



Western Wildlife

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Vol. 12, Number 4

NEWSLETTER OF THE LAND FOR WILDLIFE SCHEME

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Celebrate!

250,000 ha of Land for Wildlife Sites!

During the *Land for Wildlife* visit, landholders nominate the areas of their property that they intend to manage with nature conservation as the major priority. These are called 'LFW Sites'.

Last June we reached a very important milestone – collectively, the landholders who have registered with LFW have dedicated over 250,000 ha as LFW Sites! These areas are an important adjunct to the formal conservation reserve system, especially as many of them are in the highly-cleared agricultural south-west. What a wonderful achievement – well worth celebrating!

A special event was held on the farm that crossed the magic number – “Hallswood Park”, Badgingarra, the property of Pam Toster and Peter Phillips. It was a



The three-way partnership in action: Georgie Colebrook (NACC Targeted Investment Programme), landholders Peter Phillips and Pam Toster and LFWO Fiona Falconer.

lovely day! More than 60 people attended, chatting and exchanging information while listening to brief talks and munching superb food. A highlight was the bush ramble, conducted by naturalist Eric McCrum, who enthralled everyone as he illustrated the complex interconnections that exist in living ecosystems.

The day was designed to highlight the three-way interaction that takes place in biodiversity extension

– the landholder with good bushland, LFW with best-practice management suggestions, and the NRM groups with funding programmes to support the management actions. In this case the latter was the Northern Agricultural Catchments Council (NACC) and LFW is very grateful for the help of NACC staff and board members.

Our thanks go to all who helped to make the event a success, especially our hosts, Pam and Peter.



Tams Harston, Pam Young and Sandy Loveland (of Jurien Bay LFWers 'Lovelands for Wildlife') brought along some joeys to share the day.



On the bushwalk



Eric McCrum.

Greetings all!

Land for Wildlife recently celebrated a very significant milestone – between them, *LFW* members are looking after more than a quarter of a million hectares of *LFW* Sites! This is an amazing amount of land – more than twice the size of the Stirling Range National Park – and demonstrates just how much Western Australians are prepared to do to conserve our biodiversity. Congratulations to everyone for their magnificent efforts!

One problem with publishing quarterly is that it is difficult to highlight coming events, as they are often organised without enough lead time for the magazine. For example, there will soon be *LFW* bushwalks or workshops in Chittering, Mawson, Pingelly and York. Check the *LFW* page on the DEC website occasionally, as these events should be listed on it. In addition, if enough people are interested in viewing

EDITORIAL

the native legume field trial site at Buntine (see pp4 and 5) an excursion will be arranged and promoted on the website.

It seems that the name-change from *Dryandra* to *Banksia* has caused some concern! Alex George, a long-term specialist in the taxonomy of the family Proteaceae and a former Editor of 'Flora of Australia' has written to remind readers that you don't have to follow all name changes if you don't want to (see page 3).

Christmas will soon be here again (where has the year gone?) and on the back page are some new books that might make nice presents

for someone who is interested in the natural environment. All should be available in retail outlets by October.

Best wishes for a pleasant and productive end to the year.

Penny Hussey

LFW statistics as at 4th September 2008

Number of registrations = 1,669
 Number assessed = 1,542
 Total area of properties assessed = 1,115,040 ha
 Area of *LFW* Sites on assessed properties = 252,050 ha

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LAND FOR WILDLIFE ON THE WEB

Please note that the Department of Environment and Conservation has recently revised and updated its website, to combine material from its two predecessors, the Department of Environment and the Department of Conservation and Land Management.. It is now easier to reach *LFW*!

www.dec.wa.gov.au/landforwildlife

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Letter to the Editor

The Editor receives numerous communications, both by mail and email, concerning issues raised in Western Wildlife. Many are followed up to form articles or short notes in future issues but sometimes, like the example below, the topic is complete in itself.

Dryandras don't have to be Banksias!

Dear Penny

Re article by Kevin Thiele in *Western Wildlife* 12 (3): 6–7.

In the interests of scientific balance may I suggest that you point out to your readers that Kevin is mistaken in his interpretation of the two cladistic 'trees' on page six. The left-hand one (his figure 1) shows *Banksia* and *Dryandra* arising (evolving) from the same point and is said by Kevin to be the 'traditional understanding'. The other (figure 2) shows *Dryandra* arising from within *Banksia*, and is said to give a 'new understanding' that justifies having to place *Dryandra* in *Banksia*. In fact, the latter 'tree', not the first, confirms what systematic botanists have done since Robert Brown published the name of the genus *Dryandra* in 1810—place it at the end of an assumed developmental or evolutionary line within Australian Proteaceae with the implication that it probably evolved out of *Banksia* and is the most highly advanced genus. In other words, it is the right-hand tree that confirms the traditional view. To recognise them as separate genera is a perfectly acceptable scientific conclusion. It can be argued that placing *Dryandra* in *Banksia* actually obscures the distinctiveness of the two groups.

Readers could also be advised that *there is no obligation to follow the change simply because it is the latest word, or because herbaria have adopted it*. Under the *International Code of Botanical Nomenclature*, scientific names of plants are available for use if they meet certain criteria, and no further direction is given on how to choose if a plant has more than one available name. In this case, the names of all species of *Dryandra* meet the criteria, and the user can choose whichever generic name they prefer. A statement in a copy of Kevin's article on the Department of Environment and Conservation's website that a name in *Dryandra* is 'not current' refers only to the usage by the Western Australian Herbarium.

Regards,

Alex George

Consultant Botanist

(For a detailed exposition of Alex's position on this, see the *Wildflower Society of WA's Newsletter*, Vol 47 No 3, August 2008, pp 7-9.)

In brief

BRACKISH WETLANDS CAN STILL HAVE VALUE FOR WILDLIFE

Even though some lakes may be going saline, at the stage when they are simply brackish they can be very productive for certain waterbirds.



Tim Sparks of the Department of Water photographed this nesting swan on Meekin Pool (Steady's Lake), north of Darkan last October. The lake contains large numbers of submerged plants such as *Ruppia* (sea tassel) and the macroalga, *Chara*. They keep the water oxygenated and so lower the chance of algal blooms in the system, as well as harbouring huge numbers of aquatic microinvertebrates. All are ideal food for many waterbirds.



Ruppia



Chara

If your brackish lakes contain these plants, that is an excellent sign that they remain a valuable habitat.

