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Preamble, editorial comment and apologies

To date, I have not marketed or discussed any of my own products because I have tried to avoid *EcoRamblings* being viewed as a means of self-promoting either myself or my business but I have received many requests over the last year to outline the model I use to draft recommendations when preparing bushland management plans. The model is discussed in the following article titled 'Targeted Priority Management' for those people who have asked.

I would also like to apologise for the late release of this issue. The recent change of my domain, creation of my first website, creation of an online community forum, and the release of a new webpage monitoring system has prevented me from completing this issue when expected.

I have also included a section at the end of this issue about *EcoAlert*. Most, if not all, of you would have been exposed to promotional material and teasers so I am not going to bore you with costs or options – you can visit my website to get these details. This section is primarily about how the product evolved to satisfy a need to stay up-to-date with the rapidly changing landscape of our industry.

Another change worth noting here is that *EcoRamblings* will no longer be distributed by email. All issues will be made available online from my [website](#). People registered on my distribution list will continue receiving notifications when new issues are released.

Targeted Priority Management

In early 1990s while employed for the Department of Conservation & Environment (now the Victorian Department of Sustainability & Environment) I was charged with developing a system to monitor natural and cultural assets.

The outcome of this work was a system called "The Resource Evaluation and Monitoring System". Its primary aim was to establish land management principles in areas where resource conservation was a primary objective. The outcome was a system capable of being used to identify key assets, to identify conservation objectives and to identify suitable methods for accurately monitoring the changes in these assets. The system stopped short of providing a framework for prioritizing the ongoing management of these reserves.

Years later, as an ecological consultant, I was contracted to write some management plans for VicRoads and City of Bayside. It was at this time I took what I had developed in REAMS, expanded it and developed a set of simple steps to help prioritize the management of bushland reserves.

TPM is how I decide what order tasks will be completed within my management plans.

The prerequisites to using this system are, (1) you must have a map of all your significant assets, (2) you must have a map of all your significant threats, (3) it expects that you have an intimate knowledge of the ecosystems being managed, and (4) you are good understanding of best industry practice (e.g. weed control, pest control, ecological burns, etc).

Although able to be initiated on a one off basis, this protocol works best when incorporated into an ongoing monitoring-management feedback model.

Recent plans I have made using this simple protocol have resulted in an average increase in habitat hectares of 13% after 2-years in 8 bushland reserves monitored within the City of Hume and it is expected that this will double over the next few years.

The primary tenet of TPM is that all management should be focused on protecting and enhancing your primary ecological assets.

Following assessment of your bushland reserve, it should be able to be broken into distinct management units, with each unit having a value ascribed based on the biological data collected. In recent work for Hume City Council 222 units, in nine reserves, were ranked based on their habitat scores.

These management units were then ranked from the highest to the lowest habitat score. Sites in the highest quartile where nominally referred to as high-quality, the next lowest quartile medium-quality, followed by low-quality and degraded vegetation. If greater resolution is required each group can be split in two, to form eight groups – viz. H1, H2, M1, M2, L1, L2, D1 and D2.

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Targeted Priority Management, cont'd...

Threat control should be intrinsically linked to protecting and enhancing your primary ecological assets.

Priority for works should be based on protecting and enhancing areas starting from the high-quality sites and moving through to the degraded sites. Within the high-quality sites, work on H1 sites have a higher priority than H2 sites, and so on through the M1, M2, L1, L2, D1 and D2 groups.

Work can generally be broken up into (1) reinstatement of ecosystem function, (2) promotion of species, vegetation, ecosystem or habitat recovery, (3) threat prevention and (4) threat control. Tasks should be actioned, where practical, in this order.

Reinstatement of ecosystem function could include, for example, correcting the frequency, season and intensity of burns in a grassland or correcting the frequency and duration of inundation in a wetland.

Promoting asset recovery could include, for example, promoting species recruitment through increased soil disturbance, increasing the number of herbs within a depleted woodland through ecological burns, or introducing large logs as habitat for lizards, geckos and small marsupials.

