

Issue 1

November 2006



BOTANICUS AUSTRALIA PTY LTD

EcoRamblings™

ISSN 1834-2442

EcoRamblings - A New Industry Newsletter

Welcome to EcoRamblings™, an industry newsletter for people that are required to address or manage flora, fauna, vegetation or natural ecosystems within Australia.

My name is Simon Cropper, Principal Consultant of Botanicus Australia Pty Ltd, and I have prepared this publication with the primary objective of educating natural resource managers, developers, councils, community groups and governing agencies about key ecological issues I don't believe are being adequately addressed within the industry. It is hoped that an improved understanding of these issues will raise industry standards and result in better conservation outcomes.

My intention is to publish EcoRamblings™ four times a year in November, February, March and August prior to each season.

Please feel free to distribute this publication to anyone interested in Natural Resource Management. If you would like to have future

issues automatically sent to you by email, send me an email with SUBSCRIBE in the subject line to my email address at the end of this newsletter. If at any stage you wish to discontinue receiving future issues, send me an email with UNSUBSCRIBE in the subject line.

Articles in this document can be cited in the same way as traditional journals, viz. Cropper, S.C. (2006) Heat stress in outdoor workers. *EcoRamblings* 1: 1-2.

Please note that numerous links to the Internet have been provided in this document to help direct the reader to supportive documentation or further reading.

I have assumed that most people will have broadband and Acrobat® Reader on their system. I apologise if this is not the case.

I have marked links pointing to Acrobat® Portable Document Format files with the PDF symbol. The reader can be downloaded from the [Adobe Website](#).

Heat Stress in Outdoor Workers

If you are a weather watcher you will have noted comments in the media that this year is showing signs of an [El Niño](#) event, which can result in below [average rainfall](#) during summer. Consequently, media releases by the Bureau of Meteorology have predicted a [warm end to 2006](#) throughout Australia, and an [80% probability](#) of higher than normal temperatures throughout most of Victoria. What is apparent to me, as an amateur weather watcher, is the shift over the last year from a mild dry winter and mild summer (typical of the drought over the last 10 years), to a colder winter (although not very wet) and what appears to be the start of a very hot summer.

Summer heat has significant impacts on outdoor workers and consideration should be given to heat stress, UV protection and extreme weather. This article how-

ever is limiting it's discussion to the impacts of water loss or dehydration and how to minimise them. Dehydration is not just a concern with workers conducting heavy workloads outside but is also a problem with passive observers (e.g. supervisors, surveyors, botanists), especially when they are outside for lengthy periods of time even in moderate temperatures (25°C and above). Problems with dehydration can also be magnified by humid conditions, age, health or

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Heat Stress in Outdoor Workers, *cont'd*

when workers need to use protective clothing that reduces the cooling effect of sweating or that restricts the ability to drink (e.g. respirators).

Hot summer conditions can lead to an increase in core body temperature, loss of body fluid or an imbalance in body salts. Changes in the normal physiological condition of the body can start with difficulties in concentration and lead to loss of endurance, a general feeling of discomfort, cramps, headaches, nausea or complete system shutdown. The latter condition is called heat stroke and can be fatal. Although resembling a heart attack, it can be distinguished by an elevated body temperature, the absence of sweating, red flushed skin, a rapid pulse and breathing difficulty. Heat stroke victims require immediate hospitalization. Outdoor workers should familiarise themselves with the [first aid treatment](#) for the various forms of heat stress. Prevention however is preferable. ^{1,2,3,4}

THINGS YOU CAN DO TO PREVENT HEAT STRESS ^{1,2,3,4}

- Avoid the consumption of alcohol or coffee immediately prior to working in hot environments as they are diuretics and result in the loss of body fluids.
- Wear protective clothing to minimise exposure to the sun and allow air movement over the body.
- Regularly drink small quantities of fluids containing replacement electrolytes.
- Establish a cool shady rest area with ready supplies of cool water.
- Avoid working in hot humid periods of the day.
- Schedule heavy outdoor work to cooler periods of the year or limit work to cooler times of the day.
- Establish a self-monitoring program – an unusually high heart rate has been shown to be a good indicator of heat stress. ⁴
- At the sign of any heat stress, stop all activities, retire to a cool shady area and rest.

