

Woodland Wanderings

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Managing Travelling Stock Routes and Private Property for the Persistence of Woodland Birds across the SW Slopes

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The travelling stock route (TSR) network of New South Wales is a large-scale system of vegetation corridors which criss-cross some of the country's most extensively cleared and intensively managed agricultural regions. Gazetted early in Australia's pioneering history, it allowed for the movement of livestock prior to the advent of truck and railway transport. Suggested changes to the management of the TSR system, which may result in the loss of sections to freehold tenure, warrant the assessment of its value for biodiversity conservation, and the potential flow-on benefits it provides to surrounding farmland. Conservation planning decisions will need to be made regarding which sections of the network to sell or retain, so it is important that we have a clear understanding of what types of TSRs have highest biodiversity value, in order to inform these decisions.

In response to these issues, 24 properties and 32 travelling stock routes (TSRs) across the south-western and central slopes were surveyed for birds as well as vegetation attributes in the spring of 2009. The study region covered 1,400 ha, stretching between Forbes in the north to Cootamundra in the south. Sites incorporated the full spectrum of vegetation conditions and types found in stock routes across the region, and included routes ranging from 38 to 570m wide. The survey paddocks also represented a range of land use types, including native and exotic pastures, lucerne and clover, and crops of wheat or canola. These surveys form part of a larger Australian National University PhD project. Additional surveys have been conducted which focussed on insectivorous microbats, which are likely act as important biological controls against crop pests, and native bees, which provide pollination services to nectar-bearing crops such as canola and lucerne. It is hoped that the outcomes of these surveys will be published in the near future.



Field surveys being conducted in Causes North TSR, approximately 30km west of Grenfell. Photo: Pia Lentini.



Native pastures such as this form important supplementary habitat for woodland birds in the wheat-sheep belt. Photo: Pia Lentini.

Although all birds were recorded in the surveys, the final publication focuses on the woodland-dependent species. Woodland birds are of particular conservation concern in south-eastern Australia, having experienced population declines for several decades as a result of habitat loss, invasive species, and changes to land use. Iconic woodland birds across the region attract tourism, and provide pollination and biological pest control services to private land. Because they are widespread and conspicuous, woodland birds have also helped to stimulate community interest in conservation issues, making them a particularly useful focal group for research.



The Grey-crowned Babbler, which is listed as vulnerable in NSW, was found only in travelling stock routes or paddocks containing native pasture. Image courtesy of Dejan Stojanovic.

Key lessons deduced from the woodland bird study were:

1. It is very important to maintain structural complexity in the stock routes to ensure a diversity of woodland bird species. This includes increasing the amount of logs and leaf litter on the ground, cover of shrubs, and the number of large trees. In particular, trees with peeling bark are important, particularly for insectivorous species.

2. When it comes to enhancing woodland bird communities, the effect of TSR width, or 'size' is secondary to structural complexity. This means that conservation efforts should concentrate on smaller, better quality TSRs, or improving structural complexity of the vegetation already present. However, some woodland species known to occur in the region were not found in either the TSR or paddock surveys, so are likely to be persisting in only the largest remnant patches in the landscape. For this reason, the continued protection of

contiguous vegetation in the national reserve system is very important.

3. Native pastures form an important source of supplementary habitat for woodland birds. Two species of conservation concern in NSW, the Grey-crowned Babbler (*Pomatostomus temporalis*) and the Brown Treecreeper (*Climacteris picumnus*), were only found in either travelling stock routes or native pastures. The bird communities found in native pastures also most closely resembled those found in the stock routes. This may be explained by the fact that native pastures are usually subject to less intensive management practices and lower inputs, which is in turn likely to have a positive effect on the insect communities upon which many of these birds rely.

4. The retention of scattered trees on farmland is important. There was a significant increase in the number of woodland bird species in paddocks with a higher number of scattered trees. These trees provide shelter and nesting sites for hollow-dependent species, such as the vulnerable Superb Parrot (*Polytelis swainsonii*). They also act as 'stepping stones', making otherwise cleared paddocks more permeable to species which require tree cover and protection from aerial predators.



The retention of scattered paddock trees in the landscape encourages the visitation of woodland birds to properties.

Photo: Pia Lentini.

5. Narrow stock routes may support a lower diversity of woodland birds, however these narrow routes appear to act as a source of bird visitors to farmland. Specifically, paddocks located adjacent to narrow stock routes supported a higher diversity of woodland bird species than those next to the widest routes. This is likely to be caused by the fact that birds in narrow routes will 'spill over' to adjacent farmland in search of additional feeding and nesting resources. As mentioned above,

native pastures with plenty of scattered trees are likely to provide the best 'spill over' habitat for woodland birds.

The above findings and recommendations for woodland bird conservation in the TSR network will be compared to those deduced from the microbat and native bee surveys, to see how the three taxonomic groups respond differently to local habitat and landscape factors. The outcomes of this project, due to be completed in early 2012, will therefore be guidelines as to how to manage the TSR network and landscape to maximise total diversity of these three beneficial groups, and which TSRs specifically should receive highest priority for protection.

Acknowledgements: This study would not have been made possible without the support of the land holders

who granted access to their properties, individuals who generously volunteered their time to assist with field work, and staff from both OEH and the Lachlan CMA who provided valuable information. The project received financial support from the Paddy Pallin Foundation, the Wilderness Society's WildCountry Science Council, and an Australian Postgraduate award and CSIRO top-up scholarship to the author.

Further reading:

Lentini, P. E., Fischer, J., Gibbons, P., Hanspach, J., and Martin, T. G. (in press) Value of large-scale linear networks for bird conservation: a case study from Travelling Stock Routes, Australia. **Agriculture, Ecosystems and Environment.**
doi:10.1016/j.agee.2011.03.008

Atlas of Living Australia

<http://www.ala.org.au/>

Have you always wondered what wildlife might be living on your property or in your region? Then why not explore the two great resources mentioned in this newsletter, the Atlas of Living Australia and the Atlas of Wildlife NSW. These tools offer you not only some useful wildlife information but also give you an opportunity to contribute to all our collective knowledge of Australia's natural heritage.

The screenshot shows the Atlas of Living Australia website. At the top is a navigation bar with links: Home, Explore, Tools, Share, Support, Contact Us, About the Atlas, My Profile, and Log in. Below the navigation bar is a search bar with the text "Search the Atlas". A banner below the search bar states: "The Atlas is a work in progress. This website is a window into what we are doing. We are busy integrating many more data sets and solving issues around combining data from different sources. We welcome your contributions. Learn more." Below the banner are three main sections: "Get Started" (with examples, forums, videos and frequently asked questions), "Explore" (information on species, maps, collections and regions), and "Share" (sightings, photos and information). Below these sections is a "New & Noteworthy" section featuring images and links for Natural History Collections, GBIF, Wattles, Iconic Species, Shorebirds, and Citizen Science. To the right of this section is an "Atlas updates" section with links to "More updates" and two recent updates: "5 MAY, 2011 'Barcoding blitz' on Australian moths and butterflies" and "15 APRIL, 2011 April Newsletter 2011". At the bottom of the page is an "About the Atlas" section with text about the initiative and a link to "Learn more". On the right side of the bottom section is the logo for "An Australian Government Initiative National Collaborative Research Infrastructure Strategy".

Conservation and Agriculture: Antagonists or Co-dependants?