ECONOMIC VALUE OF BIODIVERSITY

DEVELOPING NATIVE PERENNIAL LEGUMES AS PASTURE SPECIES FOR THE WA WHEATBELT

Dion Nicol and Megan Ryan

Declining revenue coupled with a climate that is becoming drier and more variable each year has created a demand for low input, resilient farming systems in Western Australia's northern and eastern wheatbelt. According to recent research, hardy native legumes found in the region may have an important part to play in developing these new farming systems. Many native perennial legumes have the characteristics that could make them productive in low-input, water efficient farming systems.

WA has some of the most diverse vegetation in the world growing on poor soils in arid or semi-arid environments, much of which can be found next to some of the most efficient broadacre farming systems in the world. How native drought-tolerant legumes can be incorporated into new and pre-existing farming systems is currently being explored by Future Farm Industries CRC (FFI CRC) researchers based at the University of Western Australia (UWA) and elsewhere.

The need for new (perennial) pasture options in WA

With increasing input costs for cropping and predictions of a significantly drying climate, WA farmers are looking for options to offset risk and maintain primary production. Current farming systems have been developed using introduced species, predominantly from the Mediterranean region, with subsequent breeding to select for adaptation to Australian farming areas. However, this process can be slow and costly and encounter difficulties with quarantine restrictions. While a large array of new exotic annual pasture legumes are currently being released to farmers, choice of perennial pasture legumes is currently limited to lucerne (*Medicago sativa*) – which is being grown with mixed success in the drier areas of the WA wheatbelt due, in part, to poor adaptation to drought and difficult soils.

Increased adoption of perennial legumes is desirable



Cullen graveolens on the Fortescue River floodplain, Pilbara. Ph: D. Nicol

as, in addition to their ability to fix atmospheric nitrogen, their year-round growth and deep roots will aid in rebalancing the hydrology and reducing the development of dryland salinity; reducing soil erosion especially in summer/autumn; quick production of biomass in response to the autumn break of season; and perhaps, provision of drought resilience within a farming system. Perennials also allow

farmers to take advantage of summer rainfall instead of having to bear the high cost of spraying out undesirable summer weed species such as paddy-melon, mint weed and caltrop. Perennial pastures also have multiple factors that improve animal production and welfare such as provision of vitamin E during the summer drought and higher quality feed when summer rainfall destroys dry feed quality. Biodiversity benefits may also accrue. Adoption will be driven through the ability of perennial legumes to provide green feed for livestock in the traditional summer/autumn feedgap hence species with promise will be those able to keep leaves during hot, dry summer conditions.

Preliminary research shows that native plants can be both well-adapted to the soils and climate of the WA wheatbelt and may be highly productive. Some genera of native plants are showing significant promise for future domestication.

FFI CRC on-going research

The FFI CRC has conducted several preliminary screening and collection programs. Seed and rhizobia collected from natural populations during these projects have been placed in storage and are available to support future breeding and research programs. These preliminary programs, along with the sparse available literature, have highlighted *Cullen* species as highly productive, likely to be nutritious and palatable, and demonstrating many biological traits that make them well suited for domestication, such as good seed

ECONOMIC BIODIVERSITY

continued from page 4

native legumes

production and physically dormant hard-seeds.

Currently there are a number of field experiments in WA involving natives, primarily species of *Cullen*. UWA PhD student, Richard Bennett, has trialled 120 populations (ie seed collected from discrete populations) from nine Australian *Cullen* species in deep yellow sands at Buntine in the northern wheatbelt. This field site typically receives about 300 mm of rainfall annually, but during the experiment it was considerably drier. Some populations of eight *Cullen* species persisted better, and seven populations of *C. australasicum* both persisted better and were more productive than the best performing lucerne cultivar in the experiment.

Cullen australasicum is a multi-stemmed, erect, herbaceous legume to one metre high. Stems can become woody with a diameter of ~15 mm at the base. It is a perennial, but often flowers in the first year with pink to mauve flowers in showy racemes to 300 mm long. It is a very variable species with regard to growth form, leafiness and seeding characteristics. It is native to the eastern states of Australia and also shows good potential for development as a pasture species on alkaline soils in South Australia. Further studies into breeding and drought tolerance will continue this year. Field sites are being established by the Department of Agriculture and Food at Buntine, Merredin and Newdegate.

Another field experiment, managed by UWA PhD student Dion Nicol, is located at Mukinbudin in the central eastern wheatbelt of WA (mean annual rainfall 285 mm) in a heavy clay soil with a calcareous and sodic (ie hostile) subsoil. This experiment will be the first to compare the basic agronomic information and yields between current pasture legumes

and two native *Cullen* species (*C. cinereum* and *C. graveolens*). Access tubes to two metres are installed and water use through the profile will be measured along with plant survival and productivity over two years. This experiment was re-started in May 2008 after a poor initial establishment in 2007. Surviving plants sown in 2007 showed remarkable growth during the following summer and autumn prior to the autumn break.

Cullen cinereum and *C. graveolens* both occur naturally in northern WA, although not in the WA wheatbelt. As part of his honours studies, Dion observed these species growing prolifically in the Fortescue River floodplain – an area with similar soils to his field experiment site at Muckinbudin.

Associated research

There are also a number of ongoing research projects focussed on *C. australasicum*, other *Cullen* species and other native perennial

legumes. These include examination of the breeding system of *C. australasicum* and its ability to cross with other *Cullen* species and the tolerance of *C. australasicum* to herbicides commonly used to control broad-leaved weeds in pastures. Tolerance of phosphorus fertiliser, productivity under low phosphorus conditions, ability to access poorly soluble sources of soil phosphorus, along with tolerance of drought, waterlogging and soil acidity are being investigated. The use of unpalatable nurse shrubs to facilitate the growth of palatable climbing species (*Glycine canescens*) is being investigated as well as the regional adaptation and bioactivity of *Kennedia prorepens*. A small project is investigating grain legume potential of selected native annual and perennial legume species. Further exploratory research appears justified on many genera, particularly *Swainsona*.

Conclusions

Native perennial legumes show considerable promise as pasture species for the drier areas of the WA wheatbelt. Preliminary results suggest species will be identified that are both productive and well adapted to hostile soils and drought and/or a drying climate. However, results are preliminary and important issues remain to be investigated before cultivars are released to farmers, notably the impact of these native plants on animal productivity and health. Low seed supplies currently limit our ability to provide seed to farmers for trialling.

Megan Ryan is a lecturer in Pasture Science and Dion Nicol is a PhD student at UWA. They can be contacted on: Megan.Ryan@uwa.edu.au and nicol02@student.uwa.edu.au

Note:

would you like to visit

these trials at Buntine?