Threat prevention could include for example, searching a bushland remnant for weed seedlings and removing them before they become established, removing foreign organic matter before it introduces nutrients to the soil, erecting a fence to prevent people entering a significant area, or constructing a path to prevent excessive disturbance to an area.

Threat control within bushland reserves is usually limited weed control and pest control.

To complicate matters further, threats can be ranked based on the level and extent of their impact on the environment. For example, in my plans, weeds are categorised into either Category 1, 2, 3 or 4 weeds.

Category 1 and Category 2 weeds include all those aggressive noxious and environmental weeds that dominate the vegetation and are very difficult to eradicate. Category 1 weeds are those species with fruit or seed that allow them to rapidly disperse and establish into adjacent areas. This includes such species as **Cynara cardunculus* (Spanish Artichoke) and **Lycium ferocissimum* (African Box-thorn).

Populations of Category 2 weeds, although dramatically impacting on bushland remnants, tend to spread laterally. This includes such species as **Acacia baileyana* (Cootamundra Wattle), **Bromus catharticus* (Prairie Grass), **Echium plantagineum* (Paterson's Curse), **Foeniculum vulgare* (Fennel), **Genista monspessulana* (Montpellier Broom), **Nassella neesiana* (Chilean Needle-grass), **Pennisetum clandestinum* (Kikuyu) and **Phalaris aquatica* (Toowoomba Canary-grass).

Category 3 weeds include all other non-indigenous species. Category 4 weeds include all those Victorian natives that are either non-indigenous or have been planted in the incorrect vegetation type within the target area.

Control of Category 1 weeds are more important than Category 2 weeds because they are able to spread more rapidly into adjacent areas. They are in fact a

threat to nearby high-quality management units despite not actually being within the unit.

So here is the next variable - the spatial relationship between asset and threat, and the ability for the threat to reach the asset. Although the dispersal distance of Category 1 Weeds are variable and most certainly directional, to keep things simple I consider all infestations of Category 1 Weed within 100m of a high-quality or medium-quality management unit a threat to that MU. Personally I use GIS Software to cross-match MU Ranking with Threat Rankings to obtain a list of infestations to target and in what order, but it is just as easy to do this manually for small reserves.

Other parameters that influence the outcome are:

- D2 Management Units are generally isolated or removed. For example, in a grassland surrounded by exotic grass, this grass could be cleared and replaced with a gravel track so fire trucks could access the area when the native grassland was burnt.
- Some tasks are seasonal. For example, an ecological burn that occurs in autumn would need to be followed up with weed control in spring and early summer.
- Weed growth and pest activity is seasonal.
- Threat prevention, like weed seedling removal and rubbish collection, should be done regularly.
- Threat control methods should be variable. Low impact techniques like handweeding should be preferentially used in high-quality areas to minimize the impact on the environment.

So the final task list looks something like this...

Priority 1 actions

- Reinstatement of ecosystem function in H1 Sites
- Promoting asset recovery in H1 Sites
- Threat prevention in H1 Sites
- Threat Control in H1 Sites

Priority 2 Actions

- Reinstatement of ecosystem function in H2 Sites
- Promoting asset recovery in H2 Sites ... and so on

Or, in a grassland reserve, for example

Priority 1 Actions

- Reinstatement of ecosystem function in H1 sites followed by weed control in spring and early summer.
- Walk over H1 sites and remove weed seedlings, dog faeces and organic rubbish.
- Handweed Category 1 & 2 weeds in H1 sites
- Spot-spray using non-residual herbicide Category 1 Weeds occurring within 100m of a H1 Site.

Priority 2 Actions are similar but for H2 Sites

Priority 3 Actions are similar but for M1 Sites

... and so on

Obviously some tasks, such as burns, can span multiple MUs but should aim to include as many of the better-quality sites as possible.

