared by	DEC Region/District involved
WMP 41	Dunsborough Burrowing Crayfish (<i>Engaewa reducta</i>), Margaret River Burrowing Crayfish (<i>Engaewa pseudoreducta</i>) and Walpole Burrowing Crayfish (<i>Engaewa walpolea</i>) Recovery Plan 2007-2016	Kellie Mantle for the Burrowing Crayfish Recovery Team	Blackwood, South West and Frankland, Warren
WMP 46	Rufous Hare-wallaby Recovery Plan 2007-2011	Dr Jacqueline D Richards for the Mala Recovery Team	Shark Bay, Midwest, East Pilbara, Pilbara

WMP = Wildlife Management Program

The flora interim recovery plans are:

No/series no.	Title	Prepared by	DEC Region/District involved
282	Mason's darwinia (<i>Darwinia masonii</i>)	Martine Scheltema, Cassyanna Gray (Coffey Environments)	Geraldton, Midwest
283	<i>Lepidosperma gibsonii</i>	Martine Scheltema, Cassyanna Gray (Coffey Environments)	Geraldton, Midwest
284	Woolly Foxglove (<i>Pityrodia axillaris</i>)	K Pryor, R Hayes, J Collins, C Page, A Brown	Geraldton, Avon Mortlock, Midwest, Wheatbelt
285	<i>Dryandra fuscobractea</i> (now <i>Banksia fuscobractea</i>)	Kym Pryor, Benson Todd, Rebecca Hayes	Moora, Midwest, Wheatbelt

It is intended that all approved recovery plans and interim recovery plans will soon be uploaded onto DEC's internet: www.dec.wa.gov.au



Left Muchea limestone on property purchased by DEC. Photo – Melissa Hoskins



From far left Gimlett (*Eucalyptus salubris*) on clay in Kendenup. Photo – DEC; white faced heron perched on a dead *Melaleuca cuticularis*. Photo – Kimberley Oswald; stromatolites at Lake Thetis. Photo – Val English; and sandhill dunnart. Photo – Glen Galkhorst.



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