OTHER ISSUES TO CONSIDER IN ANY HEAT STRESS MANAGEMENT POLICY

- Ideally 150-200 millilitres of cool fluids (10-15°C) should be drunk every 10-15 minutes. It has been shown that electrolyte-carbohydrate drinks promote fluid consumption, enhance fluid retention and maintain electrolytic balance. Ideally any electrolyte drink should have moderate carbohydrate levels (4-8%) and moderate NaCl levels (0.06-1.8%; 0.6-1.8 mg/mL; 10-30 mmol/L). No other electrolytes are necessary. ¹

- Fluids should be cool and pleasant to drink. You can purchase expensive sport drinks but if no one likes the taste, people will abstain from drinking until after work resulting in a form of “voluntary dehydration”. Consultation should occur between employers and workers to identify preferred beverages. ¹
- Consider the accumulative loss of fluid and sodium over several days’ exposure to hot environments. Workers should be encouraged to rehydrate between shifts. ^{1,4}
- People working regularly in hot weather become acclimatised to the heat and are better able to tolerate heat stress. Unfortunately this resilience is rapidly lost and workers normally able to work extended periods in the heat lose this ability after only 1-2 weeks in normal conditions. This means people taking holidays or returning from sick leave require time to reacclimatise to hot conditions. This can take up to 3 weeks to occur. ⁴

Personally I believe that dehydration is overlooked as a major cause of accidents in an outdoor workplace, especially during summer. How does loss of concentration and judgement due to heat stress differ from that experienced through the consumption of alcohol? Very little I suspect. Take the time to discuss, prepare and implement a heat stress management policy in your work place – it could save someone’s life.

SOURCES USED TO PREPARE THIS ARTICLE

1. Clapp A. J., Bishop P. A., Smith J. F., Lloyd L. K. and Wright K. E. (2002) A review of fluid replacement for workers in hot jobs. *American Industrial Hygiene Association Journal* **63** (2), 190-198.
2. Elliott F. (2004) Quenching the summer heat. *Occupational Health & Safety* **73** (5), 122-125.
3. McLachlan G. and Aencherbacher R. (2002) A new approach for beating the heat. *Occupational Health & Safety* **71** (3), 81-54.
4. Tharr D., Krake A., McCullough J. and King B. (2003) Health hazards to park rangers from excessive heat at Grand Canyon National Park. *Applied Occupational and Environmental Hygiene* **18** (5), 295-317.

OTHER USEFUL LINKS

[US Army Corps of Engineers - Heat Stress Information Guide](#)^{PDF}

[Flinders University – Local Guidelines for Working in Hot Conditions](#)

Site stratification, an essential component of a flora survey

While in the field, vegetation surveys can be superficially split into two parts – site stratification and data collection. Site stratification is the process of splitting the study area into blocks of homogeneous vegetation, while data collection aims at documenting these blocks. The level of stratification within a particular project differs depending on your objectives but generally aims at avoiding significant changes in measurable characteristics that will influence your chosen indice. The choice of site strata has a huge impact on the end result of a survey.



Habitat quality in Victoria is now documented using Habitat Scores^{1,2}. This indice is a composite of vegetation and landscape characteristics that is standardized to a value between 0 and 100. An overview of the methodology used to collect habitat scores are outlined by Parkes *et al.* (2003)² and DSE (2004)¹. In short the vegetation is rated based on the presence, abundance or quality of large trees, canopy cover, understorey, recruitment, weeds, logs and organic litter, and a variety of landscape characteristics.

As part of the VQAM¹, rules were established to indicate the conditions under which a vegetation patch should be split. Paramount is the need to ensure each stratum only contains one [Ecological Vegetation Class](#), followed closely by

homogeneity in select habitat components¹. The VQAM establishes a set of visual triggers that should be used to justify strata and ensure adequate resolution to document the variation of habitat scores throughout a site¹.

Over the last year, ignoring a few intensive surveys, the average study area assessed by Botanicus Australia Pty Ltd was 3.3 hectare in size (n=11, SD=2.1, Min=1.3, Max=7.5) and using DSE's stratification rules was split into 15 strata (n=11, SD=6, Min=6, Max=21). Botanicus Australia Pty Ltd has found that sites stratified in this way better represent the variation of vegetation across the site and provide a better estimate of the amount of habitat hectares remaining.