Arthur Webb, conservationist, drover, poet and farmer from Southern NSW. He owns & manages his own property where he is implementing practices with the intent to achieve the outcomes promoted in this article.

Are agriculture and conservation both failing and for the same reasons? They are generally considered mutually exclusive, but could there be another way? Could it be, rather than being mutually exclusive, that they are co-dependant?

The traditional governmental driven conservation approach of top-down, agency-led planning and decision-making is failing to protect our fragile ecosystems. The problem begins with the idealized concept of the nature of the country in its pre-European state. Country is being purchased and in the name of conservation, being fenced off and forgotten, thereby creating even-aged thickets of trees too thick for individual trees to develop and mature and reach their habitat potential. It follows that there is a resultant loss of biodiversity and a moribundity of the surviving understory. Landholders are being advised by people, with the grandest intentions, promoting these same ideologies. Historically, major landscape changes began within 20 to 30 years of the introduction of grazing animals. James Gormley (1). in 1870-80 quotes a 20 mile square paddock west of the Lachlan lambing down 150,000 ewes. This appears to be a phenomenal number of sheep, but Gormley says it was not exceptional. This brings to our attention the exceptional abundance of the grassy ecosystem, the explosion of livestock numbers that happened right across the country and the ecological disaster that must have ensued at the next dry/drought period. Around the same time Gormley bought Hermitage Plains Station, near the Bogan and he says:

"When I sold the station the land was open forest, thickly covered with grass. In many parts there were thousands of acres free from timber. I inspected the run ten years after and found most parts densely covered with scrub and the grasses so scant that ten acres would not feed a sheep". In the ensuing ten years the land had been fenced and heavily stocked. Again there is information to be gleaned: how quickly inappropriate practices can change the landscape and the altered meaning of the word "forest". Forest is regularly used in explorers' journals and is understandably often misinterpreted. Currently forest is accepted as meaning thickly timbered, but pre-20th century, it had a very different definition. Forest then denoted the best country.

From the mid 1850's, right across the country, massive

germinations of tree seedlings (especially eucalypts & cypress-pine) commenced. In places they came up "like a carpet" (2). At around the same time calamitous erosion events were beginning to occur (3). Next the European Rabbit was introduced. The magnificent, fertile (but fragile) grassy ecosystems, after a series of dry, followed by wet years, bereft of the grass roots that had been holding the soil together, began blowing and washing away.



Farmers, as a collective have come to believe the age old story that has been repeated ad infinitum; that the soil in this land (Australia) was ancient, fragile and impoverished, and that because it was so old it lacked mineralization and therefore to have productive agriculture, artificial fertilizers had to be added. Well, this is partly true. It was ancient and fragile, but impoverished, no!

Could you imagine? ecosystems with grass green up to the horses' bellies in the middle of a dry summer (4)? This ecosystem comprising grasses, a myriad of forbs, flowers and twining legumes. What are now incised shallow sandy creeks were often "chains of ponds" - deep waterholes, interspersed with swamps, covered in reeds and teeming with fish. These grassy ecosystems had patches of wattles and other shrubs and scattered trees and with occasionally thickets of young trees. Strzelecki, the explorer, collected a number of soil samples with a mean organic matter content of approximately 17-18% i.e. 10% carbon. Can you imagine the nutrient-holding capacity and the water-holding capacity of such soils? Can you imagine these lands alive with small marsupials,

regularly turning this soil over in their search for roots and fungi, large flocks of Budgerigars and Plains Turkeys and Brolgas on the swamps?

So now we have an idea of what the land was like in its pre-European state. This brings us to one of the main reasons as to why conservation is failing. The issue of the quantity and the quality of the food source for the native fauna is not being addressed. Sure - trees do provide some of the food required, but the majority of the food was produced in the grassy groundlayer and it was this grassy groundlayer that built the soil fertility. This fertility is a key to the health, fecundity and resilience of the fauna (and flora) and ultimately the number that can exist sustainably in a given area. Native grasses and legumes have been replaced to a large extent by introduced grasses and the steeper and locked up country is dominated by trees that are too thick to express their maturity. In winter rainfall areas introduced grasses are generally dormant from mid-November to mid-April; five months. Most mammals/birds cannot survive five days without food, let alone five months. Aboriginal knowledge tells us there is a complex evolved co-dependency among the native fauna. Take one species out of the system and you have broken a link in the chain and weakened others, possibly precipitating a domino effect. It is a paradox. This resilient ecosystem that has survived and flourished through millennia of droughts, floods and fires can be so delicate, fragile and unsustainable when unbalanced.

Now to agriculture. It is failing for two reasons. The first: 90% of the topsoil has been lost through agricultural practices. That means that 90% of the nutrient-holding and water-holding capacity has also been lost. Our soil bank is bare! There is no more credit! Unless the current methods of farming are altered, agricultural production will continue requiring to be supported by the application of artificial fertilizers, pesticides and herbicides, at ever-increasing costs. Agriculture is the foundation of civilization – without food we don't have one. It is also the financial foundation of multinational chemical companies. From the chemicals farmers spray onto the plants and soil and administer to animals, to the chemicals produced by pharmaceutical companies that assuage an increasingly diseased population, the result of consuming nutritionally bereft and adulterated foods.

The second reason: agriculture has become the poor cousin to all other industries. Country towns and the

associated infrastructure have retracted and become moribund. Most of the young people have left for the cities. The task of feeding the people, caring for the land, and upholding the traditional cultural values of this nation, is being carried out by a group of tired old men (and women) working longer and longer hours for comparatively less remuneration. Right at this moment a wonderful hiatus is being observed to this long-term trend. But as sure as night follows day, one can be assured the cost price squeeze will continue unabated. Fuel and fertilizers are set to double or treble in the next ten to fifteen years, something over which farmers have absolutely no control.



Can you imagine a farming system that builds soil faster than it erodes? Pastures that respond to rain whatever time of the year it falls? Cropping and pasture systems that incorporate C4 perennial grasses (increasing soil organic matter and carbon) to a point where the water-holding capacity and nutrient-holding capacity far outstrip what is possible under conventional practices? This type of farming system is achievable and could be the foundation of a landscape that would once again be able to support many of the native animals and birds that have disappeared or retracted to isolated pockets.

In conclusion I ask you to suspend your disbelief. Question everything you are told. Go and observe nature and learn to read the landscape and find your own truth. "The most truthful piece of learning in life is to unlearn what is not true" – Greek philosopher Antisthenes.

References

1. Exploration & Settlement of Australia - James Gormley
2. A Million Wild Acres - Eric Rolls
3. Soil Erosion Phosphorus & Dryland Salinity in the Upper Murrumbidgee –B.J. Starr
4. Journey of George Augustus Robinson 1840-41 – Garry Presland



2nd NSW Conference on Travelling Stock Routes Managing the Uses, Users & Threats for Heritage, Habitat & Livelihood

**National Parks Association of NSW (NPA) are
hosting their second state-wide conference on
travelling stock routes**

Orange Ex-Services Club on Thursday 28 July, 2011.

The travelling stock route and reserves (TSRs) network across NSW is a globally unique public-owned continental-scale bush corridor that holds significant habitat, heritage and economic values.

