



Newsletter of the Weed Society of Victoria Inc.

volume 26 issue 1 2015

Weedscene

Hawkweed Hunting in the High Country



Volunteers familiarising themselves with mouse-ear hawkweed on the Bogong High Plains, January 2015



Orange hawkweed
(*Hieracium aurantiacum*)
▪ Federal Alert List for Environmental Weeds
▪ State prohibited weed
(depi.vic.gov.au photo)



King devil hawkweed
(*Hieracium praealtum*)
▪ State prohibited weed
(depi.vic.gov.au photo)



Mouse-ear hawkweed
(*Hieracium pilosella*)
▪ State prohibited weed
(depi.vic.gov.au photo)

If you think you have found hawkweed, do not attempt to treat or dispose of it yourself: contact DELWP immediately on 136 186 or email weed.spotters@depi.vic.gov.au

What is Hawkweed?

The hawkweeds are herbaceous members of the second largest family of flowering plants, the Asteraceae (daisy flowers), and belong to the genus *Hieracium*. Hawkweed spreads by runners which form new rosettes, creating a solid mat once established, and by wind-dispersed seed. Hawkweed regrows each year from below-ground rhizomes and invades intact native vegetation as well as disturbed sites. Hawkweed is thought to inhibit recruitment and growth of neighbouring plants through allelopathic exudations, reducing the soil suitability for other species.

Three species of hawkweed occur in the Victorian Alpine region (see left) and have a reputation for spreading aggressively in cool-temperate areas, often at high altitude, such as in parts of USA, Britain, Canada, New Zealand, and mainland Europe away from its natural range. All three species are State Prohibited Weeds, the highest category of declared noxious weeds in Victoria, and their eradication is considered possible. In addition, orange hawkweed is one of 28 weed species on the Federal Alert List for Environmental Weeds, being of limited distribution but with the potential to seriously degrade natural ecosystems. All species of *Hieracium* have been listed or declared under various State Acts since 2003.

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WSV Membership Rates 2014-15

Pay for 1, 3 or 5 years

Concession*	\$20
Ordinary	\$60
Corporate	\$140

* Students and Pensioners

WSV is not registered to collect GST

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NEW PUBLICATIONS

COVER PHOTO: *Hieracium aurantiacum* (courtesy Rob Richardson)

Joining the Weed Society of Victoria

The benefits of membership to WSV include:

- Weedscene: newsletter packed full of information
- eWeedscene: regular electronic bulletin on weed news and events
- Discounts to WSV seminars, workshops, conferences and other events
- Opportunities to network with others.

To apply for membership, download and print the membership application form from the WSV website, www.wsvic.org.au, complete the details and mail to the WSV Secretary.

Weedscene Newsletter of the Weed Society of Victoria Inc.

- Contributions to Weedscene are welcomed. Please contact the editor for further information.
- Readers are free to circulate and reproduce Weedscene material with acknowledgment of the author and source.
- The views expressed in Weedscene are those of the contributors and are not necessarily shared by the WSV Executive Committee.

Want to receive Weedscene as a PDF? Contact the Secretary.

Society Sponsorship

Annual Sponsorship \$300

- Logo displayed on 'Weedscene' – four issues per year
- Logo and sponsor name on the Society's website
- One promotional article in 'Weedscene' per year (subject to ed. control)
- One free membership per year (optional)

Advertising rates

■ One sixth page	56 mm wide × 128 mm high	\$50
■ Quarter page	180 mm wide × 64 mm high	\$75
■ Half page	180 mm wide × 128 mm high	\$150
■ Whole page	180 mm wide × 257 mm high	\$300

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Hawkweed Hunting in the High Country by Ingrid Krockenberger



Volunteers in Sun Valley, with Rocky Valley Storage Dam visible, top left

Taking well over 600 photos is a good measure of my interest/excitement/pleasure in participating as a volunteer in the Hawkweed Eradication Program in and around the Falls Creek Alpine Resort and Alpine National Park in January 2015. My little old camera certainly had a work-out.

The project team had prioritised one hectare grids for hawkweed surveillance based on proximity to known infestations, prevailing winds, suitable habitat types and other factors. About two one-hectare plots were searched per team per day. Several new patches of a few mouse-ear hawkweed plants were discovered in the aptly-named Pretty Valley. (More details on volunteer achievements later in this issue.)