So there it is. Simple isn't it? Please feel free to use this protocol when you are trying to prioritize tasks in your next management plan. Hopefully it is as successful for you as it has been for me.

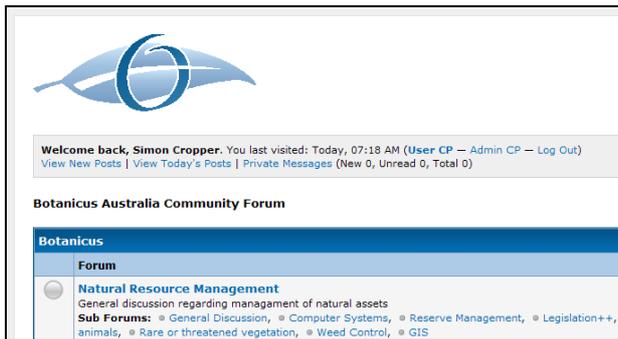
Need help setting up your first plan? I can consult on your first project to ensure you have considered all the issues. Alternatively, I can prepare your management plan or ongoing monitoring program for you. Call and we can discuss how I can help.

Questions & Answers

Housekeeping

This is the last newsletter to contain a Q&A Section. I found that although readers appreciated feedback on environmental issues, the inability for them to enter into a dialog and/or get a response in a timely manner, meant that this section had its limitations.

In response to the ongoing need for a forum to discuss issues pertinent to the natural resource management industry I have created an online bulletin board for people to post messages and obtain feedback from the broader community. I will still be contributing content but there will also be an opportunity for others to become involved ([LINK](#)).



I look forward to seeing you on the forum in the near future both to ask questions but also to contribute content. For those people whose questions I have not answered below I have submitted them to the forum as gristle for the mill.

An LGA Officer asked "Where in the Western District have naturally occurring *Microseris lanceolata* (Yam Daisy) been found?"

Jeff Jeanes, in his treatment of the genus *Microseris* in the FLORA OF VICTORIA (1999), identifies 3 taxa, none of which could definitively be attributed to *Microseris lanceolata*. The taxa are distinguished by flower size and the number of bristles on the seed. Arbitrarily named species 1, 2 and 3, the taxa are best described as the Plains Yam Daisy, the Alpine Yam Daisy and the 'common' Yam Daisy, respectively. The Plains Yam Daisy is localised to the basalt plains, the Alpine Yam Daisy to alpine and subalpine herbfields, and the 'common' Yam Daisy is widespread throughout the state. Consequently, two taxa occur in the western district - the common widespread taxon and the Plains Yam Daisy. Most recent records of the common taxon are localised to the Goldfields Bioregion. In contrast, only a small number of confirmed records of the Plains Yam Daisy have been found in recent years from an area north of Balmoral - this taxon is considered to be vulnerable in Victoria. Although these taxa have been 'described' since 1999 some people still only record they have seen *Microseris lanceolata* in the broader sense and have not distinguished between taxa. The FLORA INFORMATION SYSTEM shows scattered records of this broader entity scattered throughout the Western Basalt Plains.

An LGA Conservation Officer Asked "In relation to old remnant trees why can't an arborist report be sufficient in making a decision about tree retention? I have been told you also need an ecologist report. Can you clarify why this is the case?"

Working through all the official methodology documents, practice notes and guidelines I was unable to find any specific comment saying arborist can't conduct habitat hectare assessments. The Port Phillip & Western Port Native Vegetation Plan, however states "The assessment of clearing applications for old and scattered trees, under Clauses 15.09 and 52.17 of planning schemes, should be based on the trees' ecological values. While an assessment of the structural soundness or the life expectancy of a tree may be relevant where risk to life or property is in question, it is not a basis for assessing ecological value. Therefore assessments should be conducted by an experienced ecologist rather than individuals with arborist skills alone. Scattered or isolated old trees, even in declining health, with hollows, broken limbs and fissures, usually contribute more to habitat values, than younger trees that are structurally sound" (PPWPCMA 2006, Page 56). This position has been reiterated in the Port Phillip Update released by DSE Port Phillip Region.