NPA has been working for over 50 years to protect the unique properties of the TSR network in NSW and is actively engaged with the range of interest groups who enjoy sharing its multiple uses. NPA has initiated a new campaign to engage the community in understanding the importance and potential of the TSR network across the continental landscape. By building partnerships with all Australians these assets will gain higher recognition and priority for environmental infrastructure investment.

TSRs in the sheep-wheat belt of central NSW contain some of the best remnants of Grassy Box-Gum Woodland and other threatened vegetation communities with associated wildlife.

Across the state, approximately 80% of TSRs are correlated with vegetation communities of high or very high conservation status. Effective management and restoration of the TSR network would make a significant contribution towards state, federal and international biodiversity conservation targets.

The TSR network was established to drive sheep and cattle during early European settlement, often along the very same corridors used for millennia by Aboriginal Australians for travel, trade and cultural lines. They are still used in many places for these original purposes.

Many low impact recreational activities are also provided by TSRs including access to favourite fishing spots, bird watching, plant photography, bushwalking, cycling and picnicking.

The TSR network is the embodiment of a common resource that should be sustained for the shared use of multiple stakeholders and for multiple uses. Current threats include further fragmentation through sale of public property, weed invasion, over-grazing, firewood collection, industrial logging, mineral and gas exploration and extraction, infrastructure impacts, climate change and wider losses of biodiversity.

A key priority is to establish a framework of strategic management principles to guide the many users of NSW TSRs and ensure their day-to-day practices are consistent with sustaining the fuller spectrum of multiple values.

The purpose of the 2nd NSW TSR Conference (2011) is to bring together the full diversity of stakeholders to collaboratively develop the basis for this framework, to identify the types of monitoring and evaluation needed and the funding sources, for the shared use, custodianship and sustainable management of this unique public resource.

The Grass Routes initiative has been developed in collaboration with NPA to broaden the scope of interest and opportunity for the future of the heritage, habitat and livelihood values provided by TSRs.

The TSR network in NSW could be a keystone in a nation-wide network of shared use, multi-function bush corridors, especially if linked with other TSR networks (Queensland, Western Australia) and the landscape-scale initiatives (eg. The Great Eastern Ranges Initiative, Trans-Australia Eco-Link).

**For more information visit www.npansw.org.au and
www.grassroutes.org.au**

Photo TSR Forbes Rd Jenni Kirk

Environmental Farmers Network

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The Environmental Farmers Network (EFN) is an organisation intent on improving environmental health of private and public land in farming areas. The EFN will make its views known on a variety of issues to do with the environment, but it is not a political party.

The EFN has been formed by a group of farmers with a wide environmental experience. They are very aware of the significant efforts being made by the farmers across the landscape when it comes to responsible environmental management. But they are also aware that without greater public and political support this work will not be sufficient to make the substantial and lasting changes needed.

There is a need for a collective voice to represent those who are trying to protect the environment in farming regions.

The Environmental Farmers Network seeks to improve the environmental health of private and public land in farming areas by:

- Promoting **policies** for best practice environmental management on farms and in farming regions;
- **Advocating** increased private and public support for rural environmental programs, especially those that protect and enhance natural biodiversity;
- Generating environmental **awareness** in the broader community;

EFN also provides comment via media releases on topics of current interest

Media releases have been made as follows:

- Opposition to cattle release in Alpine National Park (Jan 2011)
- Blackwater events in the Murray Darling Basin (Jan 2011)
- Independence of Murray Darling Basin Authority under attack (Dec 2010)
- Opposition to cattle grazing in Alpine National Park (Nov 2010)
- Cropping on roadsides (Nov 2010)
- Biolinks & Habitat 141 Project (Nov 2010)
- Murray Darling Basin Plan (Oct 2010)
- Alpine park cattle grazing (Jan 2010)
- EFN supports new red gum national parks (Jan 2009)
- Farmers support native vegetation exemptions (Sep 2008)
- Red gum forest management proposals (Aug 2008)
- Tree felling not the way to protest (Jul 2007)
- VEAC proposals for management of river red gum forests (Jul 2007)
- Gwydir wetlands (Jun 2007)
- Barmah wetlands (Feb 2007)
- Land and Biodiversity White Paper proposal (Aug 2006)



Media releases and membership can be found on the networks website
<http://www.environmentalfarmersnetwork.net.au/index.php>

To thin, or not to thin? The value of dense native woody vegetation for birds

Damon Oliver Threatened Species Officer Office of Environment & Heritage

I'm sure you've all heard the saying "that locked-up scrub needs a good thinning" or "you need to thin those young trees to give the remaining ones a chance to grow"? Maybe you have had these very thoughts about parts of your property where eucalypts or other native woody plants form dense stands. The question of whether thinning dense native shrubs, regrowth eucalypts or native pines provides good outcomes for biodiversity in rural landscapes has created considerable discussion amongst land managers and some environmental scientists for the last few decades. Whether thinning is necessary for enhancing biodiversity still requires far more research to provide landholders with the best information for biodiversity management balanced against primary production outcomes. Although my expertise focuses primarily on native birds, part of my motivation for writing this article stems from personal experience with trying to thin a dense stand of Black Cypress-pine (*Callitris endlicheri*) when I lived in Dubbo about 10 years ago. The thinning resulted in poor biodiversity outcomes for ground orchids.



A ground orchid
(Photo by T. McLeish)

In recent years, research conducted in the rangelands of central west NSW is suggesting that primary production outcomes can be improved through the removal of native shrubs, rotational cropping and careful grazing to restore a native grassy groundlayer. While the restoration of a native grassy groundlayer is of obvious benefit to primary production, the net biodiversity gains are not as clear. An increase in the extent of native grasses will benefit

some fauna species that prefer open habitats. However, this has to be weighed against the net loss of plant and animal diversity from the removal of shrubs.

If thinning is desirable for primary production, one of the key challenges for landholders and land management agencies is to know what proportions of dense woody vegetation and more open vegetation and grazing country should be retained to ensure that biodiversity values are maintained. There is an increasing body of knowledge that shows the retention of areas of dense woody vegetation at the landscape scale is beneficial for fauna species which require such vegetation, including many threatened and declining bird species. The key message I want to deliver in this article is that the need for thinning woody vegetation for primary production outcomes cannot be justified also on the basis that dense 'locked up' woody vegetation is bad for biodiversity. It's certainly a complex and sometimes political issue and this article is intended to provide land managers with some food for thought on the biodiversity issues associated with thinning and clearing dense woody vegetation.

Examples of dense woody vegetation

Dense eucalypts and native cypress-pine regeneration (or 'locked-up scrub')

Most Australian eucalypts and native cypress-pine (*Callitris* spp.) have the ability to regenerate to form dense stands of saplings, particularly after significant



Cypress-pine (photo by Phil Spark)

rainfall events and when stock grazing, rabbits and fire are excluded. Many readers from inland NSW will be familiar with very dense stands of White Cypress-pine (*Callitris glaucophylla*) that can develop in some state forests, travelling stock reserves and private land. It is a well-known fact that the growth rates of trees in these stands can be suppressed for many decades – hence the term ‘locked-up scrub’ has been applied. Eucalypt species, including River Red Gum (*Eucalyptus camaldulensis*), Coolibah (*E. coolabah*) and Poplar Box (*E. populnea*) are renowned for regenerating as dense copses after disturbance events such as floods. Some land managers believe that these types of dense woody vegetation require thinning to assist in land management in primary production landscapes.