In the easier terrain and vegetation, the one hectare plots were surveyed along well-disciplined lines of volunteers, guided by ropes, to search every square inch for hawkweed. Hazards were well-concealed water-ways meandering through the dense groundcover, and leg-cramps from stepping over springy mattress-like vegetation in the peatland (Ecological Vegetation Class (EVC): Alpine Valley Peatland and Sub-alpine Wet Heath mosaic).

In the more difficult terrain – very steep slopes and thick chest-high shrubs (head-high on me!), or snow gum woodland with dense understorey and thick litter layer (EVC: Sub-alpine Shrubland and Sub-alpine Woodland) – it was not possible to use rope-guides, as volunteers had the challenging task of surging through dense growth and trying to stay upright, whilst searching for hawkweed. I tried not to think of snakes, as it would not have been possible to distinguish them from the dense branches we were stepping on! (Definitely taking thick gaiters next time – bring on the snakes!)

Two members from each team carried GPS devices so that it was possible to accurately map the surveyed areas. The days' maps were displayed every evening and it was quite entertaining to observe the paths taken by each team, from well-disciplined parallel straight lines to wild curly squiggles, depending on the site.

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Hairy orange hawkweed (right) abutting and partially disguised by the smooth-leaved (possible) field daisy (*Brachyscome decipiens*), Sun Valley



Mouse-ear hawkweed with flower bud and spreading stolons, Pretty Valley



WSV Secretary, Bec Grant on Day 1

Hawkweed in the Victorian Alps

Species	Date*	Naturalisation distribution
Orange hawkweed (<i>Hieracium aurantiacum</i>)	1999	Tasmania, Victoria (Bogong High Plains, Mt Hotham, Mt Buller, Ballarat Botanic Gardens), Kosciuszko National Park
King devil hawkweed (<i>Hieracium praealtum</i>)	2003	Bogong High Plains
Mouse-ear hawkweed (<i>Hieracium pilosella</i>)	2011	Bogong High Plains, also NSW (no further information available), eradicated in Tasmania and ACT

Disturbance factors which favour hawkweed invasion

Ski resorts and slopes	Known focal points of exotic plant species introductions to the Australian Alps (deliberate garden plantings and possible transfer from ski equipment and machinery)
Roads, aqueducts, hiking trails and huts	Exotic species are more prevalent along areas of movement, occupation and potential transfer
Fire	Frequency and intensity of fire is likely to increase as a result of climate change
Cattle grazing	Large areas were subject to cattle grazing licences from the 1850s until the 2003 fires

* First recorded date of naturalisation in Victoria

Sources of Information:

<http://invasives.org.au/blog/hawkweeds-a-recent-discovery-in-victorias-alps-and-a-taxonomic-name-change/>

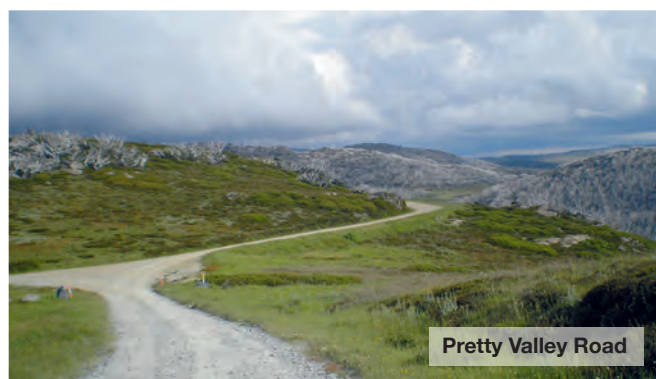
<http://www.depi.vic.gov.au/agriculture-and-food/pests-diseases-and-weeds/weeds/state-prohibited-weeds/hawkweed>

http://parkweb.vic.gov.au/__data/assets/pdf_file/0015/314502/19_2070.pdf

Fire

The Falls Creek Alpine Resort landscape is draped with the ghostly traces of the 2003 and 2006 fires – vast tracts of silvery snow gum stags, many of which have come to life again from lignotuberous growth at their bases.

It is a constant reminder of the transience and vulnerability, yet resilience, of Australian landscapes. And it's a worrying reminder of the perils of a changing climate, accentuated by the flurry of fire emergency response which was triggered by several lightning strike spot fires in the area.



Pretty Valley Road



Lightning strike spot fire on Mt Cope, with retreating thunderstorm on the right

Threatening Processes for Vegetation in the Victorian Alps

What's at Stake?

