

Effects of drought on our south-west bushland

Issue 78

Winter 2011

Time of Makuru and Djilba in the Nyoongar calendar.

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2010 was one of the driest and hottest years on record across the Perth Metropolitan Area. We asked five experts for their observations on current bushland health and the potential implications if below average rainfall continues this winter.

Substantial deaths of jarrah (*Eucalyptus marginata*), marri (*Corymbia calophylla*) and some wandoo (*Eucalyptus wandoo*) have been observed along the Darling Scarp from Perth to Brunswick Junction. Professor Giles Hardy suggests as much as 60 per cent of the vegetation is affected. "Further east, these deaths are continuing and we are seeing around 10–15 per cent of forest dying, especially along ridges, where soils are shallow, and possibly on sites affected by *Phytophthora* dieback. Jarrah, *Banksia grandis* and sheoak (*Allocasurina* species) appear quite susceptible, although many other species in spots are also dying, including marri," he says.

Associate Professor Ray Froend has observed widespread mortality of vegetation on the Swan Coastal Plain. "The most affected have been the phreatophytic tree species (deep-rooted plants that obtain water from a permanent ground supply or from the watertable) succumbing to a rapid depletion (within a season) of available water sources. Canopies of whole stands of trees have browned, shed and died (e.g. the Ridges area of the Gnangara Mound). However the more widespread response has been 'spot deaths' of individual or small clusters of trees," he says.

Insect attack

The degradation in plant and ecosystem health from drought is being exacerbated by secondary impacts. "Foliage discolouration in jarrah and marri is coupled with drying in the stem wood which is now being attacked by wood-boring insects," explains Dr George



Widespread canopy decline of jarrah (Eucalyptus marginata) in the Ridges area of the Gnangara Mound on the Swan Coastal Plain in April 2011. Photo – Ray Froend

Matusick. "Although many of our prominent tree species can 'dieback' during periods of drought and re-grow their canopies when the rain returns, the amount and level of insect attack on the stressed trees suggest they are not coming back. I would not be surprised to see high levels of tree mortality, including seedlings, resprouts and large mature trees, on the sites that have been affected."

Short-term response

"Many forests throughout the world will 'self-thin' during periods of drought, with weaker individual trees dying while the rest of the forest survives," explains Dr Matusick. "However in the south-west of WA, the trees are so tough at hanging on and staying alive that when they hit their breaking point, many or most trees die in a given area. This attribute of the forest is resulting in a step-down pattern of mortality. In other words, instead of the weakest individual tree,

shrub and understorey species dying throughout the forest, large patches of forest are dying all at once," he said.

Professor Hardy believes many of the jarrah and tuart (*Eucalyptus gomphocephala*) trees that have collapsed will not resprout. "Many stressed trees are getting heavily infested by insect borers and there is significant evidence of frass at the base of many trees in the forest, particularly marri. Eucalypts are very resilient to drought and appear healthy for a long time after effectively being dead. So we can expect to see a substantial increase in tree deaths in the jarrah forest and on the Coastal Plain," he says.

Long-term outlook

"Mortality is likely to increase substantially and extend to many more sites if we have a dry 2011 winter as some models are predicting," says Professor Hardy.

Continued page 5 ...

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Urban Nature UPDATE *By Julia Cullity*

At the time of writing, Perth has received some autumn rains but we are still below average for the year. The Bureau of Meteorology outlook is also showing strong odds favouring a drier-than-normal winter over south-west WA in 2011. From March onwards the Urban Nature team started to notice death and decline in both canopy and understorey species in urban remnants. We asked a number of researchers to comment on the implications of drought on our bushland areas – sobering reading. Let's hope for substantial rains this winter and best of luck to those involved in weed control and revegetation works this season.

Our next issue will mark the 20th anniversary of *Ecoplan/Bushland News*. Old photos of identities who've helped make a difference in bushland conservation would be gratefully received (and returned). We would love to highlight the personalities and achievements of the WA conservation community.

We would like to thank our readers who provided feedback in our Bushland News survey. Although the response was very low, at 1.3 per cent, we will incorporate your suggestions in future issues. Congratulations to our prize winners, your gifts will be posted.

Microbat box – Sally Lake, *Wildflower Country* – Dave and Libby Daniel, *Brush with Gondwana* – Freea Itzstein-Davy

My apologies to Department of Environment and Conservation (DEC) staff. I forgot to advise that you weren't eligible for the draw but your comments were greatly appreciated.



Samson Park Primary School students and the City of Fremantle surveying for the graceful sun-moth. Photo – Julia Cullity

Great Cocky Count 2011 *By Xander Kabat*

This year's Great Cocky Count, a joint venture between Birds Australia WA and DEC, was a great success. Designed to obtain a snapshot of the endangered Carnaby's cockatoo (*Calyptorhynchus latirostris*) population numbers, the survey now covers the area from Esperance to Albany to Geraldton. Thanks to volunteers, 316 potential roost sites (and growing) are now recorded on the database. This year 4,921 birds were counted across the entire survey range with 3,402 found in the Greater Swan Region (compared to 5,058 in 2010). A comparison of birds counted at 68 matched roosts sites between 2010 and 2011 corroborate a ~33 per cent population decline. Therefore, follow-up surveys are crucial to determine what is happening. We asked people to return to their sites on 7 May, and to continue to do so on 5 June, 9 July and 7 August.

Breeding data have provided some good news. By examining the ratios of triplets (34 per cent), pairs (55 per cent), and



Carnaby's cockatoo (*Calyptorhynchus latirostris*) in flight at Yanchep National Park. Photo – Xander Kabat

solo (11 per cent) birds, we were able to obtain an idea of the rate of reproductive success, and have found that this has not significantly changed. Thanks to the volunteers, our knowledge of where this critical roosting habitat occurs is increasing with each survey. For more information contact Xander Kabat at Greatcockycount@birdsaustralia.com.au.

Contacts

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Current and archived issues of *Bushland News* are available at www.dec.wa.gov.au/programs/urban-nature/index.html.

Spring Bushland News

Spring *Bushland News* contributions should be sent to Urban Nature at urban.nature@dec.wa.gov.au by **Thursday 25 August 2011**. *Bushland News* seeks original contributions. If your submission has been or may be published elsewhere please let us know. Compiled and edited by Jo Tregonning.



WA boneseed eradication blitz continues By Hillary Cherry

Boneseed (*Chrysanthemoides monilifera* ssp. *monilifera*), a South African shrub, was introduced to Australia as a garden plant in the late 1800s. Boneseed has caused extreme environmental damage, impacting more than 200,000 ha of bushland in South Australia, Tasmania and Victoria. Potentially, 37,000,000 ha in south-west Western Australia are at risk of boneseed invasion. The good news is, it's 'not too late to eradicate'!