A shrubby understorey (photo by Phil Spark)

Native woody shrubs (or ‘woody weeds’)

Some regions of central and far western NSW support areas of dense native shrubs, such as emu-bushes, turpentine trees or buddas (*Eremophila* spp.), hopbushes (*Dodonaea* spp.), wattles (*Acacia* spp.), and sennas, punty-bush or cassia (*Senna* spp.). These shrub species are often referred to as ‘woody weeds’. They are not weeds, but in fact indigenous native plants that are naturally part of the landscape and should not be treated as if they were introduced weeds. In some areas ‘woody weeds’ have increased in abundance from prolonged grazing, lack of fire and declining rainfall at the expense of a more grass dominated groundlayer. This type of vegetation has caused some landholders management problems in terms of reduced grazing capacity, stock movement limitations and increased habitat for pest animal species. The Central West and Western Catchment Management Authorities (CMAs) have published a very comprehensive set of guidelines about the management of ‘woody weeds’ in central-western NSW, which describes in greater detail

the full list of species that are considered ‘woody weeds’. They have also published some case studies in which clearing has assisted land managers to improve their grazing management (Central West CMA 2010).

The biodiversity values and benefits for retaining dense woody vegetation

One of the arguments presented for clearing dense shrubs (“woody weeds”) and thinning dense stands of suppressed eucalypts and cypress-pines is that areas they occupy have very low biodiversity values. Some of these assumptions are based on lack of a native groundlayer (in the case of areas with dense shrubs) or lack of large mature trees (in the case of dense stands of small eucalypts and cypress-pines) equating to a low diversity of fauna species. However, in the last two decades a number of studies have been conducted on individual bird species and entire woodland bird communities in landscapes of inland NSW supporting dense stands of Box-Pine Woodland (Major *et al.* 1999, 2001; A. Drew CSIRO unpubl. data; Briggs *et al.* 2007), dense regrowth Box-Gum Woodland (Monatague-Drake *et al.* 2009) and dense shrubs (Ayers *et al.* 2001; Doerr *et al.* 2009). All of these studies clearly show that many bird species, particularly insect-eating birds, rely heavily on dense woody vegetation. At a landscape level, other bird species require a mix of both dense or open shrubland and more open grass-dominated vegetation. The message from these studies is that all types of native vegetation have important values and that landscape management must endeavour to achieve a mosaic of different vegetation states from dense shrublands to open grassy woodlands.



A thicket (photo by Phil Spark)

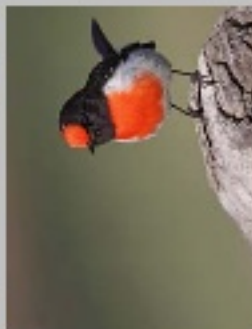
WOODLAND BIRDS THAT REQUIRE DENSE WOODY HABITAT



The **Speckled Warbler (V)** requires a mix of shrubs, tall dense grasses and regrowth eucalypts or cypress-pines. It is often seen in dense 'locked-up' Black Cypress-pine thickets.
Photo: Chris Tzaros.
Information source: Doerr *et al.* 2009.



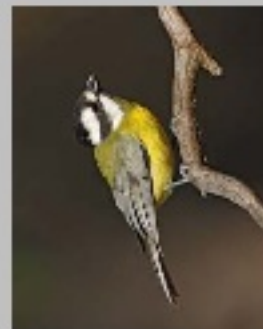
The iconic **Superb Parrot (V)** is a beautiful parrot of the NSW inland slopes and plains. It forages and roosts in dense shrubs such as wattles, hop-bushes and saltbushes.
Photo (of a female bird): Dean Ingwersen.
Information source: <http://www.threatenedspecies.environment.nsw.gov.au/speciesprofile/profile.aspx?id=10645>



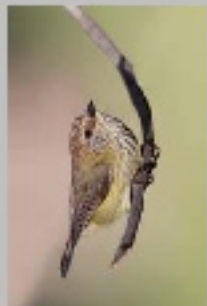
The gorgeous **Red-capped Robin (D)** is well-loved by many landholders who have dense stands of White Cypress-pine regrowth, or areas with dense native shrubs, including wattles. It needs shrubs and dense regrowth for nesting sites.
Photo: Dean Ingwersen.
Information source: Doerr *et al.* 2009, Major *et al.* 1999, 2001.



Gilbert's Whistler (V) lives in woodland and mallee with a dense shrub layer in western NSW. It nests and forages in dense shrubs, including Broombush and Cherry Ballart, respectively. It also forages on the ground.
Photo: Chris Tzaros.
Information source: Doerr *et al.* 2009.



You may have heard the **Crested Shrike-tit (D)** prying under bark for insects and spiders. It forages under loose bark and shows a strong preference for dense stands of eucalypt regrowth in some landscapes, such as the NSW South-western Slopes.
Photo: Dean Ingwersen.
Information source: Montague-Drake *et al.* 2009.



The **Striated Thornbill (D)** is a tiny insect-eater of forests, woodlands and shrubby areas across NSW. It relies on dense shrubs and eucalypt saplings for foraging and nesting.
Photo: Dean Ingwersen.
Information source: Doerr *et al.* 2009.



The **Regent Honeyeater (E)** is a flagship species for woodland bird conservation. It forages for insects and spiders in dense shrubs, such as wattles, Sifton-bush and Blackthorn. It needs fine material from Sifton-bush for nest-building.
Photo: Dean Ingwersen. Information source: <http://www.threatenedspecies.environment.nsw.gov.au/speciesprofile/profile.aspx?id=10841>



The **Black Honeyeater** of semi-arid and arid inland Australia relies on nectar from emu-bushes and fruit from native shrubs, including saltbushes. It builds its nest in shrubs, including wattles.
Photo: Dean Ingwersen. Information source: <http://www.threatenedspecies.environment.nsw.gov.au/speciesprofile/profile.aspx?id=10156>



The **Grey-crowned Babbler (V)** is a real character of the inland woodlands because of its amusing habits and raucous calls. It requires dense shrubs for nesting and roosting and forages in shrubs and on the open ground in woodland areas.
Photo: Dean Ingwersen. Information source: <http://www.threatenedspecies.environment.nsw.gov.au/speciesprofile/profile.aspx?id=10660>



The **Glossy Black-cockatoo (V)** relies specifically on the seeds of a small number of species of she-oaks for food. Some she-oak species occur in dense thickets.
Photo: Doug Mills.
Information source: <http://www.threatenedspecies.environment.nsw.gov.au/speciesprofile/profile.aspx?id=10140>



The **Brown Tree-creeper (V)** usually prefers open woodland with a grassy understorey, though in more inland areas, this species is sometimes found in landscapes with a dense shrubby cover.
Photo: Chris Tzaros.
Information source: Doerr *et al.* 2009.



This gorgeous **Splendid Fairy-wren (V)** occurs in many areas of western NSW that have a dense shrub cover. It feeds and nests almost entirely in dense shrubs, though of a wide variety of species.
Photo: Dean Ingwersen.
Information source: Doerr *et al.* 2009.



The **Jacky Winter (D)** prefers a mix of open areas and shrub cover for nesting and perching. You may have also seen this bird perching on fences and posts on your farm.
Photo: Dean Ingwersen.
Information source: Montague-Drake *et al.* 2009.