The hawkweed eradication program is being conducted at the Falls Creek Alpine Resort and surrounding areas of the Alpine National Park. The 1,535 ha Resort could be considered representative of the Victorian Alps as it supports 13 of the 16 alpine Ecological Vegetation Classes (EVCs) that exist in alpine Victoria, having a total of 19 EVCs which also include four subalpine and 2 montane communities. Three EVCs, Alpine Valley Peatland, Sub-alpine Wet Heath and Alpine Pond Herbfield, are included in the Alpine Sphagnum Bog and Associated Fen community federally-listed under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC). An additional two EVCs, Snowpatch Grassland and Late-lying Snowpatch Herbland, are state-listed under the *Flora and Fauna Guarantee Act 1988* (FFG). A further 10 EVCs have rare or threatened conservation status.

There are at least 42 rare and threatened plant species within the Resort, including one EPBC-listed species, three FFG-listed species and 38 species on the state Department of Environment, Land, Water & Planning (DELWP) Advisory List. The Resort also has a substantial number of listed fauna supported by the unique habitat of the Victorian Alps, including:

- 2 mammals: Mountain Pygmy Possum (EPBC/FFG) and Spot-tailed Quoll (EPBC/FFG);
- 4 reptiles: Alpine Sheoak Skink (EPBC/FFG), Alpine Water Skink (FFG), Alpine Bog Skink (FFG) and Guthega Skink (EPBC/FFG) – see photo right;
- 1 frog: Alpine Tree Frog (EPBC/FFG), and;
- 2 aquatic stoneflies (FFG).

This little fellow (right) was collected by Latrobe University's Zak Atkins investigating the ecology, life history and thermal biology of the endangered Guthega Skink, when the hawkweed survey coincided with the skink survey at Pretty Valley in January



The highest key threats to vegetation in the Resort have been identified as weeds, pest animals and climate change. Development remains a moderate to high threat. Erosion and sedimentation are considered a moderate risk (but I would

add that the impact of erosion and sedimentation would vastly increase following fire).

Climate Change

Expected climate change impacts include:

- more favourable conditions for a broader range of pest plants and animals;
- reduced extent for communities dependent on longer periods of snow cover (such as snowpatch vegetation);
- increased fire frequency and fire intensity;
- greater variability in ecological processes such as flowering and seed set, and;
- expansion of the treeline and incursion of trees into formerly treeless vegetation.

Invasive Species

Over 260 weed taxa, many of them naturalised, have been recorded within 5 km of the Falls Creek Village. The alpine/subalpine environment and the distance from other settlements limit the weed flora of Falls Creek Resort. However, weed invasion has the potential for highly negative impacts on a unique environment.

Salix cinerea (grey sallow) recruited spectacularly following the 2003 and 2006 fires, and has received a lot of attention due to the listing of many willow species as Weeds of National Significance (WONS). Another WONS species, European blackberry (*Rubus fruticosus*), also occurs in the area. Spear thistle (*Cirsium vulgare*), English broom (*Cytisus scoparius*), St John's wort (*Hypericum perforatum*), as well as blackberry, are local weeds listed as regionally controlled species under the *Catchment and Land Protection Act 1994* (CaLP). In addition to the hawkweeds, the following local weeds have been classified as "highly invasive and a very serious threat to vegetation or its recruitment" in the area: sweet vernal grass (*Anthoxanthum odoratum*), montbretia (*Crocasmia x crocosmiiflora*), English broom, St John's wort, soft rush (*Juncus effusus*), blackberry, grey sallow and rowan (*Sorbus aucuparia*).

Pest animals known to occur in the area include foxes, cats, deer, hares and rabbits. (I saw my first-ever hares over several days, and there were traces of deer activity evident at the Basalt Hill hawkweed survey site.) Impacts from feral herbivores include grazing and browsing of native vegetation, ring-barking or bark-stripping trees, trampling, erosion, dispersal of weeds, and degradation of water quality. Feral carnivores pose substantial risks to key species such as the Mountain Pygmy Possum and the various species of rare and endangered skink.

Source of Information: Ecology Australia Pty Ltd (2011). *Falls Creek Alpine Resort Biodiversity Management Strategy*. Report for Falls Creek Resort Management.

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Hawkweed Eradication Program



View of Rocky Valley Storage Dam from Pretty Valley Road

The Falls Creek Hawkweed Eradication Program is a partnership between Parks Victoria, the Department of Economic Development, Jobs, Transport and Resources, and the Falls Creek Resort Management Board, operating in the Falls Creek Alpine Resort and the adjacent Bogong High Plains area of the Alpine National Park.