Contact Fiona Falconer

and, if enough people

are interested, she will

liaise with the authors to

arrange a Field Day.

fiona.falconer@dec.wa.gov.au

FERAL FAUNA

HAVE YOU SEEN A BIG CAT?

Mike Griffiths



When *Land for Wildlife* Officer, Avril Baxter, decided to jazz up our display at Woolorama this year by introducing a 'big cat', little did she know that it would spark so much interest.

The taxidermied puma (hired from the WA Museum) took pride of place and with the caption 'have you seen' drew records from Peaceful Bay, Denmark, Frankland, Orchid Valley, Muja Power Station, Allinson, Wellington Dam and Wagin. The most recent sightings included three from the Tambellup area in the past 18 months and two years ago at South Balladonia.

Big cat stories have been around for many years as Mike Griffiths reports:

Talk to people living almost anywhere in rural WA between the Murchison and the south coast and, before long, you're bound to bump into those who have stories about 'big cats' in the countryside. You're also bound to hear stories about circus accidents and American servicemen involving exotic big cats, and you realise that the line between fact and folklore gets a bit blurry. But just how much is fact and how much is folklore?

To answer that question, it's necessary to do a bit of proper homework, listen to people who have first-hand information, and look for evidence – and keep the newspapers for cleaning windows! Then it starts to get interesting ...

Military historians and others are well aware of the custom of military forces from many countries of carrying various animals as *military mascots*. It is a well-known tradition from Britain and the US, particularly during the American Civil War, World War II and post WWII years. The tradition continues to the present day, but in war-time, it was almost the norm for US servicemen to have dogs, monkeys, roosters, donkeys, badgers and yes, even exotic cats as mascots for ships, army regiments or air force squadrons. The animals were given names, and in many cases, even ranks! After WA saw a vast build-up of US forces during WWII, Western Australians talked about seeing American servicemen with 'mountain lions' on leashes at various camps and on navy ships. Interestingly, two US airforce squadrons stationed in other Australian states had black panther-like animals as their emblems.

As far as the circus accidents are concerned, one of the few facts that is firmly established is that a great number of circus convoys criss-crossed WA in bygone years. A typical circus convoy from the 1950s, for example, included a number of trucks towing caravans and trailers with equipment and animals; it was quite normal for circuses to carry a host of animals on these trucks, including elephants, bears, ponies, tigers and lions. Cougars and panthers were also known to be carried in smaller numbers, but thankfully all animals were generally very tame and closely watched. At least two circus convoys were known to have had roadside accidents in the late 1950s and early 1960s in south-west WA, but there is no documentation as to which animals were carried and if any escaped. But as all good historians know, a lot more things happen in history than are documented or picked up by the local press at the time – especially where infringements of wildlife laws were involved!

So what of big cat sightings in WA? To the majority of people who have never had unusual experiences of any sort, it may be difficult to understand that those who report seeing big cats often feel a bit the same as they would if they'd seen little green men or the Loch Ness Monster. After being ridiculed or dismissed a few times by people close to them or a local 'authority', they are not always particularly enthusiastic to tell the world about their encounters. (This happened a number of times with naturalists who reported good sightings of 'extinct' ivory-billed woodpecker in the US, now

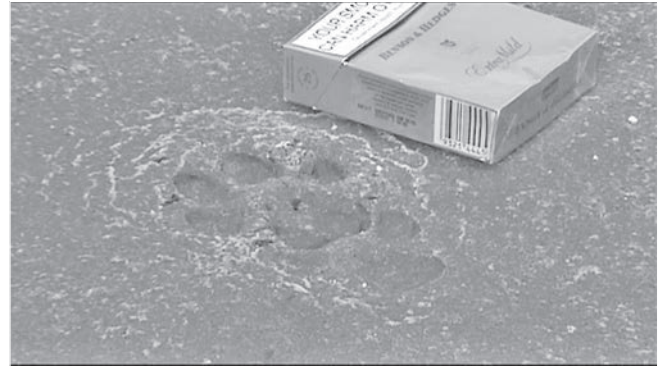
*continued from page 6***Big cat****FERAL FAUNA**

known to be present in low numbers.) At the same time, it is important to remember that our feral cats sometimes grow to the size of small dogs and are surprisingly common across the State. (Ecologists are well aware that their impact on native fauna is very worrying, as reported in various editions of *Western Wildlife*.) Many sightings of 'big cats' happen during the night or in bad light, and many are only fleeting glimpses of the animals, and furthermore, many people are not experienced at recognising wildlife. We must therefore, as a general rule, listen carefully to those who report 'big cat' sightings, while not being too hasty to judge either way until we are sure of certain facts.

Local people in rural areas on farms, stations, and in Aboriginal communities may not always be wildlife experts or have biological training, but as many *LFWers* know, landholders often know their local wildlife and bush better than anyone else! And quiet conversations with these people all over southern WA reveal that there are many who claim to see large brown or black cats that often have long, thick tails, muscular bodies and move like greased lightning when prompted! They are often reported to send normally brave farm dogs into rapid retreat, and are sometimes reported jumping over fences rather than through (some have described this as an almost 'effortless' gliding motion when the animal is in full flight). Horses with slash marks to shoulders and necks, and fully grown sheep with broken necks and rib cages eaten bare with surgical precision add to the intrigue.

So what of the evidence? And where are the photos? Many photos turn out to be feral cats and other bush animals, lack scale objects to indicate size, or are simply too blurry to tell. But ask how many people have good photos of the snow leopard in central Asia or the eastern cougar in Quebec and New Brunswick (confirmed in recent years) and you may sympathise with locals who will tell you just how unexpectedly the 'big cats' appear and how fast they disappear. It's interesting to note that early American settlers called the cougar the 'spirit cat' as they rarely saw them even when their presence was known from footprints in the snow and stock losses. And keep in mind WA's feral deer, known from a few scattered areas mainly in the south of the State but are rarely seen by the public (see *WW*, January 2007 regarding feral deer from the Shire of Gingin). These are large hoofed animals that move around in herds but few (if any?) photos of WA's feral deer exist.

Aside from photographs of the animals, other forms of evidence of 'big cats' may be just as difficult to obtain. But a few photos of very big, distinctly cat-like footprints from various areas in WA have come to light, some in quite recent years. Unlike dog prints, cat prints rarely show



Footprints across edge of muddy lake-bed south of Ballardonia, WA. Several people examined the prints, which were widely spaced and at one point, seen to show a leap of over 2 metres from the lake-bed up onto rocks. None showed claw marks. Photo courtesy Don Bird.