Boneseed is a weed of national significance and a declared plant in WA. It invades bushland and forms dense thickets that smother native plants and prevent regeneration. Since 2006, land managers across south-west WA have been implementing the WA Boneseed Eradication Strategy with help from the community. Only 38 boneseed infestations occur in WA, from near Geraldton in the north to Albany in the south, and most are less than 1 ha. Because boneseed is relatively easy to control, all infestations in WA are deemed eradicable.

Biology

Boneseed is an erect, woody, evergreen shrub growing to 2–3 m tall. The fleshy leaves are an elongated oval shape with toothed edges. Young leaves are rounder and often covered with a white cottony down. The conspicuous yellow, daisy-like flowers

bloom in late winter and spring (August–October). They have 5–8 petal-like ray florets which grow in clusters at branch tips. The globular green fruits ripen to black and contain one smooth, hard, bone-coloured seed. Up to 50,000 seeds can be produced per plant and seeds germinate readily.

Control

The movement of boneseed plants or seeds is prohibited and all plants should be eradicated. New infestations should be destroyed before they flower or set seed. Shallow roots make boneseed easy to hand-pull or dig up when small. Plants can be left to decompose on site as long as roots are not near the soil surface. Larger plants can be cut down and herbicide applied to stumps immediately after cutting. When large plants are



Boneseed (Chrysanthemoides monilifera ssp. monilifera) is a Declared Plant in WA and has yellow daisy-shaped flowers and globular berry fruits. Photo – Hillary Cherry

removed, new seedlings will sprout from the seed bank and should be hand-pulled immediately.

WA boneseed eradication

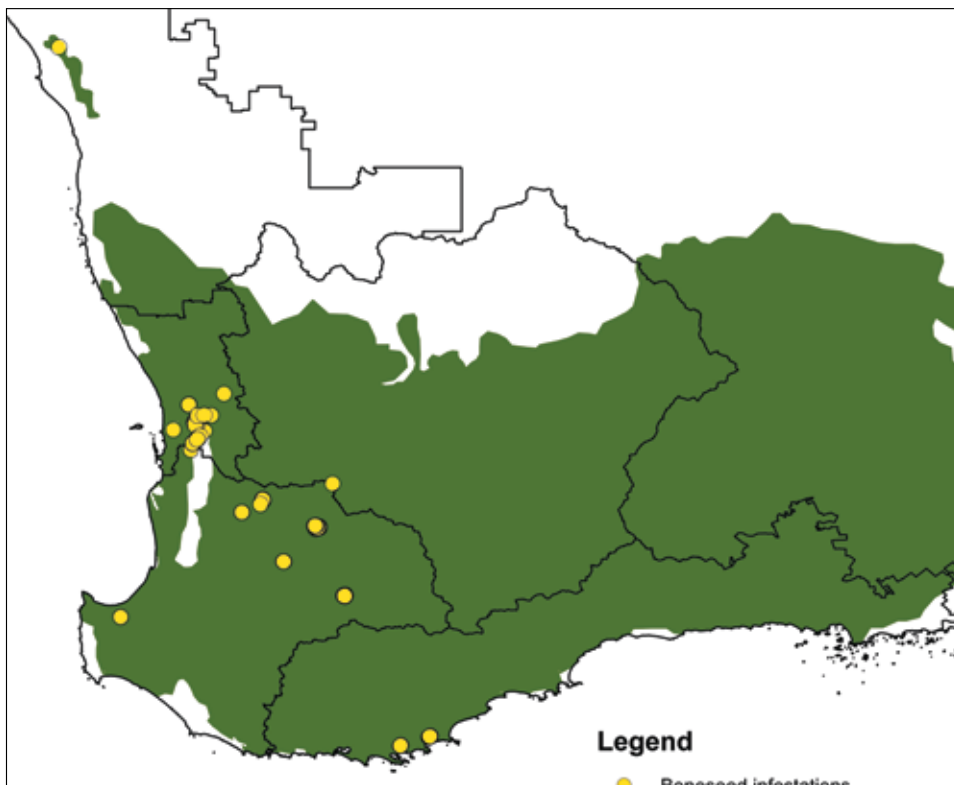
A collaborative partnership has developed between the Perth, South Coast, Southwest, Northern Agricultural and Wheatbelt natural resource management regions, DEC, Department of Agriculture and Food (DAFWA), Main Roads, local governments, Landcare, Aboriginal groups, private land managers and the National Boneseed Program. Together, partners have mapped and controlled all boneseed, held annual *Boneseed Blitz* awareness campaigns, and initiated research on seed longevity and the effects of karriginolide on germination. Karriginolide is the chemical in smoke that promotes germination of many native and exotic species. A partnership with the Nyoongar community was also initiated to teach 18–24-year-olds weed surveillance and other land management skills, using boneseed as a 'test case'.

You can help! Please be on the lookout for the 'pretty yellow daisy flowers' of boneseed this August to October. **Report potential boneseed sightings to the DAFWA Pest Info line on 1800 084 881.**

More information

www.weeds.org.au/WoNS/bitoubush
FloraBase <http://florabase.dec.wa.gov.au/browse/profile/7927>

WA Boneseed Coordinator. Contact Luke McMillan on 0466 744 960 or Luke.McMillan@perthregionnrm.com.



Boneseed infestation sites in south-west WA as of September 2010. Image – DAFWA

Ants and seeds

By Judy Fisher

Ants have important and diverse roles to play in our ecosystems, including interactions with plants and soil aeration. They are important seed predators and dispersers of seed. Ants can alter the distribution of both native and introduced plant species.

Ants are known to dominate arthropod groups and are good bio-indicators of ecosystem change. They are well known for their interactions with seeds; whether this be through harvesting, consumption, collection or dispersal.

Elaiosome-bearing seeds

Harvester ants fall into the general category of ant collectors and use the seed for food. Other ants are selective about the seeds they collect and only collect seeds with an attached elaiosome – an oil and fat storing appendage which they consume. Approximately 1,500 Australian plants from 87 genera and 24 families have elaiosome-bearing seeds and are called myrmecochorous. Some species with an elaiosome include *Acacia* species, *Grevillea batrachioides*, **Erodium botrys*, *Hovea* species, *Kennedia coccinea* and *K. prostrata*.