Hawkweeds are considered to be a high potential threat to environmental values in the Victorian Alps. Known populations of hawkweeds in the Victorian Alps are relatively small and somewhat contained. It is therefore strongly believed that hawkweeds can be eradicated in the near future if sufficient resources can be allocated for early detection and treatment.

Whilst new infestations are still being detected, the number of new sites is declining over time. However, hawkweed surveillance undertaken by humans is resource intensive and physically demanding for volunteers and contractors.

So the next step in the Hawkweed Eradication Program is determining the feasibility of the use of a hawkweed detection sniffer dog. A trained dog may not only cover ground faster than humans, it may be more effective at detection, including underground roots and rhizomes.

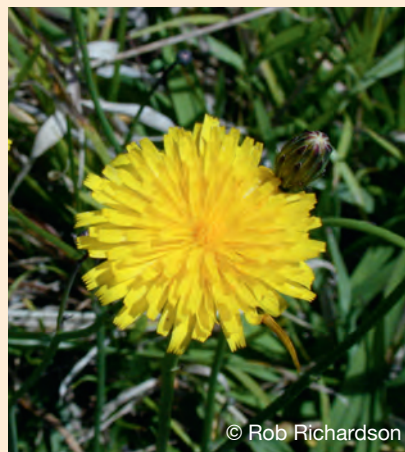
2014/2015 Falls Creek Hawkweed Survey

One hundred and two volunteers participated in the Hawkweed Eradication Program over the 2014–2015 summer. Volunteers contributed almost 1,350 hours and surveyed 70 ha of the total 170 ha surveyed this summer. A total of 63 new infestations were found and treated in a combined surveillance effort conducted by volunteers, staff and contractors during the 2014–2015 season.

Source of information: Keith Primrose, Project Manager, Hawkweed Eradication Program, Parks Victoria.

Call-and-Response Hawkweed Work Song

I don't know and I don't mind,
Orange hawkweed's hard to find,
We will brave it rain or shine,
Search for hawkweed anytime.
Hold on!
Look here!
Oh no, cat's ear!



Cat's ear *Hypochaeris radicata*



© Rob Richardson

Hawkweed Project Control Group

The Hawkweed Project Control Group oversees the hawkweed eradication program in the Victorian Alps. The Group comprises representatives from the Department of Economic Development, Jobs, Transport and Resources, Parks Victoria, Falls Creek Resort Management, and Mt Buller and Mt Stirling Resort Management. High quality data collection in combination with novel research has been used by the Group to answer key eradication questions.

Where are the hawkweeds?

Modelling of seed dispersal expanded from a simple distance parameter, to sophisticated simulations of seed travel based on hawkweed seed characteristics and the alpine landscape. Combined with suitable habitats for germination and establishment, search area maps were developed to target search effort.

How hard should we look?

As the relationship between search effort and detection varies according to the type of landscape and vegetation, an optimisation model was developed to prioritise resource allocation.

How detectable are hawkweeds?

Hawkweed can easily be mistaken for several other daisy species at first glance. There is a risk that search teams might fail to detect plants, given the varied terrain and identification challenges, so an experiment was conducted to determine the level of confidence the Group can have in their surveillance data. This information was also used to develop resource allocation optimisation.

The future of hawkweed eradication

Detection experiments have established that human searchers struggle to find non-flowering hawkweeds, particularly in thick vegetation, so the next step for the Project Control Group is investigating the effectiveness of a dog trained to detect hawkweeds, utilising dogs' heightened sense of smell, agility and ability to be trained. It is possible that a hawkweed detection dog could more efficiently and effectively detect flowering or non-flowering plants, and potentially even sniff out underground parts that human searchers could never find.

Source of information: Hauser, C., Smith, N. and Pascoe, C. (2014). Victoria's Hawkweed eradication program: An enduring Alpine partnership. *Australasian Plant Conservation* **23** (2): 5-7.

See also: Hanigan, L. and Smith, N. (2014). Determining the feasibility of training a dog to detect *Hieracium* species. In: Proceedings of the 19th Australasian Weeds Conference, 1-4 September 2014, Hobart, Tasmania (www.caws.org.au/awc/2014/awc201413741.pdf).



Eradication of pines in Sun Valley is possible once the soil seed bank is exhausted and the remaining saplings are removed. Stumps of felled mature trees are visible.

WSV News

WSV Conference Presentations Published in Plant Protection Quarterly

Seven presentations from the 2014 Victorian Weeds Conference, 'Invasive plants and animals – contrasts and connections', have been published as peer-reviewed articles in *Plant Protection Quarterly* Volume 29 No. 3 2014.