Footprints in the Eneabba district close to where 'big cats' have been reported. The matchbox is 5.3x3.5cm. Photo courtesy Ray Woods.

claw marks, and are typically more rounded than the rectangular dog prints.* That being said, it can still be surprisingly easy to confuse dog prints with those of large cat species. Other evidence of big cats could include scats or well-documented animal kills, but this is rarely considered sufficient on its own and really needs to be considered in combination with other more concrete forms of evidence. It has been argued that until body evidence or DNA comes to light, the issue of 'big cats' won't be taken too seriously in Australia. And until there's good evidence ...

We hear people talk about 'panthers' and 'cougars' as if they're the same, but the true panther is a black leopard (*Panthera pardus*), native to Asia and Africa and distinct from the cougar, puma or mountain lion (*Puma concolor*), native to North, Central and South America. (The endangered 'Florida panther' is in fact a cougar, just to add to the confusion!) But if there's any exotic cat species out there in the WA bush other

FAUNA

PROSTRATE FLAME FLOWER: THE LONG ROAD TO RECOVERY

Benson Todd



Since its rediscovery in 1995, the prostrate flame flower (*Chorizema humile*) has embarked on a journey of recovery aided by landholders, researchers and DEC staff. While this critically endangered species has a long way to go, significant steps have been made to ensure its long term security.

The prostrate flame flower is a small prostrate (ground hugging) shrub that grows to approximately 60 cm in diameter. The many slender and rigid stems radiate out from a central root and have obovate leaves arranged alternately along the stem. In winter and spring it produces 'standard pea flowers' in fiery shades of red, orange and yellow. This species was first collected near Cue in 1931 by William Blackall. Further specimens were collected east of Geraldton in the Kojareena area and from the Strawberry area east of Dongara in the late 1960s. An intensive survey of these areas was undertaken by research botanist Diana Papefus in 1995 in an effort to relocate the species, however efforts proved unsuccessful.

That was until later that year when Diana showed a specimen of the

prostrate flame flower to Alison Doley who recognised the plant and promptly showed Diana to an area on her property east of Coorow where 17 plants were located. With the fortuitous rediscovery of what had been thought to be a lost species, attention quickly turned to searching for further new populations.

In 1996 Diana focused her search efforts in the general area of the newly found population resulting in the location of three further populations, one in the Coorow area and two some 200 km south near the town of Bindi Bindi. With the number of known plants totalling 31, the species was declared as rare flora, and in 1998 ranked as critically endangered. The ranking was prompted by the low number of plants and the threats to the species. Threats to this species' survival noted in 1998 included grazing and trampling, competition from weeds and lack of recruitment. The location of populations on degraded road verges and small bush remnants on private property was also a consideration in the species being ranked as critically endangered.

An Interim Recovery Plan

(IRP) outlining recovery actions to ensure the long-term survival of the prostrate flame flower was prepared in May 1999. The IRP triggered a further survey to be undertaken by Stephen Davies in 2000 resulting in further populations being discovered in both the Bindi Bindi and Coorow areas.

The sites where new populations were found were characteristically in heath or shrubland on grey duplex soils among granite and chert outcrops. They matched the previous known sites and provided a good definition of the plant's preferred habitat.

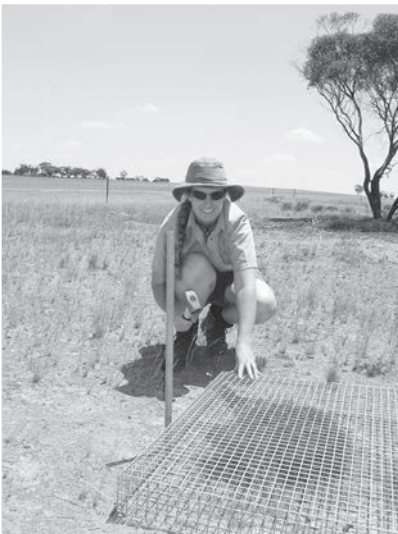
Other initial recovery actions undertaken included the installation of rare flora markers on road verges to ensure that road maintenance activities did not impact on the species, limited seed collection, fencing of some populations on private property and the publication of a species information sheet.

The IRP was revised in 2006 and further monitoring and surveys were undertaken. Surveys resulted in the number of known populations increasing to 14 but only 117 plants were recorded. The spread

continued from page 8

Prostrate flame flower

of the populations remained the same with two distinct groupings, one near Bindi Bindi and one at Coorow. Monitoring of the existing populations also showed that herbivores - kangaroos and rabbits - found the prostrate flame flower irresistible, with all plants showing signs of heavy grazing. Even those plants with wire netting laid over to protect them were grazed as the kangaroos had learnt that by standing on the wire they could still access the soft green foliage. Grazing and low rainfall in the Midwest had taken its toll, reducing the plants' ability to flower and set seed, posing a risk to species survival by inhibiting recruitment and limiting recovery actions such as seed collection



Steel mesh cages were made to protect the plants from grazing. All populations received the cages with the last being installed on Christmas Eve of 2006. The cages proved robust enough to protect the plants from grazing with all responding with lush new growth and prolific flowers. In the following season staff from DEC's Threatened Flora Seed Centre were able to collect precious seed.

Seed collection is often a key

FLORA

step in the recovery of rare flora species; stored in an appropriate manner seed can last for decades providing an insurance policy against extinction and allowing for recovery actions such as reintroductions or translocations. Seed is best collected from a range of plants and populations to ensure the preservation of genetic diversity.

Seed from the prostrate flame pea is most effectively collected by placing a small nylon bag over immature fruit and returning approximately a week later when the fruit has opened, expelling the seed into the bag. No more than 10% of seed is removed from any one plant in a season; thus allowing for natural recruitment.

With the existing plants protected from grazing and a good representation of seed in storage, the focus of recovery shifted to the establishment of populations in secure locations. The process of establishing a new population of flora with seedlings produced in nurseries is known as translocation. For species of rare flora, a careful planning process is undertaken to ensure that no harm is done to the species by undertaking such works. It was decided that two translocations of the prostrate flame flower would be undertaken, one in the Bindi Bindi area using seed from the southern group of populations and one in the Coorow area with seed sourced from the Coorow populations.

In winter of 2007, 206 seedlings grown from seed by the Botanic Gardens and Parks Authority were planted in a nature reserve near Bindi Bindi. The plants received protective caging and will be watered via a

gravity-fed irrigation system for the first two summers to assist in their adjustment to the world outside of the nursery. The plants are monitored every six months to assess their progress; to date 75% have survived the first summer with some even setting seed.