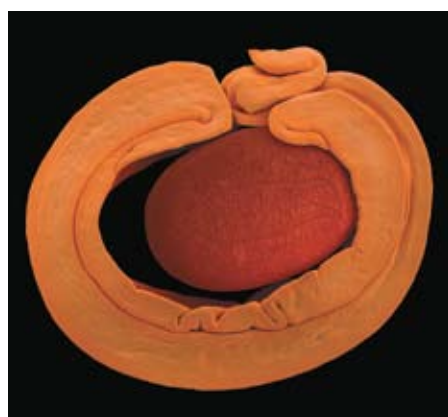
Weed seed dispersal

Environmental disturbance may affect the food supply of ants and impact on the size and diversity of ant populations. Grimbacher *et al.* (2002) found that ant diversity in Sydney's bushland was lowest at weed infested sites and highest at reference sites. As part of this Sydney study, seed removal experiments were conducted with seeds of five weed and five native non-myrmecochorous species. Seed was placed in plastic petri dishes and left in the field for seven days. Weed species used in the experiment were **Chorys gayana*, **Anagalis arvensis*, **Cyclopernum leptophyllum*, **Plantagio lanceolata* and **Sida rhombifolia*. All weed species had their seeds removed by ants during this period with **A. arvensis* being the species with the greatest seed removal across all weed and native species.

It was found that a seed species may be removed by several different ant species. Single ant species may also remove a variety of different seed species. This removal of weed seeds by ants indicates that ants may play a role in the dispersal of weed seed.



Ants moving the seed of *Grevillea batrachioides*. Photo – Andrew Crawford



The common local native red-eyed wattle (*Acacia cyclops*) has a striking red elaiosome (orange in this photo) that wraps entirely around its seed to attract both ants and birds as agents of dispersal. Image – Seeds: Time Capsules of Life © Rob Kessler, Wolfgang Stuppy and Papadakis Publisher, UK. www.papadakis.net

Field studies I have conducted in Perth indicated that seeds of the weed veldgrass (**Ehrharta calycina*) are removed by ant species. Observations of veldgrass seedlings grouped around ant holes suggest ants have played an important role in their dispersal. It has been found that veldgrass seeds are not dispersed long distances by wind – a maximum distance of 4.35 m (Wittkuhn 2010). It may be that ants are important vectors of veldgrass seed dispersal and aid its establishment to locations beyond the natural dispersal range of the veldgrass mother plant.

Although it appears that ants have a key role to play in the dispersal of weed species, we do not know what proportion of weed seeds are consumed by the ants and what proportion are dispersed to a new location where they may germinate and continue the spread of the species into new areas.

When weeding, keep your eyes open for ants and see if you notice any association between germinating weed seedlings and ant holes, it may well be that it is the ants which are assisting the spread of the species you are removing and so widening the area in which you need to weed.

More information

Grimbacher, P S, Hughes, L (2002) Response of ant communities and ant-seed interactions to bush regeneration. *Ecological Management and Restoration* 3(3): 188–199.

Judy Fisher's Perth ant study results will be available late 2011. Email Judy on judyf2007@googlemail.com or ecologist@waanthropologist.com

Wittkuhn, R S (2010) Wind-aided seed dispersal of Perennial Veld Grass (*Ehrharta calycina*): Implications for restoration in weedy urban bushland remnants. *Ecological Management and Restoration* 11(2): 148–150.

Effects of drought on our south-west bushland Continued from page 1 ...

Dr Matusick agrees we will see much more plant mortality next spring and summer if winter rainfall is low.

"It is possible that we will see spikes in insects and disease in the forest next year that will be a by-product of the death that is occurring now. I would expect to see *Banksia grandis*, sheoak, jarrah, and marri continue to die well into next summer unless we receive substantial rain this winter," he says.

Professor Erik Veneklaas suggests that the mortality may help reduce the density of vegetation. "Denser vegetation requires more water, which the roots are not able to supply, causing species with high water requirements or low drought tolerances to suffer mortality. We may simply end up with a more open vegetation in which some species are less prominent than before (or disappear) while others may become more abundant (and new ones may appear). This is not a disaster as long as it doesn't mean that invasive species take over or rare species are decimated," he says.

Recent research completed by Ray Froend suggests that below average rainfall on the plain during the past 20 years has resulted in a significant shift in the composition and structure of the banksia woodlands and wetland vegetation of the region (Froend and Sommer 2010). This gradual, progressive change in the vegetation is characterised by a decrease in the density of plants and increased proportion of xerophytic (drought tolerant) and shallow rooted species over many years. Recovery of the vegetation from 'threshold' seasonal events has been recorded for banksia woodland (Sommer and Froend 2011); however, the density and composition of the vegetation has changed, and, with a continuation of below average rainfall conditions, is unlikely to return to a pre-impact state.

"Since European settlement, management of our forests and woodlands has changed their structure substantially," says Professor Hardy. "In the jarrah forest, the stand density and leaf area index is much higher than before Europeans arrived. There are fewer old trees (which use less water) and more young trees using more water in an environment that is much drier than it was previously. The question becomes: should we consider trying to reduce stand density to (attempt to) maintain a forest by reducing tree water use in a stand, or do we walk away and just watch what happens and then let them 'stabilise' naturally? This will take many decades or more."

To Dr Pieter Poot, the worry is not just one year with exceptionally low rainfall and high temperatures, but that south-west Australia has become considerably drier since the mid 1970s and many of our plant communities are likely to be under chronic drought stress. "Predictions for the future are that it will only get worse; south-west WA is among the few areas where future climate modelling not only indicates warmer temperatures but also less rainfall," he says.

"It would be no surprise that if this trend continues tipping points may be reached where we would see much more large-scale

plant death. Obviously, this is bad news for some of our rare plant and animal species and communities which we may lose. Also, some of the common ecosystems that we are all so familiar with are likely to change in species composition, some of the change being gradual but others much more abrupt. Some people would say that evolution will take care of it and our native plant and animal species will simply adapt to the changed conditions. However, many of our plant and animal species now live in fragmented, isolated populations in a matrix of agricultural or urban land that they simply cannot traverse. They are also greatly affected by a range of exotic weeds, pests and diseases that we have brought in."

More information

Froend, R and Sommer, B (2010) Phreatophytic vegetation response to climatic and abstraction-induced groundwater drawdown: Examples of long-term spatial and temporal variability in community response. *Ecological Engineering* 36: 1191–1200.

Sommer, B and Froend, R (2011) Resilience of phreatophytic vegetation to groundwater drawdown: is recovery possible under a drying climate? *Ecohydrology* 4: 67–82.

www.foresthealth.com.au

Contributors

All contributors to this article are keen to get trans-disciplinary collaboration to conduct research on bushland health, monitor change and develop management tools.

Associate Professor Ray Froend from the Centre for Ecosystem Management at Edith Cowan University and the WA Centre of Excellence in Ecohydrology at The University of Western Australia (UWA). r.froend@ecu.edu.au

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Dr Pieter Poot from UWA and Department of Environment and Conservation pieter.poot@uwa.edu.au

Professor Erik Veneklaas from UWA erik.veneklaas@uwa.edu.au

Learning opportunities

Bushland plant survey techniques

One-day workshop to gain skills in flora and/or vegetation survey with the Wildflower Society of WA. Free for volunteers involved in the Bushland Plant Survey Programme and \$140 for government or industry employees. 23 Saturday July, 10am–3pm, DEC Woodvale Research Centre. Email bjkeighe@it.net.au before 11 Monday July for a registration form.