The **Chestnut Quail-thrush (V)** is mainly found in mallee woodlands in western NSW that have a native shrub-layer. It uses shrubs mainly for protection.
Photo: Chris Tzaros. Information source: www.threatenedspecies.environment.nsw.gov.au/tsprofile/profile.aspx?id=10168



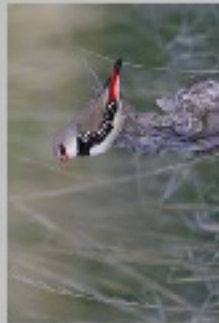
Although you would mainly see this bird either flying within the woodland canopy, or way up in the sky, the **Dusky Woodswallow (D)** also forages on insects and nectar in shrubs. It also sometimes nests in shrubs and shows a preference for areas with regrowth eucalypts in some regions.
Photo: Dean Ingwersen.
Information source: Montague-Drake *et al.* 2009



Shrubs are very important for roosting and nesting sites for the **Peaceful Dove (D)**. Its distinctive soft cooing call is a feature of western woodlands.
Photo: Chris Tzaros.
Information source: Doerr *et al.* 2009.



A well-loved bird of the bush, the **Eastern Yellow-robin (D)** forages in dense shrubs and favours dense stands of regrowth eucalypts in some regions.
Photo: Dean Ingwersen.
Information sources: Doerr *et al.* 2009, Montague-Drake *et al.* 2009.



A beautiful finch that requires shrub layer for nesting, as well as grassy areas for foraging, the **Diamond Firetail (V)** shows a preference for regrowth eucalypts in areas such as the NSW South-western Slopes.
Photo: Chris Tzaros.
Information source: Montague-Drake *et al.* 2009.



A great songster of the mallee and some western woodlands of NSW, the **Crested Bellbird (D)** forages in low dense shrubs and builds its nest in dense shrubs or saplings.
Photo: Dean Ingwersen.
Information source: Doerr *et al.* 2009.



The **White-browed Babbler (D)** relies even more heavily on dense thickets of shrubs than does the Grey-crowned Babbler. It often forages and nests in shrubs with prickly foliage (e.g. wattles).
Photo: Dean Ingwersen.
Information source: Doerr *et al.* 2009.



The **Restless Flycatcher (D)** is often called the Scissors Grinder due to its distinctive call. It forages above the foliage of shrubs for insects and builds its nest in shrubs, often near watercourses.
Photo: Dean Ingwersen.
Information source: Montague-Drake *et al.* 2009.



A well-loved woodland bird that often nests around farmhouses, the **Grey Shrike-thrush (D)** feeds in shrubs and saplings and occasionally builds its nests in shrubs. It is a very fine songster.
Photo: Chris Tzaros.
Information source: Doerr *et al.* 2009.

(E) = Endangered – a species that is likely to become extinct unless the circumstances and factors threatening its survival cease to operate.
(V) = Vulnerable – a species that is likely to become endangered unless the circumstances and factors threatening its survival cease to operate.
(D) = Declining – a species that has declined in the last two decades and is likely to become vulnerable unless threats to this species are reduced

Woodland bird species that favour dense shrubs and regrowth

Some recent studies into the habitat preferences of woodland birds in western NSW, including Briggs *et al.* (2007) have found a strong positive relationship between shrub cover and density and number of species of insectivorous woodland birds in Box-Pine Woodlands in central New South Wales. Earlier studies by Major *et al.* (1999, 2001) and Alex Drew from CSIRO (unpubl. data) in cleared landscapes of central NSW demonstrated the value of dense stands of White Cypress-pine along linear remnants (roadsides and TSRs) for declining woodland birds such as the Red-capped Robin (*Petroica goodenovii*). In these landscapes there has been a loss of shrubs and groundlayers due to prolonged over-grazing by rabbits and stock. Structurally, dense thickets of White Cypress-pine provide the much-needed shrub layer that Red-capped Robins and a suite of other small insect-eating birds require. Further south, in the South Western Slopes bioregion of NSW, Montague-Drake *et al.* (2009) identified nine species of threatened and declining woodland birds that were more likely to use dense regrowth woodland patches than old-growth woodland patches. They suggested that thickly-vegetated areas are important for nesting and sheltering. I have recorded some of these threatened birds breeding in a small woodland with patches of dense eucalypt regrowth, plantings and scattered native shrubs near my home in Canberra.

Semi-arid shrublands and birds of shrubby woodland

In the last decades, two key studies were conducted in the central-west of NSW in landscapes supporting dense native shrubs, including species of *Eremophila*, *Dodonaea* and *Senna*, as well as dense stands of eucalypts such as Bimble Box and Grey Box (*E. microcarpa*) and thickets of White Cypress-pine (Ayers *et al.* 2001, Doerr *et al.* 2009). Ayers *et al.* (2001) concluded that a suite of birds were only found in areas with high native shrub cover. This was supported most recently by Doerr *et al.* (2009) in their study of bird communities in eighteen 500-hectare landscapes with different levels of woody vegetation, both in terms of tree and shrub cover. These landscapes ranged from very open, cropping areas with scattered trees, open, grazed woodlands, woodlands with open shrub cover and woodlands or shrublands with closed shrub cover. Interestingly, they found that both the number of bird species and the diversity of bird species were greater in the landscapes with open and closed shrub layers compared to the more open, agricultural vegetation states. Diversity of

bird species at the landscape scale was positively related to the proportion of scrubby vegetation in the landscape and, conversely, negatively related to the proportion of agricultural vegetation states in the landscape. One of the other key findings of this study was that 42 bird species were identified as being 'scrub specialists', which means they were either only found in, or showed strong preferences for landscapes with open or closed shrubby vegetation.

The following biodiversity management recommendations were made by Doerr *et al.* (2009) for landscapes in central western NSW with a mosaic of shrubby and open vegetation:

1. Maintain landscapes with between 33% and 67% scrub (i.e., dense woody vegetation) to maintain much of the bird community diversity in the region;
2. Maintain a spectrum of woody vegetation densities (i.e., some landscapes with 33-50% scrub and others with 50-67%);
3. Maintain patches of scrub vegetation states that are separated from other patches of scrub by no more than 1km;
4. Connect patches of scrub vegetation states that are separated by up to 1km with either with a continuous corridor of scrub or with a paddock containing scattered trees in which the trees are separated from each other by no more than 100m and,
5. Areas of open scrub (with clear separation between clumps of trees and shrubs) may be particularly important for native birds, may still have some production value, and can have a healthy grassy groundlayer in the areas between trees and shrubs. Where such a grassy layer still exists in open scrub, retain and protect it with careful management of total grazing pressure.