With the Bindi Bindi translocation progressing well, and the Yerecoin Bush Fire Brigade maintaining the watering system, planting of the Coorow translocation was the next step. Site selection was difficult east of Coorow because of the lack of suitable habitat represented in the conservation estate. The offer of a suitable site on the Falconer's LFW registered property at Waddy Forest east of Coorow was too good to refuse. Planting of 136 seedlings was completed there in June 2008.

Further planting is proposed at the Bindi Bindi and Coorow translocation sites with the aim of achieving a stable population of around 200 plants. Monitoring of populations will continue, so will searches for new populations, but for now this once lost species has been found and is now well on the road to recovery.

Benson Todd is Flora Conservation Officer at DEC Jurien Bay. He can be contacted on 9652 1911.



A misty morning at the Coorow translocation site. All photos: Benson Todd.

NEWS

SOUTH COAST LFW 'REVEAL THE PLANT CHALLENGE'

Sylvia Leighton

More than 100 vegetation communities mapped in a small area where only 11 vegetation communities had previously been recorded!

In early June the South Coast *Land For Wildlife* programme decided to focus on plants and present three workshops on related topics. The venue selected could not have been more topical – the Albany Herbarium which is located at the back of the Department of Environment and Conservation (DEC) South Coast Office precinct. This is the largest herbarium outside Perth and contains 23,000 specimens.



LFW members being shown the process of storing pressed plant samples by the Coordinator of the Albany Herbarium, Coralie Hortin

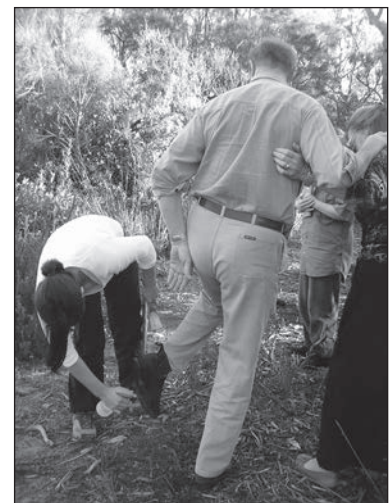
The herbarium is run by a dedicated team of local volunteers from the Albany Wildflower Society. The Coordinator, Coralie Hortin, demonstrated to the *LFW* members the detailed process of how a plant specimen is treated once it is submitted to the herbarium. They saw first-hand how the plants are carefully pressed, named, vouchered, mounted and stored in an insect-free environment. They were also able to explore the 'self help' herbarium in the front area of the building where members of the public are encouraged to bring in plant samples and try and identify these themselves.

Workshop members were then treated to a 'mind blowing' talk providing an insight into the complexity of the vegetation communities that we are dealing with in the south coast region. DEC regional botanist Libby Sandiford gave her first public presentation on the progress of the vegetation mapping team who have taken on the challenge of trying to produce vegetation

maps that truly represent what is out on the ground. They selected a 25 kilometre radius area of the Albany townsite to carry out the vegetation mapping thinking this would be a realistic area to be able to survey over the allocated nine months. Very quickly they realised that this was a very unrealistic expectation! Over the nine months they have recognised over 100 different vegetation communities and they have only surveyed about 20% of the total area! The old Beard maps had only recorded 11 vegetation communities for this same region.

Luckily the team was able to get an extension of funding for the project over another nine months. Some of the next challenges include how to incorporate components into the map that acknowledge recent vegetation community species composition changes due to events like dieback or repeated fire events that do not allow all species to propagate.

The last talk was provided by DEC Dieback Officer Nicole Moore. She particularly looked at precautionary actions *LFW* members can take to try and ensure that dieback is not brought onto their own properties. Many members thought that it might be easier to lock up the property and exclude all visitors! Nicole was more optimistic and gave the workshop members practical experience in cleaning of tyres and shoes. The members also visited a nearby dieback infection and were shocked to see the loss of species composition in the vegetation community.



Nicole Moore cleaning peoples' shoes ensuring that workshop participants were not responsible for carrying dieback spores in or out of the field site.

Photos: S. Leighton.

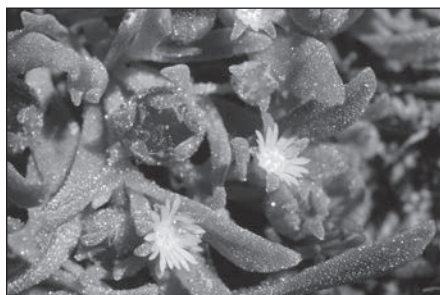
WEEDS

COPING WITH SALT - THE ICEPLANT WAY

Penny Hussey

Any plant living in salty water has a problem, how can it get at the water despite the salt?

Plants take in water through their cell membranes by a process called osmosis. The sugary cell sap is more concentrated than the soil water, so osmotic pressure draws water into the cell. But if the water outside is salty, it can draw fresh water the other way - out of the cell. Thus, although surrounded by water, the plant will die of drought. Some plants, however, are able to cope with the harsh conditions – how do they do so? One successful group are the iceplants.



*Slender
Iceplant
(Mesembry-
anthemum
nodiflorum)*

Right across the cropping belt where you have saline loamy soils, iceplants (*Mesembryanthemum crystallinum* and *M. nodiflorum*) can be found. Introduced from South Africa, they are sprawling plants with leaves that glisten like crystal, and superficially daisy-like cream or white flowers.

Iceplants are in the pigface family, Aizoaceae, a worldwide family of shrubs and herbs most of which have specialised adaptations to periods of low moisture availability. Many, such as the bizarre ‘living stones’ of South Africa, live in deserts, while others live in saline areas. Of the 2,500 species worldwide, there are 18 genera and 60 species in Australia, eight genera and 39 species being native. In WA there are 29 native and 12 introduced naturalised species.

Most plants in this family are succulents, storing water in their leaves. They flower after good rains, mostly in bright reds, pinks and yellows, forming spectacular ‘carpets of colour’ in their native southern Africa’s Succulent Karoo vegetation type. Because of their colour and general hardiness, many are popular garden plants*.

Many (perhaps all?) of the plants in the family exhibit an unusual method of photosynthesis. Ordinary photosynthesis is termed the C₃ process, but pigfaces also use another chemical pathway, called the CAM

(Crassulacean Acid Metabolism) process which is adapted to water stress conditions. C₃ plants take in CO₂ through their stomata during the day, but CAM plants close their stomata during the day and open them at night, so minimising water loss by transpiration. Iceplants can switch from one mechanism to another, depending on fresh water availability in their root zone. The C₃ process is much more efficient during the winter growing period, but CAM will keep them growing and seeds maturing as the ground dries out.