Although trees such as these would be considered a risk by an arborist they have ecological value as habitat for indigenous fauna.



Trees hollows such as this one provide valuable shelter and breeding sites for indigenous insects, amphibians, reptiles, birds and mammals. They generally only appear in large old trees. For a thorough review of the subject, check out Gibbons P. and Lindenmayer D. (2002) 'Tree Hollows and Wildlife Conservation in Australia' Edition 1 (CSIRO Publishing: Collingwood).

Questions & Answers, cont'd...

An LGA Conservation Officer Asked "What is the best time of year to monitor vegetation to ensure you get as many species represented on a site?"

The simple answer to your question is that there is no best time. Unless you monitor a vegetation community throughout a year any assessment is likely to miss various plants. Apart from the seasonal variation between plants, spatial and temporal factors prevent you from ever being able to obtain a comprehensive sample of all the plants present within an area unless you sample all areas, each season over many years.

Things to consider when planning an assessment are the objective of the monitoring, the vegetation type(s) present and the skills of the observer.

All monitoring programs should be intrinsically linked to an objective and an objective to an indicator. Whether an assessment is adequate is dependant on whether it is a realistic surrogate for your indicator. For example, if your objective were the recovery of the herbaceous element of a grassy woodland, spring monitoring documenting number of herbs in a defined area would be a reasonable surrogate for herb biodiversity. If however, the vegetation was characterised by autumn flowering orchids and lilies then an autumn assessment would be in order. Trying to establish what vegetation is or was present in the assessment area, allows you to review the component taxa and establish when a survey would be best. The last factor dictating the time of a monitoring event is the skill of the observer. Experienced assessors are able to identify most plants using vegetative characteristics alone, while less experienced observers will need to monitor in the peak flowering period.

In the case of one-off assessments aimed at quantifying the vegetation quality (e.g. habitat scores), most vegetation types can be distinguished by the perennial species present - although there are some notable exceptions like ephemeral wetlands and grassy woodlands.

Personally, in situations where the identity and quality of the vegetation can be established using perennial species, I conduct monitoring over the cooler months. The first reason for this is that cooler temperatures minimize the amount of compositional change between years - e.g. if you observed an increase in species between years in an area being actively managed it is more likely due to the management rather than an early seasonal change. The second advantage in conducting assessments in winter is that it provides a broader assessment window than any of the other seasons where plant growth is more active.

Ann Lloyd McKenzie (President, Friends of Glass Creek Parklands) asks, "What is the best way to deal with an **Ehrharta erecta* (Panic Veldt-grass) infestation in an open forest revegetation area?"

Annual grass control is one of the most problematic

issues in any grassy ecosystem. Over the years many techniques have been applied with varying success. Muyt (2001) 'Bush Invaders of South-East Australia' (RG & FJ Richardson: Meredith) proposes a mix of hand weeding and herbicide application for control of this species, with burning used as a means of purging seed from the seedbank. In my experience, unless you are focusing on a very small area, these techniques are difficult to apply and most practitioners fall back to broad-acre spraying or doing nothing at all. Preventing establishment and containing the spread of annual grasses can significantly reduce future workloads when restoring grassy ecosystems. If however you are actually talking about an alienated area that has been revegetated, my suggestion would be to plant indigenous understorey species before the shrub and tree layer. This prevents these species from reducing the light reaching the ground and favouring this shade-loving species.

A government officer in response to my discussions on the potential response of indigenous ecosystems to climate change in Issue 5 of *EcoRamblings* stated "Your thoughts resonated with me, though I reckon that the capacity of the landscape to respond to the rapid change we're likely to encounter is limited. And while the principles seemed sound, they may not prove realistic, particularly given the likelihood of weeds filling niches before Victorian species."