SOURCES USED TO PREPARE THIS ARTICLE




1. DSE (2004) 'Vegetation Quality Assessment Manual - Guidelines for applying the habitat hectare scoring method.' Edition 1.3 (Department of Sustainability and Environment: Melbourne). 
2. Parkes D., Newell G. and Cheal D. (2003) Assessing the quality of native vegetation: The 'habitat hectares' approach. *Ecological Management and Restoration* 4 (s1), S29-S38. 

WebSearch

A new revolution! Open Access Journals

When people think of journals or periodicals, they think of the paper versions bought at the newsagent or viewed in public libraries. These traditional journals publish papers for free but charge subscription fees to libraries, institutions or individuals. Well, as is always the case, people have turned this institution upside down – enter the Open Access Journals. These journals charge the authors a fee for publishing an article but allow anyone to download them FOR FREE. Several online databases exist that catalogue Open Access Journals, viz. [DOAJ](#) and [Open J-Gate](#), and it is worth regularly searching these for useful content. Both search engines provide the ability to search for articles.

Some links relevant to Nature Conservation...

-  [Avian Conservation and Ecology](#)
-  [Wildlife Biology in Practice](#)
-  [Urban Habitats](#)
-  [BMC Ecology](#)

Pimelea spinescens (Spiny Rice-flower)

A diversity of information exists on the Internet – some good some bad. Careful scrounging however can uncover valuable scientific data not readily accessed through traditional means. To illustrate this point a variety of links are provided below showing the type of data available for *Pimelea spinescens* ssp. *spinescens* (Spiny Rice-flower) readily available to anyone with access to a computer.

-  [Environment Protection and Biodiversity Conservation Act 1999 - SPAT Summary](#)
-  [Flora and Fauna Guarantee Act 1988 – Action Statement](#) ^{PDF}
-  [North Central Catchment Management Authority – Roadside Conservation Case Study](#) ^{PDF}
-  [Abstract of the only published peer-reviewed paper on the species](#)

Have you unwittingly breached copyright?

Have you received a scientific report and been impressed with its size only to find out that a small proportion is actually original work and that the bulk of the report actually consists of text extracted from the Internet or cut-and-paste from various documents? This practice has become rife in the natural resource consultant industry of late as policy documents are systematically collated and catalogued in numerous appendices.

In a report I recently read the authors had included the [benchmarks](#) for each of the Ecological Vegetation Classes present on site – in full; including the copyright notice specifying that the material is protected under the Copyright Act 1968 ! In the absence of a statement indicating that the material was reproduced with permission from the Victorian Government, one can only presume that they merged the PDF file available on the DSE website with their own. In another appendix, the web-based report from the [EPBC Act Protected Matters Search Tool](#) was presented, unchanged from the HTML format it was created. This material was also adorned with the proverbial copyright notice. Following the link on the report to the copyright page for the Department of Environment & Heritage the following statement was found.

“You may download, store in cache, display, print and reproduce the material in unaltered form only (retaining this

notice, or links to it where they appear) for your personal, *non-commercial use* or use within your organisation.”

[DEH \(2006\)](#) – italics by author

So, what does this have to do with you? Clearly this report has infringed the copyright of the Victorian Government and the Commonwealth of Australia but that is the author’s problem isn’t it? Wrong, its yours as well. By paying for and accepting work that contains infringed copyright material you are also considered to have infringed the copyright because you have the opportunity to prevent the infringement occurring before it happens. So next time you get a scientific report ensure that all material used in the production of the report belongs to the author, is considered [fair use](#)^{PDF} under the Copyright Act 1968 or identifies in the text that [permission](#)^{PDF} has been given by the copyright owner to reproduce it. Otherwise you may be unwittingly exposing your company, institution or department to future litigation.

SOURCES USED TO PREPARE THIS ARTICLE

“IP Toolbox – Using Intellectual Property in your Business” December 2004 Update (IP Australia: Canberra)

OTHER USEFUL LINKS

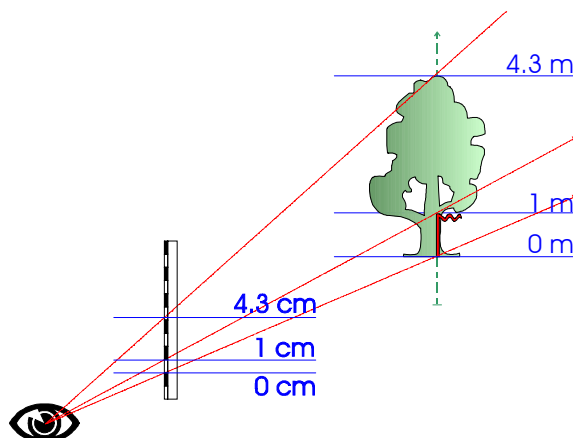
[Copyright Law in Australia – A Short Guide](#)^{PDF}
[Copyright Council of Australia](#)