Dieback basic training

One-day workshop and 1-hr online assessment. Venue: Murdoch University. Workshops: 19 Tuesday July, 27 Wednesday September or 13 Tuesday December. \$220 per person. Email Dr Nari Williams at n.williams@murdoch.edu.au for more information.

Phytophthora dieback management and planning

One-day workshop and 10-hr assignment. Workshops: 15 Wednesday June (local government), 17 Wednesday August (mine sites), 19 Wednesday October (nurseries), 16 Wednesday November (utilities). \$450 per person. Email Dr Nari Williams at n.williams@murdoch.edu.au for more information.

what's on

Opportunities for you to take part! Visitors always welcome but please confirm activities with the contact person. Most activities are FREE!

Recurrent activities

Saturday, Thursday, Sunday 9am

Guided walks with trained guides from the Friends of **Bold Park** Bushland, Floreat. First Saturday, second Thursday and third Sunday of each month. Contact 9480 3996, or www.bgpa.wa.gov.au/bold-park/walks or friendsbp@bgpa.wa.gov.au.

Saturday 9am

Bushcare activities with the Friends of **Brixton Street** Wetlands are on the third Saturday of each month. Call Regina 9459 2964.

Saturday

Bushcare activities with the **Mt Henry** Conservation Group are on the fourth Saturday of each month. Contact Jan.King@acquinas.wa.edu.au

Sunday 9am–11am

Bushcare activities with **Cottesloe** Coastcare are on the first Sunday of each month. Visit www.cottesloeecoastcare.org or contact Robyn on 9384 7668 or info@cottesloeecoastcare.org.

Sunday 9am–10.30am

Bushcare activities at Throssell Reserve, **Eastern Hills** in the Jane Brook Catchment are on the second Sunday of each month. Phone Una Bell 9572 1447.

Sunday 9.45am–12 noon

Bushcare activities with the Friends of **Piesse Brook** are on the third Sunday of each month. Contact Gerry Brown 9293 2517, Bridgett Hogarth bhogarth@ozemail.com.au, linda@johnstanley.cc or visit www.friendsofpiessbrook.org.au.

Sunday 8am–10am

Bushcare activities every Sunday with the Friends of **Shenton Park** Bushland. Contact Dani 9381 3470 or bojel@it.net.au.

Sunday 9am–12 noon

Bushcare activities with the Friends of the **Spectacles** (Kwinana) are on the third Sunday of each month. Contact Lynda Smith on 9439 1928 or outback3@iinet.net.au.

Sunday 8.30am

Bushcare activities with the Friends of **Wireless Hill** are on the second and fourth Sunday of each month. Meet at main car park. Contact Margaret 0402 105 649 or s3mmatthews@hotmail.com.

Monday, Wednesday, Friday 9am–12 noon

Bushcare activities and **wetlands walk trail maintenance** with **Yanchep** National Park Volunteers. Call Julia 9405 0771.

Tuesday, Thursday 8am–11am

Koala maintenance at **Yanchep** National Park. Call Julia 9405 0771.

Thursday 8am–9am

Bushcare activities every Thursday with **Byford** Enviro-Link. Call Johanne Garvey or Kristy Gregory 9526 0199.

Thursday 9am–2pm

Bushcare activities every Thursday in **Margaret River** with the Capes Volunteer Team. Call 9757 2202.

Conservation Volunteers Australia activity schedule.

Overnight country trips or one-day activities. Call Andrew 9227 5711 or visit www.conservationvolunteers.com.au.

Research into bird populations

with the **Herdsmen Lake** Bird Banding Group. Call Bill Rutherford (ABBBS Coordinator) 0438 910 252 to organise a visit.

July

1 Friday 7.30pm

Climate change impacts on biodiversity and ecosystems with guest speaker Grant Wardell-Johnson. Contact **WA Nats(P)**.

9 Saturday 3.30pm–6.30pm

Nyoongar culture with local elders to celebrate NAIDOC week. Story-telling, tool making and spear throwing. Cost \$5 pp. Includes damper supper and craft. Contact **BCF**.

10 Sunday 9am

Fungi and slime mould foray at Warwick Bushland. Contact **FWB**.

10 Sunday 3–6pm

NAIDOC Week walk planting and stories by the campfire with Aboriginal Elder Trevor Walley. Includes bush tucker. Spectacles amphitheatre, Kwinana. Bookings Mandy Grubb 9419 3201 or mandygrubb@iinet.net.au.

11 Monday

Planting for families in the school holidays at Whiteman Park. Bookings 9209 6000.

12 Tuesday 7.30pm

Flora of Lord Howe Island with guest speaker Greg Keighery. Contact WSWA(P).

22 Friday–23 Saturday

Planting at **Kellerberrin** with Wallatin Wildlife and Landcare. Contact Erin Lee 9274 4842 or mottplanting@menofthetrees.com.au. There is a cost – transport and catering provided.

23 Saturday 8am

Guided fungi walk in **Star Swamp** Bushland. Meet at Henderson Environment Centre, Groat St North Beach. Contact Christine 9447 2983 or starswamp@hotmail.com.

29 Friday 5pm–6.30pm

Nocturnal woylie guided walk in **Whiteman Park's** Woodland Reserve. Bookings 9209 6000.

29 Friday 7.30–10pm

Quiz night to support **Rockingham Regional Environment Centre**. Gary Holland Centre, Rockingham. Drinks on sale. \$80 per table. Bookings 9591 3077.

31 Sunday 9am–12 noon

Planting for National Tree Day at **Whiteman Park**. Contact Sarah Stevenson 9209 6034 or sarah.stevenson@planning.wa.gov.au.

31 Sunday 10am–1pm

Fungi Foray workshop with PUFF at **Baldvis Children's Forest**. Learn to search, record, photograph and identify fungi. Age: 3+ Cost \$5 pp. Includes morning tea. Contact **BCF**.

6 Saturday

Planting and dance party at Beverley with Morbinning Catchment Group. For the young-at-heart. Contact Dwayne Durcan on 0437 313 951 or dwaynedurcan@iinet.net.au. Cost \$50 pp.

21 Sunday 10am–12.15pm

Bush Critters at Baldvis Children's Forest. Pat native animals and join author Karen Treanor for a story about quendas at her house. Cost: \$5 pp. Includes morning tea. Contact **BCF**.

21 Sunday 9am

Nature walk and bush care in **Warwick** Bushland. Contact **FWB**.

26 Friday 5pm–6.30pm

Nocturnal woylie guided walk in Whiteman Park's Woodland Reserve. Bookings 9209 6000.

27 Saturday 9am–12 noon

Walking Weeders Workshop. Benefit the community and your health as you learn how to weed while you walk around Lake Claremont. Contact Friends of **Lake Claremont** on folc.wa@gmail.com or 9384 2820.