Weeds are not super-taxa. In a race to fill new niches established as a result of climate change, it is the species best adapted that will win. If an area increases in temperature and reduces in rainfall the local weeds, presumably adapted to the previously cooler and moister environment, will be equally disadvantaged as the local indigenous species. Better adapted 'dryland' species will have just as far to travel as rangeland or mallee species if significant climate change occur in decades rather than centuries.

Consider however the following...

Grasses can be categorized crudely into two groups: plants that utilise C₃ and plants that utilise C₄ photosynthetic pathways. In general, C₄ pathway has a much higher affinity for CO₂ than the C₃ pathway. This leads to "greater photosynthetic efficiency, a considerable reduction in photorespiration and a higher optimum temperature for photosynthesis. As a result C₄ plants usually perform better than C₃ plants in hot, highly illuminated environments" (Sinclair 2002). Consequently, C₄ grasses are more commonly found in the northern Australia than the southern regions. (Sinclair 2002).

Sinclair R. (2002) 'Ecophysiology of grasses' In Volume 43 (1): *Flora of Australia*. (Eds K. Mallet and A. E. Orchard) pp. 133-156. (CSIRO Publishing: Canberra).

In Victoria, roughly 20% of the grasses rely on the C₄-pathway for photosynthesis. These species, depending on the seasonal temperature and rainfall patterns

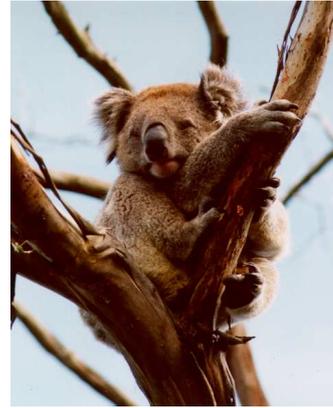
Questions & Answers, cont'd...

could be better adapted to a warmer climate than the currently more diverse C3 grasses. Of these ~83 plants, ~64% are indigenous.

Although more diverse than weed species using the C4-pathway, indigenous species have been severely depleted since 1750 as a result of habitat clearing and pasture improvement, and may have difficulty dispersing into adjacent habitat compared to more widely dispersed weedy species.

A local landowner explains "We live in the Otway Ranges and have been planting native trees and shrubs on a 10-acre section of a former dairy. The salt air environment has meant that plants have been slow in getting established however we are starting to see some good progress and the wildlife is returning. We are sighting black-shouldered kites, wallabies, echidna and more recently koalas. I have noticed that the koalas seem to be very destructive to young eucalypts, often breaking slender branches while reaching for the new growth at the top of the trees. In your view is this likely to have long lasting implications for the health of the trees? Elsewhere I have noticed that even more mature trees have been severely set back by Koalas and with the drought it is not clear how well they will recover."

Phascolarctos cinereus (Koala) can severely damage both established plants and young plants. My only suggestion is to protect the smaller plants with appropriate fencing and larger trees in danger of over-browsing with tree-guards. The National Koala Conservation Strategy ([PDF](#)) and Victoria's Koala Management Strategy ([PDF](#)) suggest as an option 'the translocation of animals out of high-density areas into appropriate habitat.' If your revegetation patch is in danger of being over-browsed speak with [DSE](#) regarding the removal of problem animals in your area.



Phascolarctos cinereus (Koala) resting in a defoliated specimen of *Eucalyptus viminalis* subsp. *pryoriana* (Coast Manna-gum) near Hastings. This animal was part of a resident population of Koala that was believed to be the cause of tree decline in the area but after careful investigation tree death was attributed to toxins leaching into the water table.

EcoAlert – webpage monitoring for the NRM Industry

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 EcoRamblings™ will provide a means by which I can keep my readers up-to-date with information on significant changes that I become aware. So stay posted.

EcoRamblings 1: 6

It has been well over a year since I replied to this question and little has changed – very few government agencies provide feedback about changes to legislation, policy or guidelines pertinent to the Natural Resource Management Industry.

Newsletters that I am aware of include...