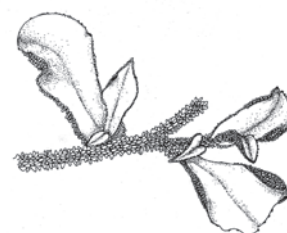
The shining effect of their leaves is because they are covered with a layer of transparent, liquid-filled ‘blisters’. What are they for? Well, they are garbage bags - excess salt drawn from deep underground is packed in them, out of the way of productive cells. When the plant dies in summer, or the leaf is shed, this extra salt contributes to surface salinity.

Thus iceplants are actively contributing to surface soil salinity, and may have a strong negative effect on the growth of other winter-growing annuals – including crops – and they are, unfortunately, an increasingly common weed of crop paddocks. Another problem with iceplants is that they accumulate oxalate in their tissues and this material can be poisonous to stock, thus it is not a good species to have in grazing paddocks either. In bushland, they probably have a similar negative effect on the germination of annuals, such as everlasting daisies, and also on seedling regeneration of native shrubs. All in all, a plant to discourage!

Definite recommendations for the control of this plant have not been developed as yet, but DAFWA has undertaken trials at both Northam and Three Springs. A metasulphuron herbicide (such as Ally®) at 5 gm/ha (trials under a minor use permit obtained by the Leibe Group) has proved effective in a paddock situation, as has glyphosate at standard rates. (For more detail on herbicide, contact Ed.)

[* See ‘Western Weeds’ for colour pics of some of the naturalised species. – Ed.]

*Broader leaves
characterise the
Iceplant
M. crystallinum*

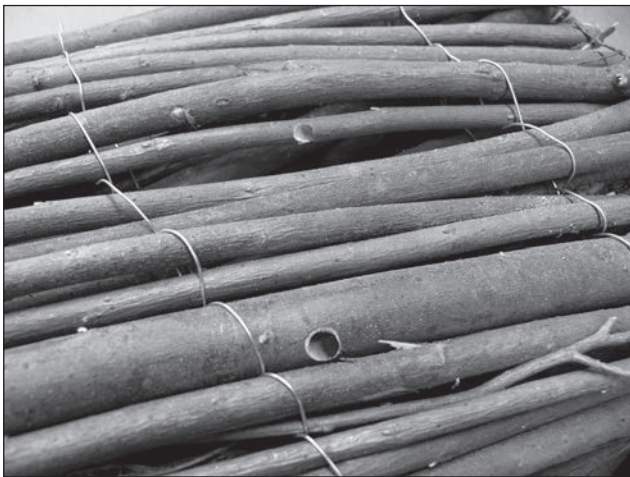


FERAL FAUNA

LIVE CHINESE BEETLES IN IMPORTED WOODEN ARTICLES

Community group revegetation projects often use bamboo stakes to mark seedling locations on public land or to support the plastic sleeve of a 'grow-tube'. Hundreds of thousands of these stakes are imported from China. Most carry a certificate stating that they have been treated to control pests in their country of origin. Imagine the concern of a worker at a planting in East Gippsland to find a live larval grub within a stake!

Pests introduced to Australia inside imported wood products could have a devastating effect on live trees and the timber industry. We have enough problems already without bringing in more! (The potential disaster posed by the European house borer was noted in WW 12/2.) Below is another example that arose last year in Perth.



A large company imports 'willow fencing screens' – a roll-up sort of instant fence made of wired together withies (willow twigs) that can be pushed into the ground to hide unsightly areas such as compost bins. When a purchaser noticed frass (wood dust) and exit holes, the presence of live Chinese auger beetles (*Sinoxylon* sp.) was confirmed (see above). This species attacks hardwood timber, and furniture and internal wooden fittings of houses could be at risk of attack if it got established. The product was recalled and, hopefully, only that particular batch of imports was affected.

The recent scare during a landcare planting, however, reminds us to be alert and look carefully at all imported timber products. If you notice anything suspicious, please call DAFWA Pest and Disease Information Service on 1800 084 881 (freecall). You may also bring, or mail, the suspect animal to DAFWA at 3, Baron-Hay Court, Kensington.

Stop press:



As this magazine was being put together, photos of a new example were sent to LFW from DAFWA. These stakes were purchased in Greenwood and were infested with Chinese auger beetles. Fortunately there were no live animals, so the fumigation process was adequate. But they are not much use for staking anything!

New alerts for emerging bird pests

DAFWA has produced three National Animal Pest Alerts to assist in raising public awareness about the potential risk of new invasive species establishing populations in Australia and becoming pests.

The pest alerts, covering the Indian ringneck, house crow and common myna, have been designed to educate the public about the risks these emerging pests pose to agriculture, the environment and social values. This will increase community awareness and encourage vigilance. This is because there is a great reliance on the public to report pest species.

Information and pictures showing these birds in the wild in Australia have been included in the brochures. These include a house crow found at a caravan park in Port Hedland, WA, and a group of Indian ringneck parakeets trapped in a Perth suburb and rehomed.

Importantly, the pest alerts also distinguish these non-native species from similar-looking native birds. As many reports of introduced birds turn out to be native species, it is hoped that this will focus reporting to the problem species.

Any sightings of unusual birds or animals should be reported to DAFWA's Pest and Disease Information Service on 1800 084 881 (freecall) and the pest alerts can be downloaded from DAFWA's website at:

www.agric.wa.gov.au

In brief

PHYLOGEOGRAPHY – HOW GENETIC DATA CAN HELP UNDERSTAND CLIMATE CHANGE IMPACTS ON BIODIVERSITY

How will our native flora and fauna cope with climate change? Will it move to new areas, as is predicted for most northern hemisphere organisms, or stay and possibly die out? *Western Wildlife* has, in the past, carried several articles addressing this problem including by Odile Pouliquen-Young (WW 4/2), Steve Hopper (WW 4/3) and Margaret Byrne (WW 6/3). The general consensus is that in WA, movement across the vast expanses of our flat landscape is not a viable option, for flora at least.

At a recent forum on climate change, Margaret Byrne (DEC Principal Research Scientist) described how a study of genetics can be used to look back into the past, and so help make predictions for the future. This line of study is called phylogeography.

Movement and long-term isolation (staying put) leave different genetic signatures in species and these can be used to identify the influence of past processes on species' distributions. In mountainous areas, movement is the most likely response to climate change and that shows up in the genetics. But most of southern Australia is relatively flat and different patterns are revealed.