September

2 Friday 7.30pm

Honey possums with guest speaker Don Bradshaw. Contact **WA Nats(P)**.

11 Sunday 10am–11.30am

Music in the Forest Bring a picnic and be entertained in the Forest amphitheatre. Free shuttle bus. Contact **BCF**.

13 Tuesday 7.30pm

Orchid flower structure with guest speaker Mark Brundrett. Contact **WSWA(P)**.

14 Wednesday 7.30pm

New perspectives on Aboriginal rock art in the Kimberley with guest speaker Dr Phillip Playford. RSL Hall, Busselton. Contact Bernie Masters 9727 2474 or bmasters@iinet.net.au.

17 Saturday 9am–12 noon

Wrestle the Reaper Practical training for *Phytophthora* dieback treatment at Jorgenson Park, Kalamunda. Contact **BSH**.

24 Saturday 9am–12.30pm

Chemical free weed control workshop at Polytechnics West (formally TAFE), Midland followed by hands-on weed management. Lunch at Harris Organic Winery. Contact **BSH**.

Please send us your October, November and December events by Thursday 25 August 2011.

Registration/Contact details

BCF Baldvis Children's Forest

Bookings Mary on 9524 1150 or mary.rayner@det.wa.edu.au.

BSH Bush Skills for the Hills

Free community workshops. Bookings 9424 2216 or envirotemp@emrc.org.au.

FWB Friends of Warwick Bushland

Meet at the bowling & tennis club car park, Lloyd Drive, Warwick. Contact Contact on Janina Pezzarini 9404 8756 or friendsofwarwick@gmail.com.

WA Nats(P) WA Naturalists Club (Perth)

Hew Robertson Lecture Theatre, Clifton St, Nedlands. Email wannats@iinet.net.au. \$2 door entry.

WSWA(P) Wildflower Society of WA (Perth Branch)

Subiaco Community Centre, Bagot Rd. Email wildflowers.perth@ozemail.com.au. \$2 door entry.

August

5 Friday–7 Sunday

Planting at Beverley with Morbinning Catchment Group. Contact Erin Lee on 9274 4842 or mottplanting@menofthetrees.com.au. There is a cost – transport and catering provided.

5 Friday 7.30pm

Bats with guest speaker Norm McKenzie. Contact **WA Nats(P)**.



Highlights

2011 International Year of Forests celebrating forests for people. Visit www.un.org/en/events/iyof2011/index.shtml.

11 Monday–22 Thursday July

Nearer to Nature

activities by DEC will be held daily during the winter school holidays for children 4+ years at numerous locations around Perth. Visit www.dec.wa.gov.au/n2n or contact 9295 2244 or n2n@dec.wa.gov.au.

14 Thursday–19 Tuesday July

Fungimap VI Conference, Denmark WA.

Contact the Fungimap Coordinator on (03) 9252 2374 or fungimap@rbg.vic.gov.au. Visit www.rbg.vic.gov.au/fungimap/.

19 Tuesday–23 Saturday July

6th World Environmental Education Conference, Brisbane, Australia. Visit www.weec2011.org.

22 Friday July

2011 Dieback Information Group (DIG) Conference, Murdoch University. Contact Brendan Nock 9424 2248 or brendan.nock@emrc.org.au.

24 Sunday–30 Saturday July

XVIII International Botanical Congress, Melbourne, Australia. Visit www.ibt2011.com/.

23 Tuesday–25 Thursday August

2011 State Natural Resource Management Conference, Perth. Visit www.isde7.net/.

7 Wednesday September

National Threatened Species Day

Commemorates the death of the last Tasmanian tiger at Hobart Zoo in 1936.

25 Sunday–30 Friday September

Asia-Pacific Weeds Society Conference, Cairns. Weed Management in a Changing World. Visit www.apwss2011.com/.

2 Sunday–7 Friday October

Australian Native Plants Society (Australia)

National Biennial Conference, Adelaide.

'Australian Plants in a Wondrous Web'.

Visit www.australianplantssa.asn.au/the-society/anpsa-conference.html.

21 Friday– Tuesday 25 November

Ecological Society of Australia Annual

Conference, Hobart. 'Ecology in Changing Landscapes'. Visit <http://esa2011.org.au/index.asp?IntCatId=14>

2011–2012 International Year of the Bat

Visit www.yearofthebat.org/.



Funding opportunities

2011–12 Community Action Grants

Community Action Grants provide funding to local community-based groups to undertake projects that contribute to the Australian Government's \$2 billion *Caring for our Country* priorities. These include: biodiversity and natural icons; coastal environments and critical aquatic habitats; and sustainable farm practices. Eligible projects include tree planting, revegetation, dune rehabilitation, removing weeds, controlling pests, field days, recording traditional ecological knowledge and sustainable land management practices. Grants are \$5,000–\$20,000. **Opens 3 June 2011. Closes 1 August 2011.** Visit www.nrm.gov.au.

Local council grants

Most councils provide funding assistance to community groups each year through a grants program. Contact your local council for details on potential funding opportunities.

City of Swan grants are aimed at proposals that involve a wide cross-section of people in the Swan region, its biodiversity and environmental sustainability. Grants \$1,000–\$20,000.

Open year round. Visit www.swan.wa.gov.au/Our_City/Grants_and_Funding/Swan_Grants.

City of Wanneroo Community Grants provide the opportunity for not-for-profit community organisations to apply for funding to support community events, activities and projects. **Opens 1 October 2011.** Visit www.wanneroo.wa.gov.au/Council/Grants.

City of Joondalup Environmental Development Grants assist community groups and schools with projects that promote sustainable energy, water conservation, biodiversity conservation, waste minimisation and sustainable transport. \$25,000 available each financial year. Visit www.joondalup.wa.gov.au/govern/grantsandfunding/communityfunding.aspx. Contact 9400 4967 or gabrielle.calverley@joondalup.wa.gov.au.

City of Rockingham Community Grants are open to not-for-profit clubs, groups, organisations and individuals that are providing economic, social, cultural, community or environmental services, infrastructure and benefits to the Rockingham community. **Due to open July/August 2011.** Visit www.rockingham.wa.gov.au/Leisure-and-recreation/Grants-and-awards/Cultural-activities.aspx.

City of Mandurah Community Assistance Grants support projects which build the skills and knowledge of associations and/or community members, increase opportunities to volunteer in Mandurah, develop community pride and celebrate the diversity within our community. Grants \$2,000. **Closes August 2011.** Contact 9550 3275 or Rachel.Oswald@mandurah.wa.gov.au.

City of Armadale Community Grants are available to not-for-profit groups and organisations for a range of projects including organising community events, purchasing equipment, coordination of workshops, printing information leaflets and brochures. Grants \$1,000. **Closes August 2011.** Visit www.armadale.wa.gov.au/Home/Your_Community/Community_Support.