- African boxthorn (*Lycium ferocissimum*) and its vertebrate relationships in Australia
Michael Noble and Robin Adair
- Detection of alligator weed using an unmanned aerial vehicle
Daniel Clements, Tony Dugdale, Trevor Hunt, Robert Fitch, Calvin Hung, Salah Sukkarieh and Zhe Xu
- The Keith Turnbull Research Institute: 50 years of pest plant and animal research
Fiona Ede, Raelene Kwong, Greg Lefoe, Jackie Steel and John Weiss
- Effects of spot herbicide applications for control of cane needle grass patches in non-arable situations
David A. McLaren and Kym L. Butler
- To weed or not to weed? The application of an agent-based model to determine the costs and benefits of different management strategies
J. Steel, J. Weiss and T. Morfe
- The invasion of *Pittosporum undulatum* in the Dandenong Ranges, Victoria: realising predictions about rates and impact
Roslyn Gleadow and Jeff Walker
- Understanding the biology and ecology of poverty weed (*Iva axillaris* Pursh) – A guide towards eradication and control programs in Victoria
Zachariah Munakamwe

From the President



From a personal viewpoint, the last couple of months could be encapsulated in two words – Blackberry and Ragwort! Throw in a significant rise in rabbit numbers across the

State and you have ‘busy times’ for those working on these concerns (and others) in various capacities and roles.

The committee is continuing to work well as a team and to apply their enthusiasm in making great improvements to the functioning of the society. After considerable efforts and planning, the AGM Seminar ‘Invasive species from woodland to waves in Westernport’ has finally come together and shaping up as a great opportunity to learn and network. It will be a great time to catch up with our members and meet some new ones, so please introduce yourselves to the committee.

Post AGM, we will be commencing plans for WSV’s 50th birthday in 2016. If there’s something you want to see happen at next year’s biennial conference, then we’d love to hear from you by emailing our secretary at secretary@wsvic.org.au.

Advocacy Update

Advocacy on weeds has been a regular feature of the agenda of the WSV management committee. Since passing the advocacy policy early last year, thought has been going into advocacy priorities.

At the state level, last year’s Victorian election meant that the Department of Environment and Primary Industries has been split into two new super departments: the Department of Environment, Land, Water and Planning and the Department of Economic Development, Jobs, Transport and Resources. It is still unclear what this means for weed control but the *Catchment and Land Protection Act 1994*, which is the main legislation for managing invasive plants and animals in Victoria, is being administered by The Hon. Lisa Neville MP, Minister for Environment, Climate Change and Water. This is a change from earlier arrangements where the legislation was under the Minister for Agriculture but is similar to arrangements under the former Labor government.

The WSV has written to Minister Lisa Neville and Minister for Agriculture, Jaala Pulford, congratulating them on their appointments and seeking a meeting. Top of the agenda will be discussing the *Invasive Species Control Bill* that is set to come before Parliament later this year, the introduction of a ‘permitted list’ approach to the sale of weedy plants, and better supporting the control of widespread weeds.

At the federal level, as the WSV delegate to CAWS, I have been active as part of the CAWS Advocacy and Promotion subcommittee.

We learnt late last year the Australian Weeds Committee merged with the Vertebrate Pest Committee to form the Invasive Plants and Animals Committee. This committee is still developing an updated Australian Weeds Strategy, with a draft due out later in 2015.

CAWS made a substantial submission to a Senate inquiry into preventing new invasive species impacting on the environment and presented evidence at the Perth hearing. This inquiry is an important look at recent examples of the arrival in Australia of new invaders such as yellow crazy ants, Asian black spined toad and Mexican feathergrass. The internet trade of illegal weed species has been a hot topic. The ease of buying highly invasive plants, such as Mexican feather grass and *Kochia scoparia* over ebay, was highlighted. The inquiry was due to hand down its report on 4 March 2015.

Finally at the Federal level, new legislation replacing the *Quarantine Act 1908* called the *Biosecurity Bill 2014* is up for debate in the Senate. This will greatly increase the power available to control biosecurity outbreaks, but the legislation is scant on detail, instead relying on regulations that are yet to be drafted. The Invasive Species Council and many agriculture groups have been calling for improvements to the Bill to ensure greater use of science, more independent decision-making, and improved transparency and review provisions.

Andrew Cox
WSV Executive Committee

CAWS Report

Our Australasian representative body continues its important work.