An easy and reliable method for estimating tree heights

Ever been in the field and wanted to have a reasonable estimate of tree height? If you collect Habitat Score data in Victoria so you can calculate the amount of Habitat Hectares present in an area, you need to establish the height of all Large Trees and the Tree/Shrub Canopy layer. Small trees can be measured using a height stick or if you are nimble enough, you can try and climb the tree but in most situations this requires a lot of effort. Climbing trees also poses significant OH&S Issues. The height of larger trees is normally estimated using one of numerous tools that use geometric or trigonometric principles to calculate height.

The following technique uses simple proportional principals to estimate height and has been found by me to be an easy and reliable method for estimating heights of trees up to 30m tall. It requires little effort and only requires a pole of known length, clear plastic ruler and calculator.

*Simple Method for Estimating Tree Height – Place a pole of known length, in a vertical position, directly under the highest part of a tree and observe both from a distance. A ruler is then held in front of the observer and the height of both objects noted. The height of the tree is then calculated using ratios ([RULER HEIGHT OF TREE] / [RULER HEIGHT OF POLE] * [HEIGHT OF POLE] = [HEIGHT OF TREE]). Greater accuracy can be obtained by using a larger pole of known height and observing the objects from a greater distance.*



The demise of ephemeral wetlands of the basalt plain

The basalt plain of Victoria is an extensive plain that extends from west of Melbourne through to Portland. The plain is dissected by several large rivers and creeks, and has many sizable lakes, especially in the Corangamite area. Spotted throughout the plain though, are numerous ephemeral swamps and drainage lines fed predominantly through groundwater.¹ Most of the Ecological Vegetation Classes occurring within these wetlands are considered threatened within the Victorian Volcanic Plain Bioregion.^{3,4}

Groundwater flows in these ecosystems are poorly documented but modeling suggests that these wetlands occur in discharge areas fed by regional and intermediate aquifers. Recharge catchments are believed to be $\leq 32\text{km}^2$ for regional systems to $\leq 7\text{km}^2$ for intermediate systems. Groundwater ranges between medium (2000mg/L) to high (10,000mg/L) salinity levels, and vary in chemical composition depending on the type/origin of the substrate the water passes through.² Indigenous plant species found within these wetlands are generally adapted to subsaline conditions.

The dependence of these wetlands on regional or intermediate recharge catchments, localised discharge areas and saline groundwater flows all put these ecosystems at high risk in urban development areas within the basalt plain. This is because (1) inadequate recharge areas are provided within developments, (2) rainwater is immediately channeled into the stormwater system therefore preventing it recharging the soil, (3) stormwater is channeled to low lying areas, previously discharge sites for saline water, essentially converting them from ephemeral saline 'discharge' wetlands to permanent freshwater 'recharge' wetlands. This fundamental change results in a dramatic shift in ecological function and consequently the floristic composition of the wetlands - the result is destruction of the original wetland ecosystems and loss of habitat for a wide variety of significant species.

Urban development plans within the basalt plain should aim at incorporating stormwater designs

that take into account known or modeled groundwater flow, so as to protect groundwater dependent wetland ecosystems. For example, stormwater can be retained on site on high ground in artificial wetlands and allowed to naturally seep into the soil, and low lying areas retained in their natural state as groundwater discharge sites.