City of Cockburn Landowner Biodiversity Conservation Grant Program gives financial and NRM training support to Cockburn landowners who wish to conserve and enhance the natural bushland and wetland areas on their property. Grants are for on-ground works that directly relate to the conservation and improvement of privately owned natural bushland and/or wetlands. Grants up to \$3,000. **Closes 31 October.** Visit www.cockburn.wa.gov.au/Council_Services/Environment/Landowner_Biodiversity_Conservation_Grant/.

City of Gosnells Community Sponsorship supports community organisations to deliver high quality services to the local community, and for individuals to excel in their chosen field. Conservation groups would be eligible under the Innovative Program or Project and Strategic Initiatives categories. Grants \$5,500. **Closes 5 August 2011.** Visit http://www.gosnells.wa.gov.au/scripts/viewoverview_contact.asp?NID=12657.

Town of Vincent Environmental Grants for environmental projects that target at least one of five goals: biodiversity, cleaner air, water conservation, waste management, sustainable energy use. Grants \$2,500 **Opens September and closes October 2011.** Visit http://www.vincent.wa.gov.au/Services/Environment_Sustainability/Environmental_Grants.

Shire of Augusta Margaret River Community Development Fund offers up to \$1,000 to assist not-for-profit, community and service-based organisations with events, activities and organisational development. **Opens September and closes mid-November each year.** Visit <http://www.amrsc.wa.gov.au/community/grants-and-sponsorships/>.

Activities key



Hands on – bushland and wetland management activities.



Walks and tours – look, listen and enjoy guided walks and excursions.



Skills development activities – talks, presentations, training courses and workshops.



Meetings and events – group meetings, expos, festivals and conferences.

Please send us your regional report (150–200 words) and a photo by Thursday 25 August 2011 .
Text may be edited in response to volume of submitted reports.

Point Peron update *By Richard Usher*

During recent months, the main focus of the Preserve Point Peron Group has been to water the young plants that were planted last winter and spring. With the continuing dry weather, our watering has had to continue far longer than originally planned.

Last winter we planted some 600 new shrubs and trees, all indigenous to the Coastal Plain area. They are planted in areas not designated for the proposed canal and high-rise development. Our watering regime has given all new plants about two litres of water every three weeks. At the start of summer we added wettasoil and this has allowed good penetration of moisture into the root zone. We have been pleased to note a very low rate of failure, with most plants thriving and some now developing flower buds.

Recently we discovered a large amount of old asbestos fencing material which had been dumped in the bush at Point Peron. The litterbugs had driven their vehicle about 25 m from the road, and in the process destroyed several of our guarded young plants as well as established vegetation. It is thoughtless acts like this that generally reduce the visual amenity of the area. I am pleased to say that once the material was reported, DEC quickly arranged its removal, and our group has done much to repair the environmental damage.



Despite south-west WA experiencing the driest year on record, recent high tides have resulted in rising groundwater inland from Mangles Bay. Photo – Hugo de Boorder

Recently we have been surprised to discover a sudden rise in groundwater inland from Mangles Bay. The remarkable thing about this is that we have not seen any meaningful rain in months. Water is lying in the culvert underneath Memorial Drive – the drain which links Lake Richmond to Mangles Bay and along the boundary of the proposed canal development. In the absence of rain and in view of several high ocean tides, the effect of tidal action in the rise of groundwater is compelling. This phenomenon has been reported to the proponents of the proposed Point Peron canal development.

For more information email Richard on rusher@iinet.net.au.

Threats to biodiversity at Paganoni Swamp

By Leonie Stubbs

One of our group's primary goals is removing threats to biodiversity at Paganoni Swamp Reserve, so we began the year by hand-weeding cotton bush (*Gomphocarpus fruticosus*), *Conyza* and mint (*Mentha* species) present in the eastern swamp. This was followed by the removal of rubbish dumped within the reserve, and the cutting and painting of woody weeds such as Geraldton wax (*Chamelaucium uncinatum*), the ubiquitous olive (*Olea europaea*) and apple of Sodom (*Solanum linnaeanum*). In May we commissioned Joe Tonga to destroy four feral bee hives. On the day he found a further three resulting in the destruction of seven feral bee hives.

We are hoping that Regional Parks will instigate regular feral animal control, as foxes and cats are impacting on native species within the reserve. The drought is also affecting vegetation, so together we need to support the government in its efforts to tackle climate change, while at the same time taking personal responsibility in reducing our consumption, particularly of energy and water. Hopefully this range of measures will enable our bushland to maintain its biodiversity.

Contact Leonie on 9536 8195 or FoPo@westnet.com.au for information on our group's activities. For information on volunteering opportunities with Rockingham Lakes Regional Park phone 9431 6500.

Banksia Woodland Symposium *By Amrit Kendrick*

Supported with a grant from Lotterywest, the Urban Bushland Council (UBC) ran a successful symposium on the biodiversity of banksia woodlands on 25 March at Wollaston Conference Centre. The day began with an optional guided bushwalk with Bold Park guides, and then more than 150 people listened to 11 speakers.

Greg Keighery from DEC discussed the uniqueness of some of our local iconic trees which are found nowhere else in the world and are specially adapted to the sandy Swan Coastal Plain (SCP) with its periodic fires, wet winters and dry summers. He noted that banksias are 60,000,000 years old in the evolutionary record. Mycologist Neale Bougher provided a fascinating introduction to fungi in banksia woodland. Animal expert Mike Bamford spoke about reptiles, birds and other fauna that persist in patches of remnant bushland adjacent to human populations. Dr Philip Groom from Curtin University's Institute for Biodiversity and Climate presented research showing how the physiology of our unique SCP plants are adapted to use a combination of ground and surface water throughout the year. Curtin University Professor Byron Lamont presented a parade of colourful photos and stories on the diverse understory found in banksia woodlands. David Knowles gave a stunning photographic presentation of the diversity of invertebrate pollinators, decomposers and predators in the woodlands. PhD researcher Shannon Dundas showed delightful video footage and slides of honey possums and their food plants. Dr Nicola Mitchell told the fascinating story of turtle frogs and their unusual methods of reproduction in the sands around banksia woodland.

The UBC website is currently under construction but will have some of the symposium proceedings and video footage available online. Symposium proceedings will be sent to all participants. Additional electronic or printed copies can be ordered from UBC for \$25 (plus \$3 postage). Email ubc@iinet.net.au.

Volunteering with a view *By Nicole Lincoln*

The Cape to Cape Catchment Group is in their third year of assisting community groups, DEC and local shires between Augusta and Dunsborough to achieve their conservation goals. The group are a handful of dedicated volunteers that meet weekly to share the great outdoors, friendship and to make a positive contribution to our local environment.