It seems that in the early part of the Pleistocene era (1.8 - 0.7 million years ago) species did contract to and expand from major refugia when significant aridity developed. But over the last 700,000 years the patterns show that most species have stayed put, that is they have persisted through climatic changes in patchy localised refugia rather than moved long distances. This accounts for the very restricted distribution of some of our plants, although the more mobile fauna (eg birds, snakes, lizards, fish) show low genetic diversity and little geographic restriction, indicating that they have recently expanded across large areas. Look after those refugia, folks!

THE IMPACT OF FIRE ON HONEY POSSUM FOOD PLANTS

Longer-term readers of *Western Wildlife* will remember Annika Everaardt's description of her work on fire and honey possums in the Fitzgerald River National Park (WW 9/1). She has recently published an article giving details of the effect of fire on three of the possum's most important food plants*. The problem is that although plants may regenerate well after fire, it can take years before they produce enough flowers to support a population of honey possums.

She studied three plant species that were visited frequently by honey possums, two banksias and a dryandra (or three banksias, if you'd prefer!) The two banksias, *Banksia baueri* and *B. nutans*, are killed by fire and replaced by seedlings and it took 13 years before more than half of the new plants had flowered, and 23 years before all plants had done so. *Dryandra (Banksia) plumosa*, on the other hand, resprouts from a lignotuber after fire and it was much quicker to produce flowers. Within five years, 23% of the plants had flowered and 98% had done so within 13 years.

It is clear that fires at frequent intervals will have a huge effect on the food resources available to honey possums.

* Everaadt, A. 2008. The impact of fire upon the size and flowering of three honey possum food plants at the western end of the Fitzgerald River National Park, Western Australia. *The Western Australian Naturalist* 26: 85-98.

Bush detective

In March, participants in the 'After the Fence' workshop run by Helena Mills of WWF took part in a field trip to a most magnificent stand of salmon gum south of Grass Valley along the Mortlock River. Lots of diggings were noticed, each with a silky sock-like thing in the spoils.

What has been dug up?



Someone has been eating trapdoor spiders! The silken sock is the remains of the spider's burrow lining. Foxes, monitor lizards, quendas and some birds are the main creatures known to like eating trapdoor spiders but what the culprit was here – I'm not sure!

Phil Lewis - WWF-Australia, Northam

REVEGETATION

SALT IN LAKE C.Y. O'CONNOR

Damming the Helena River and pumping water to the Goldfields is a major event in WA history. Currently this system supplies water not just to the Goldfields but to much of the central and eastern wheatbelt as well. However, the system is teetering in the balance – firstly there's not enough water being collected and secondly the salinity is increasing

– again. In the life of the scheme, this is the third time the salinity has risen, each time for exactly the same reason – clearing in the catchment. Twice it has been 'fixed' by revegetation, but every 30-40 years people ignore past experience and clear some more.

The desirable salt level for drinking water is set at less than 500 mg/L Total Dissolved Solids (TDS). In Mundaring Reservoir (named Lake C.Y. O'Connor since the centenary of construction) it is fairly stable at 510 mg/L. Top-ups from a second dam downstream and from the aquifer at Gnaragarra both freshen the water and help to keep up with demand. But why is the Helena above Mundaring Weir going salt – the catchment is still covered in native vegetation, isn't it? Well, 97% is forested, 3% is cleared. It is from that 3% that the problems arise – such a small area to give such a big problem.

The Helena was fresh (290-370 mg/L) when the dam construction started in the 1900s but, in an attempt to increase run-off, about 20,000 acres of nearby forest was ringbarked and by 1908 the salinity had risen alarmingly to 550 mg/L. Water engineers clearly demonstrated the link between clearing and salinity.



Much of the cleared areas were replanted with pines, the rest left to regrow and gradually the salinity stabilised at a lower level. This was the first example in WA of a 'salinity recovery catchment'.

Alas, not all lessons learnt are remembered. In the 1940s, 50s and 60s, land releases and significant further clearing for agriculture within the catchment was permitted and pushed reservoir inflow salinity upwards for the second time. The WA Government's response in the 1970s was to build a second dam downstream (whose water comes mainly from Pickering Brook and the eastern side of Kalamunda) and to purchase private property in the catchment including the block known as Flynn's Farm.

Since purchase, trees in monoculture blocks for forestry have been planted over most of the cleared area of Flynn's Farm. In addition, 40 monitoring bores have been installed. Gradually, over 30 years, these trees have lowered the watertable and so disconnected surface runoff from sub-surface salinity. In essence, revegetation has returned the surface soil and surface runoff to below the critical 500 mg/L (aided, of course, by the decrease in rainfall since 1975).

Lesson learnt: tree planting in sufficient quantity in the correct location will, given time, lower the salinity such that the streams and surface soil are no longer saline.

But while this revegetation was quietly working away to solve this second instance of clearing-caused salinity, from 1970 on more land

release, clearing and sand-mining was permitted north of Flynn's Farm, and streams draining this area have reached salinities of 2500 mg/L. This year, agreements with the Forest Products Commission have seen pines planted over a portion of this area, but will it be enough? Will we ever learn?

[Data in this article has been extracted from the 'Helena River Salinity Situation Statement', Smith *et al.*, Department of Water, Perth 2007. Available in hard copy, CD or on DoW website.]

Penny Hussey

Did you know ...?

'No living mammals eat *Hakea*'. This is a quote from 'Australia's Mammal Extinctions: a 50,000 year history' by Chris Johnson, pub. 2006.

He goes on to develop the theme that the thorny defences of many species (not just hakeas) developed to deter the megaherbivores, such as the 'hippo-sized wombat' *Diprotodon*, that went extinct around 45-40 thousand years ago. Fascinating stuff!

continued from page 7

Big cat

than our monster feral cats, they are proving extremely hard to corner! Maybe it's time for 'Pink Card for the Pink Panther'!

** When photographing footprints, skulls, or dead animals, it is always important to include scale objects in the photo to give a clear indication of size. People having their own sightings of any unusual animals are encouraged to record as much information about their sighting as possible (including description, approximate time, other witnesses etc) as soon as possible, though much later is better than never!*

Mike Griffiths is a naturalist and conservation worker with an interest in rare and unusual fauna and flora. He lives in the Perth Foothills and works in the wheatbelt, travelling around WA in his spare time talking to 'bushies', LFWers and ecologists. Interested readers are invited to contact Mike on hiromike@primus.com.au or phone on 0428 530 989. In addition to discussing the issue of 'big cats', any information on photos of feral deer from WA would also be most welcome.