The CAWS Executive is reviewing the criteria for travel awards to assist with attendance at the biennial Australasian Weeds Conference and its yearly student awards. At present, travel awards to attend the conference are only available to 'people physically working with weed control in roles such as noxious weeds officers, local government staff, weed control contractors and coordinators of community weed control initiatives'. We'd like to hear your thoughts via a short online survey at www.surveymonkey.com/r/CAWStravelawards.

Applications have just closed for the yearly CAWS student and young scientists travel awards for postgraduate students and young weed scientists. The awards will be made by

May 2015. This information will be updated on the CAWS website as it comes to hand (www.caws.org.au).

Work by the Weeds Society of WA is underway for the 20th Australasian Weeds Conference to be held in Perth on 11–15 September 2016 (<http://www.20awc.org.au/>).

A number of new books about weeds are planned. Four books are to be produced by the Weeds Society of WA, while two are planned for Queensland. CAWS agreed 'in principle' to provide a loan to assist production of the WA books.

The CAWS constitution is being adopted at a special general meeting in late March after a technicality meant changes at two earlier meetings were ruled invalid. This will allow the new position of past-president to be created.

Finally, discussions have been taking place to ensure that those people living in the Northern Territory and have an interest in weeds can participate in the work of a weed society. The Weed Society of Queensland has created an NT branch, while the Weeds Society of WA already has several NT members. The Weed Management Society of SA is also an option for people living in Alice Springs.

Andrew Cox, CAWS delegate

In the Media

French Island Biodiversity

French Island is the focus of the WSV 2015 AGM Seminar 'Invasive species from woodlands to waves in Westernport' on 18–19 March, along with Phillip Island. French Island is also the focus of a recent ABC RN Off Track program. Audio and transcript can be found at: <http://www.abc.net.au/radionational/programs/offtrack/french-island-tour/6030456>

New Pasture Plants Intensify Invasive Species Risk

ABC Science has an article and accompanying video on a paper published in the Proceedings of the National Academy of Sciences of United States of America. Lead author Associate Professor Don Driscoll, Australian National University, reports on the risk posed by conventionally-bred pasture plants and on how eight countries on six continents regulate that risk. Don Driscoll is quoted as stating "Australia spends around \$100 million each year on managing weeds in the natural environment and there should be better assessment of the weed risk of pasture plants" and "none of the countries we surveyed required environmental risk to be taken into account for new varieties of species that are already in the country". Article and video can be found at: <http://www.abc.net.au/science/articles/2014/11/04/4120713.htm>

New Weeds Declared in South Australia

Biosecurity SA have included an additional 24 species and removed five species from the Declared Plants Policy, which sets out control conditions for more than 100 weeds. New declared species include buffel grass, an important but invasive pasture species in northern Australia (with obvious links to the article above). Audio can be found at: <http://www.abc.net.au/news/2015-01-20/new-sa-weeds-declared/6027994>

Weed Identification and Treatment Guide released as an App

The Weed Society of Queensland has developed and released an app version of the popular and user-friendly book 'Weeds of Southern Queensland', making the information very portable and accessible. The app contains photos and information for 132 weeds, with details of control and treatment methods, and also landholder obligations for the control of declared weeds. It has been designed as a weed identification and treatment guide for use by the widest possible audience. Further information and download at: <http://www.wsq.org.au/WSQ%20app.htm>

2015 WSSA Award Winners

Two dozen people recently received awards by Weed Science Society of America for their outstanding contributions to the field of weed science. Read the story at: <http://www.prweb.com/releases/2015/02/prweb12508083.htm>

Invasive Plants PhD Research Projects

This is the second in our new series on invasive plants research projects being undertaken by PhD candidates in Victoria.

Investigating the use of carbon for targeted weed management and for grassland rehabilitation within the Western Grassland Reserve

PhD candidate, Shakir Ahmed, is supervised by Assoc. Prof. Singarayer Florentine, Dr Nicholas Schultz and Dr Grant Palmer (Federation University Australia), Dr David McLaren (Victorian Department of Economic Development, Jobs, Transport & Resources) and Dr Steve Sinclair (Victorian Department of Environment, Land, Water and Planning). This project is a component of a large adaptive management project supported by the Victorian Government to investigate new tools for managing weeds in former arable locations in the Western Grassland Reserve. The Melbourne Waste Management Group is providing financial and in-kind support over three years to help implement this trial. Several other organisations are providing carbon materials.