The Capes volunteer Team at Moses Rock erecting an erosion control fence: (from left) Gilbert Stockman, Tracey Skipplings, DEC volunteer, Joan Hutchings, Emma Hastie, Miles Durand and Nicole Lincoln. Photo – Nicole Lincoln

This year the group has ventured into some of the most beautiful landscapes the Capes region has to offer. We have pruned overgrown sections of the Cape to Cape Track near Quarry Bay, collected native seed along Prevelly Beach, built an erosion control fence at Moses Rock, collected marine debris for identification near Boranup, got up close to a western ringtail possum (*Pseudocheirus occidentalis*) while monitoring possum boxes and planted native plants at Redgate Beach, Gracetown, Dunsborough and Margaret River. The volunteer team is supported by

the South West Catchments Council with funding from the Australian Government's *Caring for our Country* program.

We invite you to lend a hand, meet new friends, learn a new skill and enjoy the beautiful outdoors with the Capes Volunteer Team. On the job training, tools and transport provided. No experience necessary. We meet every Thursday at the Cape to Cape Catchment Group office in the Community Resource Centre on Turnbridge Street, Margaret River at 9am and return by 2pm. Please phone 9757 2202.

Revegetation with MOTT *By Monica Durcan*

Land degradation continues to be a major issue in the WA Wheatbelt and with several disastrous seasons, cash-strapped farmers inevitably put revegetation projects on the back burner. This is where the rest of the WA community can help. We are raising funds to pay for seedlings and Men of the Trees' field officers are working with land managers to ensure the seedlings are placed in the landscape for best environmental outcomes – addressing salinity, wind and water erosion and reconnecting habitat. All donations towards this project—'Diversity across the Wheatbelt—we're putting it back together'—are tax deductible. We are also offering corporate team-building packages and volunteer planting experiences to help put these seedlings in the ground this winter.

We have just launched 'Farmscape Services' for urban and rural revegetation projects. Assistance can be provided to design revegetation projects of any size.



Men of the Trees volunteers sorting out seedlings at the Ballidu planting in 2007 as part of Men of the Trees Activate planting. Photo – Men of the Trees

Men of the Trees will work with the land manager to develop a species list, link them up with contractors for site works and will even provide a planting team. The planting team is also available for weeding and tree guarding where appropriate.

For more information contact Monica on 9291 8249 or 0418 934 870 or mdurcan@iinet.net.au.

Community forums inspire

By Victoria Maguire

Perth Region NRM has been running a series of community forums to assist those working in bushland conservation. In March the forum focused on 'Recruiting and Retaining Gen X and Gen Y Volunteers'. Martha Barnard-Rae of Volunteering WA gave excellent advice on volunteer management models and key principles for step-by-step volunteer management. Tim Kenworthy of Youth Tree Group spoke on youth volunteering and Marnie Giroud from the Swan River Trust provided an overview on the 'River Guardians' volunteer program. The River Guardian program has had a positive influence on community awareness and participation in river and catchment health.

In May, the City of South Perth hosted a seminar on the importance of estimating the 'Environmental, Social and Economic Value of Native Bushland'. Professor Paul Hardisty explained how acknowledging bushland value leads to better outcomes for bushland retention, our society and our economy. It is essential that decision-makers factor in our environmental concerns with their largely economic view of the world.

More information about the forums, including PowerPoint presentations and relevant contact details can be found at www.perthregionnrm.com or contact Victoria (Tori) Maguire on 9374 3325 or Victoria.Maguire@PerthRegionNRM.com.

Carnaby's flock to Star Swamp *By Christine Curry*

A flock of 60–80 Carnaby's cockatoos descended on Star Swamp Bushland Reserve in early April—about six weeks later than usual. The birds have been busy foraging in the banksia and parrot bush areas and in nearby gardens, and have also been visiting bird baths in the neighbourhood every afternoon for a drink. What is most unusual this year is that the flock has been roosting overnight in the reserve. They spend the night in the tuart trees near the Henderson Environment Centre and in the local school grounds. We have noted at least two chicks with the group.

For more information email Christine at randccurry@three.com.au.

Possum rope bridges By Kaori Yokochi

Can rope bridges reduce the impacts from road construction and improve conservation management of the threatened western ringtail possum (*Pseudocheirus occidentalis*) in south-west Western Australia?

We all know animals die on roads and this wouldn't be happening if there were no cars or roads. However, we can't live without roads. So how do we do minimise the effects on animals from roads and vehicles? We can erect fences along roads, put up road signs warning of wildlife and change speed limits. These measures may be effective in reducing the number of roadkills, but they don't reconnect habitats fragmented by the road network and other infrastructure. Habitat fragmentation is one of the main adverse effects roads have on wildlife. For many wildlife species, fragmentation has the potential to reduce overall population size and gene flow between populations. This may result in inbreeding in small isolated populations and can ultimately lead to localised extinction.

Installing rope bridges can physically reconnect habitats and reduce the number of roadkills. Rope bridges have been built in several locations in Australia, including the Hume Highway in Victoria. However, we don't know if use of these bridges results in any long-term conservation gains. Although animals have been seen using these structures, there is no data to show whether use of the rope bridges results in increased gene flow between populations from each side of the bridge.

My research will be examining how western ringtail possums and common brush-tail possums (*Trichosurus vulpecula*) use each of two rope bridges: one installed across Caves Road; the other across an artificial waterway. Both crossings are in west Busselton and link otherwise isolated habitat areas with Locke Nature Reserve.



Western ringtail possum (*Pseudocheirus occidentalis*) with ear tag and radio-collar. Photo – Judy Clarke

I will be assessing if there is a reduction in the number of known roadkills and if there is an increase in the number of known, radio-collared and micro-chipped individual possums crossing the road. Determining the total number and the number of individual possums using the rope bridges will be achieved through the use of automated, infra-red activated cameras and automated microchip readers. Importantly, by conducting paternity testing, I will be able to determine if young recorded on one side of the road or drain have been fathered by males on the same or opposite side.

Data analyses will ultimately allow us to assess the extent of gene flow and the true conservation management value of rope bridges. The results will aid planners and decision-making authorities when determining the type of conditions associated with development approval, including approval for road construction.



A rope bridge over the Hume Highway, Victoria, designed and installed by the Australian Research Centre for Urban Ecology (ACRUE, University of Melbourne) and VicRoads. Photo – Kylie Soanes (ACRUE) and Ross Meggs (Faunatech)

This study is conducted through The University of Western Australia and DEC, and is supported by the Satterley Property Group, Main Roads WA, Western Power, the Shire of Busselton and the Water Corporation WA.

My fieldwork involves catching and radio-tracking possums and will be conducted throughout the year until 2012. If you are interested in volunteering, please contact me at yokock01@student.uwa.edu.au. Your help will be greatly appreciated!