Are you managing salinity for agricultural production on your farming property?

A new website has just been established by DAFWA to assist WA farmers manage their salinity problems. The Sustainable Grazing on Saline Lands (SGSL) website for WA should be a valuable resource for farmers in many agricultural areas. It has 21 case studies of how real farmers are coping with salinity using saltbush, new pastures and other innovative ideas. Besides the farmer case studies, the site includes a 'Saltland Scoring and Solutions' section to help recognise and rate

In brief

salt land for three rainfall zones. An economics calculator can be used to work out the dollar costs and returns of revegetating land based on 24 real sites. The SGSI WA website is available at <http://sgsl.agric.wa.gov.au/> but farmers not connected to broadband can obtain a hard copy print-out or free interactive CD containing the same information from DAFWA's South Perth office by phoning (08) 9368 3333.

COFFEE MORNING AT DONNYBROOK

Donnybrook, Kirup and Balingup LFW members enjoyed a casual morning tea get-together on a sunny Saturday morning in August. The morning was organised by Middle Blackwood LFWO, Sheila Howat and hosted by long-term LFW members Dale and Barry Green on their "Boronia Farm" property at Argyle. Blackwood Valley Landcare Co-ordinator, Cheryl Hammence joined the group and started some lively conversation with a short talk on revegetation planning and procedures. A walk through the Green's fenced remnant bush and naturally revegetating wetlands provided such diversity of interest and discussion that it took two hours to complete!



Dale and Barry in front of their very tall Kingia. Photo: S. Howat

'GARDENS FOR WILDLIFE' IN TASMANIA

Tasmania has recently started a *Gardens for Wildlife* scheme.



It supports, encourages and recognises people who wish to make their property friendly for local wildlife and the environment. Members receive a sign, coloured red on cream, and an attractive booklet about sharing gardens with wildlife. The scheme has already proved very popular. To find out more, visit the website on:

www.gardensforwildlife.dpiw.tas.gov.au

Did you know ...?



.. that DNA sequencing has been used to develop a history of the dingo? They originated from domestic dogs that came from East Asia around 5,000 years ago, possibly in connection with human expansion from South China into Island Southeast Asia. They were introduced from a small population of dogs, possibly on a single occasion, and have since lived isolated from other dog populations. Thus they represent an unique isolate of early undifferentiated dogs.

(For ref. contact Ed.)

Looking for a Christmas present?

NEW BOOKS

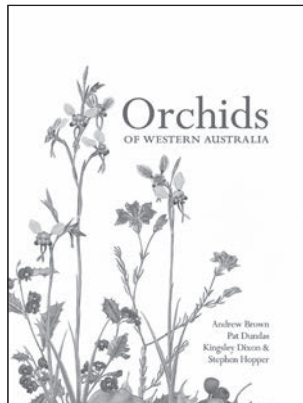
Geology and Landforms of the Perth Region

JR (Bob) Gozzard

Western Australian Geological Survey, Perth, 2007.

\$22.00 + p&h, from the Department of Industry and Resources, Perth: www.doir.wa.gov.au

Perth's geology at first looks simple – there's the coastal plain, the Darling scarp and the hills. But that apparent simplicity belies our land's complex history, from thousands of millions of years ago to yesterday. This new book will help an observer to understand and interpret why the landscape looks like it does. After introductory chapters on the geological setting, nine localities that illustrate features of geological history are explained in detail. The language is straightforward although inevitably a large number of technical terms are used, however they are explained in the glossary. The book is attractively presented with maps for each locality and plenty of photos to help interpretation. Visiting the sites could be combined with another activity - a beach picnic at Cape Peron for example, a bushwalk at Walyunga or a leisurely winery lunch in the Swan Valley. Enjoy!



Orchids of Western Australia

Retailing at \$89.95, the book is being launched in September and will be available from all good bookshops.

Orchids have fascinated people since the earliest of times, commanding celebrity status among the gentry of the nineteenth century, and universally renowned for their beauty and form. Western Australian orchids are no exception – from one of the bluest orchids of all to one of the only fully underground species in the world – Western Australia contains an abundance of orchid delights.

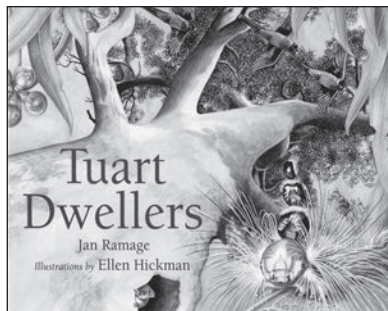
Written by three well-known Western Australian orchidologists - Andrew Brown, Kingsley Dixon and Stephen Hopper, and featuring more than 200 full-page colour illustrations by botanical artist Pat Dundas, this book describes and illustrates all 409 orchid species currently known from Western Australia.

Tuart Dwellers

Jan Ramage, illustrated by Ellen Hickman

DEC \$26.95 (Will be available in October)

Introduce a young person to the 'mad hatterpillar'! This delightful book, designed for middle primary school age upwards, celebrates the diversity, colour and ingenuity of the natural world.

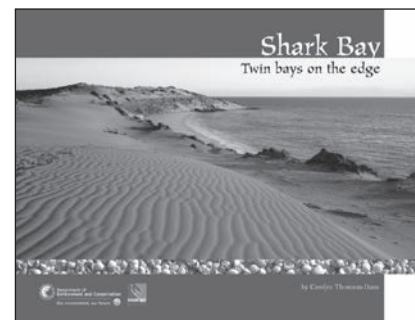


Shark Bay: twin bays on the edge

Carolyn Thomson-Dans

DEC \$39.95

The Shark Bay World Heritage Area is a place of timelessness and immeasurable biological values. This book explores the bay's unique history and natural heritage - both underwater and above.



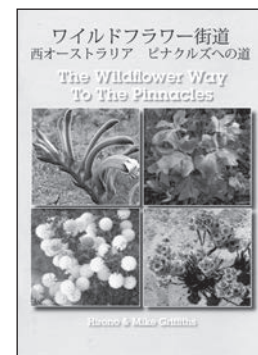
For your Japanese friends:

The Wildflower Way to the Pinnacles

Hirono and Mike Griffiths

A beautifully illustrated guide to the wildflowers between Perth and Cervantes. Text in both English and Japanese. Contact the authors for cost and where you can buy the book:

hiromike@iprimus.com.au



This newsletter is a compendium of articles written by many different people. The views expressed are those of the authors, not necessarily those of the Department of Environment and Conservation.

Published by the Department of Environment and Conservation, Perth.

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