Australia's temperate native grasslands are adapted to low-moderate nutrient soils. Nutrient enrichment caused by fertiliser application, legumes and deposition of atmospheric pollution is a major cause of alien grass invasion. The Victorian Government is in the process of reserving 15,000 hectares of land, the "Western Grassland Reserve" (WGR), to protect native grasslands west of Melbourne. Approximately 10% of the WGR is nutrient-rich improved pasture and cropping land that is currently not suitable for indigenous grassland replanting. Methodologies are required to reduce soil nutrient levels in order to benefit indigenous grassland species and reduce competitiveness of exotic weeds.

Increasing microbial activity through the application of carbon is known to cause the drawdown of soil nitrogen. A potential source of carbon substrate for this purpose is the large-particle material remaining after composting urban green waste. Many millions of tons of bark, wood and other larger materials are sieved out during commercial compost production by the Melbourne Waste Management Group (MWM).

As this high carbon content material causes nitrogen drawdown when applied to soils, it is not suitable for agriculture or horticulture and



Millions of tons of oversize green waste is left over following composting of household green waste at the MWM mulching facilities. Much of this is currently not being utilised and must be disposed of in landfill or other areas at great expense to the community.

The project aims to 'cook out' the weed seed bank and to change the soil nutrient status in order to benefit native grassland species.

Shown below, green waste mulch piles located on nutrient rich pasture. Compost temperatures above 63°C were reached at ground level and temperatures above 55°C were maintained for over three weeks in some plots. Seeds of serrated tussock, *Galenia* and *Themeda* placed at surface, 5 cm and 10 cm depths were all dead when retrieved from these high temperature plots.

Native grass seeds were sown in plots after green waste mulch was removed. Nitrogen drawdown from the mulch should reduce competitiveness of exotic weeds and increase competitiveness of native grass species, enabling long term grassland restoration.



therefore presents a disposal problem for the MWM. If this material can be shown to significantly reduce the establishment of exotic plant species, whilst also aiding in establishment of indigenous species, this process could provide a unique solution for both recycling our urban green waste and facilitating native grassland restoration.

High soil phosphorous levels are suspected of reducing indigenous grassland species (such as kangaroo grass)

establishment and survival. This trial will also be testing techniques for reducing soil phosphorous, such as the use of Phoslock. This product was developed and commercialised by CSIRO for controlling phosphorous levels in lakes and river systems. Phoslock contains the rare earth element, lanthanum, which binds with phosphorous making it unavailable for plant uptake. This will be the first trial to assess the use of Phoslock for reducing available soil phosphorous in Australia.

Dates for your Diary

March 2015

Weed Society of Victoria AGM Seminar

'Invasive species from woodlands to waves in Westernport'
Phillip and French Islands, Victoria
18–19 March 2015, www.wsvic.org.au/

8th International Integrated Pest Management Symposium



'Solutions for a Changing World'
Salt Lake City, Utah, 23–26 March 2015, <http://ipmcenters.org/ipmsymposium15/>

June 2015

17th European Weed Research Society Symposium



'Weed Management in Changing Environments', Montpellier, France, 23–26 June 2015, www.ewrs2015.org/

August 2015

6th World Conference on Ecological Restoration



Manchester, UK, 23–27 August 2015
www.ser2015.org/

XVIII International Plant Protection Congress (IPPC) 2015



'Mission possible: food for all through appropriate plant protection'
Free University Berlin, 24–27 August 2015, www.ippc2015.de

September 2015

13th Queensland Weed Symposium



Longreach, Qld, 14–17 September 2015
<http://event.icebergevents.com.au/qws-2015/>

7th International Meeting on Pesticide Resistance

Rothamsted Research, Harpenden, Herts, UK, 14–16 September 2015
www.rothamsted.ac.uk/Resistance2015

EMAPi 2015: 13th International Conference

'Ecology and Management of Alien Plant Invasions', Hawai'i Island, USA
20–24 September 2015, www.emapi2015.hawaii-conference.com/

October 2015

18th NSW Weeds Conference

'Weeds – The Future, Innovation and Adaptation'
Cooma, NSW, 12–15 October 2015
www.weedscooma.com.au/#

25th Asian-Pacific Weed Science Society Conference

Hyderabad, India
13–16 October 2015
<http://117.240.114.67/apwss/>

February 2016

Species on the Move International Conference



(Species redistribution in a changing climate – the organisers are inviting suggestions for themes)
Hobart, Tasmania, 9–12 February 2016
www.speciesonthemove.com/index.html

June 2016

7th International Weed Science Congress

International Weed Science Society
Prague, Czech Republic, 19–25 June 2016, www.iwsc2016.org/