Thinning for primary production benefits

Grazing

Some landholders consider that areas of dense trees and shrubs impinge on grazing management in terms of impeding stock movement and availability of grassy ground cover for grazing opportunities. This is particularly true in parts of central-western NSW, where grassy ecosystems that have had prolonged grazing (or, periods of historical over-grazing) and a lack of fire for over a hundred years have been encroached by dense patches of unpalatable shrub species. Whilst dense stands of shrubs and young trees undoubtedly affect the movement of stock, the evidence that trees and native shrubs suppress grasses and other groundlayer plants is mixed. For example, researchers at UNE found no impact of trees on grass cover in woodlands near Armidale (Chilcott *et al.* 1997). In contrast, rangeland grazing production-based research in the last few years in the Cobar Peneplain of central-western NSW shows that native perennial grass cover can be restored with the removal of native shrubs, rotational cropping and careful grazing management (Alemseged *et al.* 2011). I am not aware of similar work in dense stands of eucalypts or cypress-pine that shows thinning will promote native grass cover. Landholders must remember that in the long term, dense stands of small trees will naturally thin themselves through competition for resources. In the case of dense shrubs, I believe there needs to be long-term monitoring of such areas where grazing by exotic herbivores (rabbits, goats, domestic stock) has been removed for a long period, to measure whether they remain in a shrubby state or transform to a more open grassy state as the short-lived shrubs die. The message here is that the process for vegetation to change from one state to another takes many decades, which does not meet the human timeframes for change. Landholders who want to accelerate grazing management outcomes understandably want to manipulate vegetation to allow palatable native grasses to flourish. However, the case for net benefits to fauna and flora from rapid habitat manipulation by thinning dense woody vegetation requires far more testing.

The Central West and Western CMA's management guide for dense woody vegetation (Central West CMA 2010), sensibly, advises landholders of the high costs required to selectively thin or clear for primary production outcomes. In some cases the costs of thinning dense stands, or clearing or rolling dense shrubs is likely to outweigh any increase in grazing capacity. The guide also provides some visual examples where removal of

'woody weeds' has achieved some positive outcomes. An important caveat placed on thinning dense woody vegetation is the need for sensitive future grazing practices to ensure that the grass cover is maintained and not once again replaced by unpalatable shrubs. There are many situations in western NSW where the clearing or 'rolling' of native shrubs has not succeeded in restoring a native grassy groundlayer. What often remains after the initial clearing is a stand of dead shrubs with the next cohort of regenerating shrubs emerging in between the dead shrubs. Dr David Eldridge from NSW Office of Environment and Heritage has been assessing the long-term effects of grazing and shrub removal by ploughing on shrub density, groundlayer plants and soil health. He has been working on a grazing property north of Bourke as part of a 20-year study. Dr Eldridge has found that shrubs are twice as dense after ploughing and grazing, than if they were ungrazed or the soil was left unploughed. His research suggests that physical soil disturbance, such as ploughing, does not provide long-term control of encroaching native shrubs. In contrast in the study by Alemseged *et al.* (2011), a native grassy groundlayer was restored and maintained after native shrubs were removed and the cleared area managed by rotational cropping and low-level rotational grazing. Dr Eldridge has recently published a review of 244 studies worldwide that investigated the effects of encroachment of shrubs into grasslands (Eldridge *et al.* 2011). His review shows that there is no consistent pattern between shrub encroachment and measures of degradation to soil properties and other physical values. In other words, there are mixed effects on ecosystem function and structure. As will be discussed below, the potential benefits for stock grazing may come at a cost to fauna species that require a dense native shrub layer.



A mosaic of habitat types

Erosion and soil properties

In extreme cases, the presence of dense thickets of shrubs, in combination with heavy grazing, can cause loss of groundcover, heavy soil crusting and localised erosion. However, a recent study by UNE Armidale researchers (Munoz-Robles *et al.* 2010), which compared sites with and without gully erosion, found that shrub cover was actually higher where erosion was absent. They stated that if dense woody vegetation is cleared for pasture and then overgrazed, the risk of gully erosion is increased. It would appear that the removal of grazing, particularly by feral goats, would be the most cost-effective method of erosion control before deciding to remove shrubs.

The influence of the type of vegetation on soil properties is also highly variable. Research by Dr Matthew Tighe and his colleagues at UNE Armidale have shown some interesting relationships between the encroachment of native shrubs and erosion and soil properties. Generally, the soil pH under dense shrubs is low (acidic), which may affect the ability of grasses and other groundcover plants to establish. In contrast, the study by Alemseged *et al.* (2011) found that soil pH was higher (alkaline) under shrubs than in grassy areas. There seems to be a more consistent pattern for soil carbon and nitrogen, which are both generally higher under shrubs than in open grasslands, as concluded by the Eldridge *et al.* (2011) international review. However, Tighe *et al.* (2009) found that soil carbon, nitrogen, phosphorous, water content and microbial activity were lower in dense shrubland compared to open woodland. There are so many complicating factors, such as the levels and duration of grazing, that it is difficult to draw strong conclusions across large areas about the effects of native shrubs on erosion and soil properties.

Silvicultural benefits

One of the silvicultural practices applied for accelerating

the growth-rate of larger trees in a stand for timber production is the removal of groups of surrounding smaller trees, including those with no commercial value that compete for water and nutrients. This method, often termed 'group selection,' has been used in River Red Gum and White Cypress-pine forestry. It must be remembered that the intent and benefits of this type of thinning are focused on timber production and not biodiversity. Keep in mind that the retention of dense immature eucalypts and cypress-pines is beneficial to many woodland bird species, including species that are threatened and declining.

What are landholders allowed to do with dense woody vegetation?

Landholders in NSW may be permitted to clear dense woody vegetation using various provisions in the NSW native vegetation legislation. Firstly, landholders are allowed to clear a species from a defined list of native trees and shrubs defined as 'Invasive Native Scrub' or 'INS'. There are limits to how much INS can be cleared on a property and also the size of trees that qualify as INS. In other words, large old trees must be retained for their biodiversity values. Such clearing of INS must be done in accordance with conditions required for approval under an INS Property Vegetation Plan. You can download a fact sheet and list of INS species from the OEH website (see references). Secondly, landholders are allowed to thin a proportion of native woody vegetation which has a density of tree stems that is above what is considered to be at benchmark condition in accordance with regulations. Thirdly, landholders are also permitted to clear native woody 'regrowth'. 'Regrowth' is defined as native vegetation that has been previously cleared since either 1983 or 1990, depending on the location within NSW.

Keeping the issue in perspective

Whilst it is accepted that the presence of dense stands of woody vegetation can present land management challenges, the scale of this perceived problem needs to be considered both at a property and regional scale. In those areas of western NSW where there has been an increase in native shrub cover, the scale of the perceived problem varies. For example, mapping by the Central West CMA has shown that the scale of dense shrubland is significant. In contrast, the 'biodiversity in woody weeds' research project by Ayers *et al.* (2001) struggled to locate an adequate sample of continuous shrubby areas that were greater than 2 ha in size across their study area.



I believe that regional scale vegetation mapping similar to that by the Central West CMA in the Cobar Peneplain region would provide very useful land management planning information to landholders and land management and regulatory authorities.



Likewise, the size of stands of dense eucalypts or cypress-pine regrowth in woodland areas across NSW are usually confined to areas smaller than 1 ha, with exceptional cases of up to 5 ha. In contrast, in the Cobar Peneplain region, areas of regeneration of INS species such as White Cypress-pine are much larger. Keeping this in mind, landholders need to determine how much of a problem dense woody vegetation really poses on their properties. Another consideration for landholders is the cost of thinning dense woody vegetation and the constraints of what the legislation will allow, depending on the species to be cleared or thinned. What should also be remembered is that in some regions such as the NSW South Western Slopes, where more than 85% of native vegetation has been cleared, dense woody vegetation provides very important habitat and connectivity between patches of more open vegetation in rural landscapes. What might be considered as a patch of woody weeds that is far too dense, may in fact provide high quality habitat for birds and other fauna that need this type of habitat for feeding, breeding and protection from predators.