Nominations close 29 July 2011.
Visit www.dec.wa.gov.au/awards.

Initiatives at Naragebup By Anne Bellman and Christine Comer



Naragebup, the Rockingham Regional Environment Centre, is a non-profit community owned and run organisation. Initial construction of the centre showcased sustainable living, permaculture gardens, environmental displays and was a focal point for environmental groups and the community. In recent years, schools and community education programs have been established and the management of local bushland areas has been formalised.

Inspiration for Naragebup came from Ann and Bob Goodale and members of the Kwinana Rockingham Mandurah Branch (KRMB) of the Naturalists Club. Research began in 1994 on the feasibility of an environment centre and a design was chosen for the site on Safety Bay Road opposite Lake Richmond. By 1996 tree planting had commenced on-site and a newly formed management committee successfully applied for funding from the Lotteries Commission. The following year work began on perimeter fencing, organic vegetable gardens and accommodation in four old railway carriages.

The inaugural AGM was held in 1998 and membership steadily grew. A building loan from the City of Rockingham was secured and corporate funding enabled the construction of a thrombolite display. Public lectures, school lessons and the first annual environment festival were held. The straw bale building began to take shape and incorporated recycled materials, composting toilets, solar panels and a wind turbine. Peter Garrett officially opened Naragebup on 28 February 2002.

Today, Naragebup boasts an eco-playground, nature and bush tucker trails, marine and reptile displays, a waterwise garden, ponds, a butterfly house, a regional herbarium, a museum and numerous displays. Busy educational programs are interwoven with volunteer activities, maintaining the centre, survey work, walk trail maintenance, community gardens, planting and weed control.



*Child reading the new interpretive signage about thrombolites at Lake Richmond.
Photo – Christine Comer*

Natural Resource Management (NRM)

Naragebup's NRM office opened in 2001 and, with help from the 'Work for the Dole' program and work experience students, were able to continue the reserve management begun by KRMB Naturalist Club members. Naragebup currently partners with the City of Rockingham in the on-ground management of Lake Richmond Reserve, Baldivis Nature Reserve and Karnup Nature Reserve.

Lake Richmond is home to two threatened ecological communities (TECs) – 'sedgeland in Holocene dune swales' and thrombolites. Management programs focus on the conservation of the TECs and the lake. Weed eradication, woody weed removal and revegetation are the priority for this work. Funding from CoastWest, DEC and Swan Alcoa Landcare Program have greatly contributed to this cause. Assistance from the National Green Jobs Corp program provides hours of hands-on labour. Management and maintenance of the walk trails, board walks and bird hides at Lake Richmond is constant. Newly installed interpretive signs give visitors to the reserve an opportunity to learn more about this very special environment.

Baldivis and Karnup nature reserves are considered of high conservation value because of the native flora and fauna that are found in each reserve. Wildflowers, orchids and banksia are found throughout the reserves. Weed management is a priority at both reserves. Eradication of invasive grasses and non-native species is a continual project. The environmental management of these two reserves has seen trails restored and maintained, interpretive signs installed and revegetation projects grow successfully.

Nearby Point Peron has always been of interest to KRMB Naturalist Club members for walks and birdwatching. The Friends of Shoalwater chaired by Nic Dunlop carried out penguin monitoring, waterbird counts and created a herbarium in partnership with Elizabeth Rippey. The recent proposal to build a marina, residential canals and retail areas at Point Peron has generated huge local interest. Preserve Point Peron group was formed to demonstrate that the area is loved and is not a wasteland. Weed control (particularly of *Euphorbia terracina*) and rubbish removal is a priority for the group (see Regional reports this issue).

For more information visit www.naragebup.org.au or phone 9591 3077.

Resources

Website watch

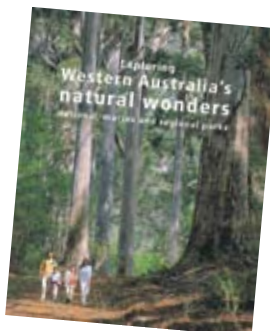
FeralScan mapping website has improved on the rabbitscan website and was re-launched in January to include camels, foxes, Indian mynas and soon pigs and wild dogs. It provides a resource for landholders, community groups and pest control officers to map sightings of ferals, create a management map, record the damage they cause and the control techniques used. The site provides links to possible funding support, online resources and control information. Sighting data will help provide a national overview of the feral animal problems for deployment of future control techniques, such as bio-control. Visit www.feralscan.org.au/.

Bush Rangers WA helps the community via a variety of local conservation projects. Visit www.dec.wa.gov.au/bushrangers/.

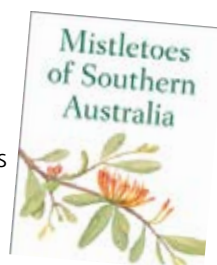
Biodiversity Heritage Library is a consortium of 12 natural history and botanical libraries that cooperate to digitise and make accessible the legacy literature of biodiversity held in their collections. They aim to make literature available for open access and responsible use as a part of a global 'biodiversity commons.' Visit www.biodiversitylibrary.org/.

New publications

Exploring Western Australia's natural wonders: national, marine and regional parks (2010) Mitchell, S. WA Naturally Publications, Perth. 327 pages. RRP \$39.95. This book showcases 65 of the top national, regional and marine parks in WA. It provides information about each park's history, natural attractions, how to explore the park and the range of activities available to visitors. Beautiful photography throughout. Copies can be purchased from WA Naturally Publications on phone 9219 8000, fax 9334 0498 or online www.dec.wa.gov.au/shop.



Mistletoes of Southern Australia (2011) Watson, DM. CSIRO Publishing. RRP \$49.95. This book summarises the evolutionary origin and global distribution of mistletoes, diversity patterns in Australasia, ecology, life history, cultural significance – both European and Indigenous, role in art and design, management and is a guide to the 46 species found in southern Australia. Includes 51 watercolours and more than 130 colour photographs.



Endangered Black Cockatoos in Western Australia: Proceedings of a symposium about their biology, status, threats and efforts to restore their habitat and population.

November 2010. Urban Bushland Council. \$25 plus \$3 postage. Email ubc@iinet.net.au to order.

Proceedings of the Banksia Woodland Symposium. March 2011. Urban Bushland Council. \$25 plus \$3 postage. Email ubc@iinet.net.au to order.

Recent research

Bettink KA and Brown KL (2011) Determining best control methods for the National Environmental Alert List species, *Retama raetam* (Forssk.) Webb (white weeping broom) in Western Australia. *Plant Protection Quarterly* 26(1): 36–38.

Cuneo P, Offord CA and Leishman MR (2010) Seed ecology of the invasive woody plant African Olive (*Olea europaea* subsp. *cuspidata*): implications for management and restoration. *Australian Journal of Botany* 58(5): 342–8.

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