REFERENCES

1. Dahlhaus P., Cox J., MacEwan R. and Codd P. (2003) 'Study - Victorian Volcanic Plains Scoping Study' (CSIRO Land and Water, Victoria). [PDF](#)
2. Dahlhaus P., Heislors D., Brewin D., Leonard J., Dyson P. and Cherry D. (2004) 'Port Phillip and Westernport Groundwater Flow Systems Report' (A technical report produced for Port Phillip and Westernport Catchment Management Authority by DPI). [PDF](#)
3. DSE (2005) 'Index of Wetland Condition: Assessment of wetland vegetation' (Department of Sustainability & Environment: Melbourne). [PDF](#)
4. DSE (2004) Ecological Vegetation Classes (EVC) Benchmarks by Bioregion. Website managed by Department of Sustainability and Environment. [PDF](#)

OTHER USEFUL LINKS / FURTHER READING

5. Hatton T. and Evans R. (1998) 'No. 12 - Dependence of ecosystems on groundwater and its significance to Australia' (Land and Water Resources Research and Development Department, Canberra). [PDF](#)
6. Coram J. E. (1996) 'Groundwater - Surface Water Interactions around shallow lakes of the Western District Plains, Victoria.' (M.Sc. Hydrogeology, University of Melbourne).
7. Coram J. E., Weaver T. R. and Lawrence C. R. (1998) Groundwater-surface water interactions around shallow lakes of the Western District Plains, Victoria, Australia. Presented at 'Groundwater: Sustainable Solutions. Proceedings of the International Groundwater Conference International Association of Hydrogeologists (Australian National Chapter)' pp. 119-124

Prepurchase Ecological Assessments – don't buy a problem!

With the release of State and Commonwealth legislation regarding protection of native vegetation, remedial works and offsets for clearance have become major components of any development activity. The best way to avoid these costly and time-consuming activities is to avoid developing on land, which will have a direct or indirect impact on native vegetation or fauna habitat. The simplest means of doing this is to involve a professional ecologist before you purchase the land, a bit like a soil assessment, and avoid buying the problem in the first place.

Questions & Answers

Introductory Note

The following questions have been provided by an existing client, at my request, to seed this section. If you have any questions please send them to me and I will attempt to answer them.

What is the best way to determine if a parcel of land requires a survey for significant vegetation?

There are only two ways you could determine the need for survey – visit the site or refer to a database of significant assets (e.g. Flora Information System, Biosites Register, [Maps of Ecological Vegetation Class](#)). In my opinion the only way of definitively determining whether a survey is required is to have someone who is familiar with indigenous plants (i.e. herbs, grasses, shrubs and trees) and indigenous vegetation inspect the site. If none of your coworkers are appropriately skilled you can approach [DSE](#) or the Conservation Officer at the relevant [council](#). Alternatively, you can arrange for a Natural Resource Consultant to visit the site and provide feedback on the need for additional survey.

Of course, there are a range of databases that show the location of significant plants and vegetation throughout Victoria, but these databases are not comprehensive and can flag an area as significant when it really isn't. The primary reason for referring to these databases is to flag potential issues within an area. If historical records for rare or threatened taxa exist within the study area that are not normally visible during the time of the assessment,

further work is usually required at a more appropriate time of year unless the area is totally cleared or obviously unsuitable for the taxon.

If any indigenous vegetation is found within the study area some sort of survey will be required. A comprehensive assessment to document significant assets will only be required if (i) a rare or threatened plant or vegetation type was seen, (ii) a rare or threatened plant or vegetation type is recorded on an ecological database but the record is unable to be discounted, or (iii) if the vegetation meets the criteria for being a remnant patch (i.e. $\geq 25\%$ of the understorey – excluding rocks and bare ground – is indigenous; a group of trees where the tree canopy cover is at least 20%; or a wetland).

How can land managers keep up with all the changes in legislation in relation to weeds, biodiversity and conservation?

Unfortunately the government agencies responsible for implementing legislation are not utilising the latest technologies like [RSS / XML Feeds](#) or Email Alerts to inform interested parties of what they are doing or changes in legislation. Keeping up-to-date requires regular data mining to find the latest information, database listings, changes to status, taxonomic changes, etc. So the short answer is that there is no real forum that collates all of this information. To some extent it is envisaged that Eco-Ramblings™ will provide a means by which I can keep my readers up-to-date with information on significant changes that I become aware of. So stay posted.

Who is Simon Cropper?



Considering you have taken the time to listen to my ramblings I thought it only fair that I let you know a little bit about myself so you can decide for yourself whether my views are legitimate. I have been a professional ecologist since 1985 and have been involved in survey work, the development and implementation of monitoring programs, detailed ecological research and management of both significant species & ecosystems. I also authored the book 'Management of endangered plants' published by CSIRO. In 1993, I established the natural resource consultancy Botanicus, which has since serviced a broad range of government and private sector clients, and has conducted numerous flora & fauna surveys throughout Victoria.



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ISSN 1834-2442

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