Finally, much of the research that I reviewed has focussed on western NSW. However, INS is also recognised in some eastern regions. For example, some tea-tree species (*Kunzea* spp.) and Sifton-bush (*Cassinia aculeata*) are recognised as INS in several eastern CMAs. Therefore, the conclusions that have been drawn from the western studies that I have reviewed, above, are also likely to

apply to the problem in more eastern regions where such studies are lacking.

Further research – working together to find the answers

I hope that readers will not interpret my article as being anti-thinning for improving primary production. I am certainly not questioning the need for some landholders to manage extensive areas of dense woody vegetation for grazing enterprises. However, if thinning is deemed necessary, it must not be assumed that it will improve outcomes for biodiversity. In 2001, I conducted a small-scale thinning of dense Black Cypress-pine on a small property I owned west of Dubbo. The intention was to promote growth rates of some of the larger trees in the stand. In the short term at least, this did not achieve my objective and, in fact caused a noticeable decline in the abundance of native ground orchids, presumably due to increased sunlight and direct exposure to soil drying. Even the clearing of exotic woody weeds in bushland in the ACT has shown to have had a negative effect for native bird populations (R. Rehwinkel, pers. comm.).

There is still very little information to support thinning of eucalypt and cypress-pine regrowth and native shrubs on a biodiversity basis. I would, therefore, encourage landholders and land management agencies to continue to work collaboratively to test the effects, both positive and negative, on biodiversity values, from the groundlayer upwards, to make sure we are providing a sustainable outcome for landholders and the biodiversity that they value.

In many cases landholders may see dense woody vegetation as a problem that they need to fix. However, when you consider the important role that dense patches of vegetation play in providing habitat to some of our most threatened birds, these areas are in fact highly worthy of protection. I hope that the array of beautiful birds presented in the news letter centre fold accompanying this article will convince you that retaining a balance of dense woody shrubs and trees with more open vegetation is a good management practice. If you look at ‘woody weeds’ in another way, they may be an asset, just like dead standing trees with hollows or fallen timber (‘coarse woody debris’) can be for many fauna species.

Acknowledgments

I thank my colleagues at OEH, John Briggs, James Crooks, David Parker and Rainer Rehwinkel for their

comments and input to this article. Carolyn Raine from the Central West CMA generously provided me with her well-balanced perspective as well as a number of recent publications of research into woody weed management in the Cobar Penneplain and Robert McLeish for a primary producer perspective after years managing native pine and box regrowth at Upper Manilla, NW NSW.

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OEH Website with a fact sheet and list of INS species: <http://www.environment.nsw.gov.au/resources/vegetation/nvinfosheet9.pdf>.

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Editor's Note:

I would like to thank Arthur Webb for putting pen to paper and raising the issue of tree regeneration and Damon Oliver for taking the time to put together a thoughtful article on vegetation management in response.

If you have an issue you would like addressed in the Woodland Wanderings please contact me (details on the back page). If you would like a personal response, please email me your inquiries and I will respond directly to you after consultation.

The Atlas of NSW Wildlife

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Office of
Environment
& Heritage



The Atlas of NSW Wildlife records sightings of flora and fauna. Landholders can both use and contribute to the Atlas.

The Atlas of NSW Wildlife is the NSW office of Environment and Heritage (OEH) database of fauna and flora records. It contains over four million recorded sightings and is the main repository of information and knowledge about biodiversity in NSW.

Why is the Atlas so important?

The records within the Atlas are used by a large variety of people for a variety of purposes, such as:

- private individuals who may wish to know about species on and around their property;
- academics and researchers working in particular areas or species;
- students working on school projects;
- OEH staff to assist in better management and conservation of species, both on and off reserves;
- Commonwealth and state government departments for conservation planning and land management;
- local government agencies for environmental impact assessments; and
- consultants and landholders looking at activities which may include clearing of native vegetation for development or agriculture.

The Atlas plays an important role in the planning system in NSW. When assessing the environmental impacts of developments and land clearing applications, government authorities and environmental consultants use the information contained in the Atlas to determine which fauna and flora species will be affected and whether this impact is acceptable. Any new surveys undertaken are subsequently entered into the Atlas to help build a more complete picture on our biodiversity.

Where does the information come from?

Records come from various sources including historical reports, OEH staff, survey data from major projects, consultants (as part of the Scientific Licence procedure), and the general public and landholders.

How can landholders use the Atlas?

The Atlas contains sightings of plants, mammals, birds, reptiles, amphibians and endangered invertebrates (such as insects and snails). It does not contain records of fish, or

invertebrates unless they are listed under the Threatened Species Conservation Act 1995.

You can search the Atlas website at <http://wildlifeatlas.nationalparks.nsw.gov.au/wildlifeatlas/wildlifeatlas.jsp>.

By choosing an area to search in, and the sorts of species you would like to search for, a map or report can be produced showing the records in the Wildlife Atlas. Of course if there are no records of that species in the search area, it does not mean the species is not found there, simply that there are no records to date.

Why contribute to the Atlas?

The more records in the Atlas, the better the picture of the distribution and presence of species in an area. Landholders with Conservation Agreements, Wildlife Refuges, Registered Property Agreements and other properties with significant conservation values are able to contribute to the Atlas by recording their sightings of fauna and flora and submitting them to OEH. These areas protect some of the best biodiversity in the state and they are a wealth of information. Many landholders have extensive species lists of fauna and flora that they have seen on their properties. Submitting these records to the Atlas allows increased knowledge about what is found in the area and may be used to predict what species are likely to exist in similar habitats in the local area. This assists well-informed decisions about land use and management. They will also be contributing to our understanding of the world around us and add to the body of scientific knowledge. Private landholders can make valuable inputs to the Atlas and help ensure important decisions are made with the best information available.

How can you contribute to the Atlas?

To ensure records are accurate, it's important to record all relevant information, including full name and contact details, location, date, habitat and other information. The spreadsheet and the manual cards will tell you what is needed to accurately record sightings.

If you are interested in supplying records to the Atlas, please contact the Wildlife Data Unit on gis@environment.nsw.gov.au or

Conservation Partners Program on 9995 6769 or conservation.partners@environment.nsw.gov.au.

Records can be submitted electronically using a spreadsheet or manually using cards.

Tablelands Snow Gum Grassy Woodland: a newly listed endangered ecological community

Extract of the NSW Scientific Committee's final determination at:

<http://www.environment.nsw.gov.au/determinations/tablelandssnowgumFD.htm>

The NSW Scientific Committee has listed Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregions as an Endangered Ecological Community (EEC) under the NSW Threatened Species Act, 1995. This EEC is commonly referred to as Tablelands Snow Gum Grassy Woodland for brevity.



Black Sallee Woodland to the east of Bombala (southern NSW) (Photo: James Crooks)

This EEC is characterised by a range of plant species, as can be seen in the list in the final determination (see the web address, above). That list comprises a diversity of trees, shrubs, grasses and forbs. It should be noted that the total species list of the community is considerably larger than that given in the determination, with many species present in only one or two sites, or in low abundance. The species composition of a site will be influenced by the size of the site, recent rainfall or drought condition and by its disturbance history. The number and abundance of species will depend on recent fire and grazing regimes.