11th International Symposium on Adjuvants for Agrochemicals (ISAA 2016)

'Creating, Bridging and Sharing the Values of Adjuvant Technology'
Monterey, USA
20–24 June, 2016
<http://events.isaa-online.org/page/269/welcome-to-isaa-2016.html>

September 2016

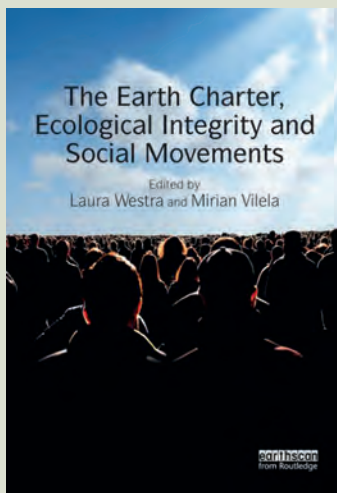
20th Australasian Weeds Conference

Council of Australasian Weed Societies
Perth, WA, 11–15 September 2016
Register your interest at <http://www.20awc.org.au/>

New Publications

For those interested in the Earth Charter and the connection between ecological integrity and social justice:
The Earth Charter, Ecological Integrity and Social Movements
Edited by Laura Westra and Mirian Vilela

Publication: June 2014
Hardcover ISBN: 9781138016927
<http://www.routledge.com/books/details/9781138016927/>



The Earth Charter is a declaration of fundamental ethical principles for building a just, sustainable and peaceful global society, with ecological integrity as a major theme. This book provides a series of analyses of ecological integrity as it relates to the Earth Charter, social movements and international law for human rights. It is shown how the Earth Charter project began as a United Nations initiative, but it was carried forward and completed by a global civil society initiative.

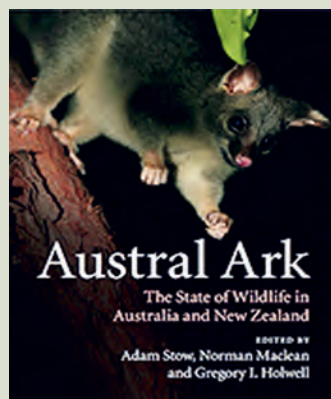
The drafting of the Earth Charter involved the most inclusive and participatory process of its time ever associated with the creation of an international declaration. This process is the primary source of its legitimacy as a guiding ethical framework. The Earth Charter was finalized and then launched in 2000 and its legitimacy has been further enhanced by its endorsement by

over 6,500 organizations, including many governments and international organizations. In the light of this legitimacy, an increasing number of international lawyers recognize that the Earth Charter is acquiring the status of a soft law document.

The book also shows the strong connection between ecological integrity and social justice, particularly in the defence of indigenous people, and includes contributions from both the North and the global South, specifically from Central and South America.

For those interested in conservation:
Austral Ark: The State of Wildlife in Australia and New Zealand

Edited by Adam Stow, Norman Maclean and Gregory I. Holwell
Publication: December 2014
Hardcover ISBN: 9781107033542
<http://www.cambridge.org>



Australia and New Zealand are home to a remarkable and unique assemblage of flora and fauna. Sadly though, by virtue of their long isolation, and a naïve and vulnerable biota, both countries have suffered substantial losses to biodiversity since European contact. Bringing together the contributions of leading conservation biologists, Austral Ark presents the special features and historical context of Austral biota, and explains what is being conserved

and why. The threatening processes occurring worldwide are discussed, along with the unique conservation problems faced at regional level. At the same time, the book highlights many examples of conservation success resulting from the innovative solutions that have been developed to safeguard native species and habitats in both New Zealand and Australia. Austral Ark fills an important gap regarding wildlife gains and declines, and how best to take conservation forward to keep this extraordinary area of the world thriving.

For those interested in a weed book for children and teenagers:

Invasive Plant Species (Invaders from Earth)

Author: Richard Spilsbury
Publication: January 2015
Paperback ISBN: 9781499400373



(From a series on invasive species by this author). Many plants can ultimately survive being eaten by animals or being destroyed by people. But there's one threat they sometimes can't withstand: invasive plant species. Readers will learn how invasive plants appear and how they defeat native plants to stake their claim. Engaging language uses the topic of invasive plants to explain how living things are connected, and how one upset to an ecosystem's balance can have repercussions for all that depend on it for survival. Colourful photographs and informative captions enhance the text to give readers a comprehensive look at invasive plants and the dangers they pose.