- Hallmark Editions provides a fortnightly eNewsletter called [EnviroInfo](#) "for professionals in the natural resource and environment management fields," but the content is focused on general news, conferences & events, announcements, services & products, positions vacant and a diary of events. Material is rarely provided that would impact on the day-to-day activities of a land manager, LGA Officer or Ecological Consultant. This is a free newsletter.

- I have been recently informed that the Ecological Consultants Association of NSW ([ECA](#)) provides its members with regular updates supplied to them from Department of Environment & Climate Change. Although free of charge you need to be a member, which costs between \$30 and \$160 a year.
- If you are a LGA Officer or Consultant you may get an infrequently published document called the "DSE Port Phillip Region - Framework Update" but this newsletter only focuses on changes to and interpretation of the Native Vegetation Management Framework.
- Some Catchment Management Authorities provide an email notification service when pages are updated but make no attempt to document what changes have occurred.

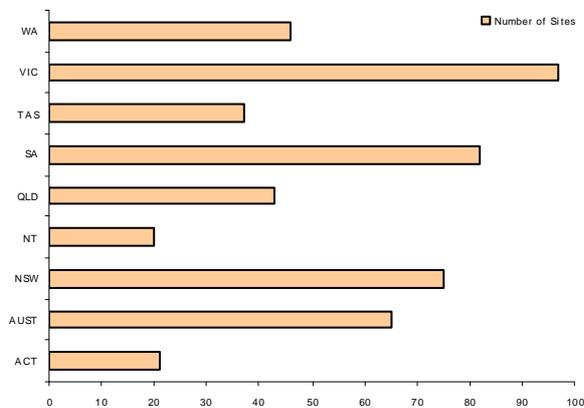
As part of keeping up with industry best practices and the latest changes in legislation & policy, I found myself visiting the same suite of webpages on a regular basis to keep up with the latest changes.

Historically, I did not do this; I would only go looking for changes when I had a job that was relevant to the subject matter. This technique was all right but I found changes/updates were little surprises that usually lead me to re-evaluate my methodology or interpretation of my results. Changes to a job after

EcoAlert, cont'd...

being awarded a contract usually meant I wore the cost. Hey, that's to be expected - Why should a client pay for me to get up to speed, when I am meant to be the expert?

The following graph shows the number of pages I currently monitor on a daily basis. Impressive huh! It is amazing what you can do if you don't sleep.



If you visit my website I provide a complete list of

webpage addresses for the pages I currently monitor. Feel free to use this page as a portal to these sites if you want to monitor them yourselves.

If however you are struck for time I have developed a system that allows me to tabulate the changes to these sites and to deliver them as an HTML email to your inbox on a daily, weekly or monthly basis at a nominal cost.

It seems from the current people taking advantage of this product; weekly updates of the Australian webpages coupled with the respective state pages are the most popular. The greatest number of sales has been from New South Wales, where recent changes in biobanking and biodiversity certification, has meant new content is being released daily. Victoria although being relatively stable over the last few years is showing signs of a new bout of releases - only recently a new document relating to NET GAIN has been released and the webpages listing the bioregional conservation status of Ecological Vegetation Classes updated. Victorian subscribers were notified that changes were imminent and were subsequently provided with a complete list of modifications.

MORE INFORMATION? GO [HERE](#).

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.

Housekeeping

Please feel free to distribute this publication to anyone interested in Natural Resource Management. All issues are available on my website. If you would like to be notified by email about the release of future issues, send me an email with SUBSCRIBE ECORAMBLINGS in the subject line to my email address below. If at any stage you wish to discontinue receiving notifications, send me an email with UNSUBSCRIBE ECORAMBLINGS in the subject line.

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](#).

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.



BOTANICUS AUSTRALIA PTY LTD
PO Box 160, Sunshine VIC 3020
Phone: 03 9311 5822.
Fax: 03 9311 5833

Email: scropper@botanicusaustralia.com.au
Internet: www.botanicusaustralia.com.au

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