Snow Gum Grassy Woodland typically forms an open-forest, woodland or open woodland that merges into grassland at low tree cover. The canopy is dominated by Snow Gum (*Eucalyptus pauciflora*), Candlebark (*E. rubida*), Black Sallee (*E. stellulata*) and Ribbon Gum (*E.*

viminalis (Ribbon Gum), either as single species or in combinations. Other eucalypts may also occur within this community, including the vulnerable Black Gum (*E. aggregata*). A shrub layer may be present and sub-shrubs are a common component of the groundlayer.

Characteristic shrubs include Gruggly-bush (*Hymenanthera dentata*) and Urn Heath (*Melichrus urceolatus*). The groundlayer is dominated by grasses and forbs, including Kangaroo Grass (*Themeda australis*), snow-grasses (*Poa* spp.), spear-grasses (*Austrostipa* spp.), wallaby-grasses (*Austrodanthonia* spp.), Scaly Buttons (*Leptorhynchus squamatus*), Golden Buttons (*Chrysocephalum apiculatum*) and Native Woodruff (*Asperula conferta*). This EEC may occur as a secondary grassland, where the dominant trees have been removed but the groundlayer remains.



Snow Gum Woodland at Mila (southern NSW) (Photo: James Crooks)

Southern Tablelands Snow Gum Grassy Woodland mainly occurs on valley floors, margins of frost hollows, footslopes and undulating hills, between approximately 600 and 1400 m in altitude. It occurs on a variety of substrates, including granite, basalt, metasediments and alluvium. The community occurs as a part of a mosaic of native vegetation communities, including swamps, bogs, wetlands, grasslands and sclerophyll forests. A number of other EECs intergrade with the Snow Gum Woodland community and are thus considered to be related. These

include Box-Gum Woodland, Montane Peatlands and Swamps and Natural Temperate Grassland.



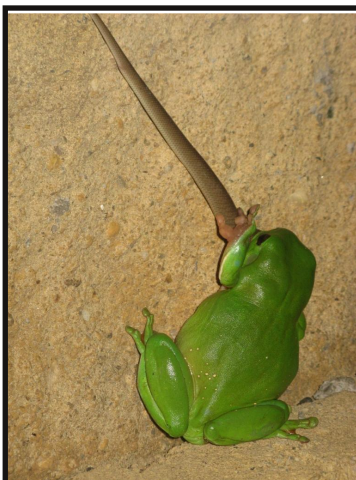
Snow Gum and Candlebark Woodland at Mila (southern NSW) (Photo: James Crooks)

The EEC has been recorded from the local government areas of Bathurst, Blayney, Bega Valley, Blue Mountains, Bombala, Cabonne, Cooma-Monaro, Eurobodalla, Goulburn-Mulwaree, Lithgow, Oberon, Orange, Palerang, Shoalhaven, Snowy River, Tumbarumba, Tumut, Upper Lachlan, Wingecarribee and Yass Valley, and may occur elsewhere within the bioregions that appear in its formal name. Southern Tablelands Snow Gum Grassy Woodland occupies an estimated extent of 14,100 ha, which is a 72% decline since European settlement. Clearing for agriculture has fragmented the community and in one region (Lake Bathurst), it has been estimated that no current patch exceeds 60 ha and that 70% of patches are smaller than 20 ha. Less than 4,000 ha of the EEC currently occur in conservation reserves in NSW.

Snow Gum Grassy Woodland is habitat for a large range of threatened animal and plant species listed under State and Commonwealth threatened species legislation. Some of these are Creeping Hopbush (*Dodonaea procumbens*), Hoary Sunray (*Leucochrysum albicans* var. *tricolor*), Button Wrinklewort (*Rutidosia leptorrhynchoides*), Gang-gang Cockatoo (*Callocephalon fimbriatum*), Scarlet Robin (*Petroica boodang*), Diamond Firetail (*Stagonopleura guttata*), Spotted-tailed Quoll (*Dasyurus maculatus*), Squirrel Glider (*Petaurus norfolcensis*), Koala (*Phascolarctos cinereus*), Little Whip Snake (*Suta flagellum*) and Alpine Tree Frog (*Litoria verreauxii alpina*).

Threats to this EEC include climate change, clearing, fragmentation, fertiliser application, tree dieback, trampling and grazing by domestic livestock, weed invasion and altered fire regimes. Many of these threats are escalating due to the intensification of agriculture, pine plantations, and residential development in southern NSW.

For a full unedited version and reference details for further information, please read the final determination at the web address given above. Priority Action Statement actions have not as yet been defined for this EEC, but are expected to be similar to those defined for other EECs of the region, including Box-Gum Woodland and Natural Temperate Grassland (see: http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/pas_profile.aspx?id=10837 and http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/pas_profile.aspx?id=10932).



Isn't nature wonderful! Yes this is a photo of a green tree-frog eating a baby Brown Snake. (photo by Sarah Dornbos).

This frog was hungry, saw a movement, thought about what to do, opened its mouth and grabbed hold. Lucky for it, the closest end of the snake was the head end or the outcome may have been different.

If you have a photo you would like to share please send it to the editor (details on the back page).



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OUR
COUNTRY

This Woodland Wanderings newsletter was edited by Toni McLeish (GBW CMN) and Rainer Rehwinkel (OEH) and was produced with funding from the Australian Government Caring For Our Country program. The views expressed in this publication do not necessarily represent those of either the Office of Environment & Heritage (OEH) or Dept. of Sustainability, Environment, Water, Population & Communities (SEWPaC). While every effort has been made to ensure that the information in this newsletter is accurate at the time of printing, OEH and SEWPaC cannot accept responsibility for any errors or omissions.

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JOIN US AT ORANGE EX-SERVICES' CLUB NSW 28 JULY 2011

THE 2ND NSW TRAVELLING STOCK ROUTES CONFERENCE

MANAGING THE USES, USERS & THREATS...FOR HERITAGE, HABITAT & LIVELIHOOD

THE GRASS ROUTES
Heritage - Habitat - Livelihood



PURPOSE & PROGRAM

The 2nd state-wide TSR Conference will bring together a wide range of stakeholders with the purpose of working together to develop the foundations of a framework of strategic management principles for the shared and sustainable use of the NSW TSR Network.

The day will be more workshop-style than a conference. After brief welcomes and short presentations, delegates will participate in discussion groups addressing the different issues & opportunities related to TSR management.

BRIEFING PACK

Short papers on key issues will be circulated before the Conference. Delegates will be able to raise other issues at the Conference too.

A full conference program is in development and will be available on the NPA website.

LAUNCHING THE GRASS ROUTES & SOME FUN

Closing out the day will be the launch of The Grass Routes bush corridor initiative. Optional drinks, entertainment & dinner (about \$40/head) will follow in the evening for those who can stay for a Taste of Orange & Frost Fest.

DATE: Thursday 28th July, 2011

TIME: 9.30am – 4.30pm, with optional dinner and networking event in the evening

VENUE: Orange Ex-Services Club, 231-243 Anson Street, Orange

COST (INCLUDING LUNCH & REFRESHMENTS):

- \$55 for concession
- \$80 for general community members
- \$120 for government and industry delegates

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THE EARTH WELFARE FOUNDATION
WILDCOUNTRY GRANT FROM THE WILDERNESS SOCIETY & DARA FOUNDATION



Register NOW at www.npansw.org.au or by calling the NPA office on (02) 9299 0000

www.npansw.org.au and www.grassroutes.org.au