

Plants and Vegetation of Native Grasslands

on Victoria's Northern Plains

The Northern Plains of Victoria, a vast expanse of ancient north-flowing river valleys and flood plains on the margins of the Murray Darling basin, once supported a wide variety of ecosystems: from woodlands and forests, shrublands and wetlands to extensive areas of open plains. These open plains were quickly colonised by early European pastoralists.

Spanning from deep in the temperate zone across central and north eastern Victoria to the semi-arid regions further north, and west between Echuca, Kerang and the northern Wimmera, these grasslands occurred on highly arable and productive soils, that, not surprisingly, were also at the centre of traditional Aboriginal society. In fact, there is considerable evidence that Aboriginal land management over countless generations played a major role in shaping the extent and nature of these grasslands, especially in the most productive temperate zones that are perfectly suited to support trees. Frequent Aboriginal burning not only served to improve navigation between preferred seasonal hunter-gathering grounds, but also provided clans with staple game, vegetables, seeds and other resources.

Following the rapid replacement of Traditional Aboriginal Society with European agriculture and settlement within the first decades of European occupation, these grasslands underwent dramatic change. The introduction of cattle and sheep, cultivation for crops and later extensive irrigation and the cessation of regular burning in many areas resulted in extreme levels of habitat destruction, the widespread invasion of weeds, and the loss of many important native species.

For more information on grassland conservation and how you can help visit: trustfornature.org.au/campaign/plains-wanderers or contact trustfornature.org.au Ph. (03) 8631 5888

Species conservation status
EPBC Act = status under the Federal Environment Protection and Biodiversity Conservation Act 1999

CR = Critically Endangered EN = Endangered VU = Vulnerable NT = Near Threatened

FFG Act = listed as threatened under the Victorian Flora and Fauna Guarantee Act 1988

L = listed N = nominated for listing

DELWP = status on the Advisory List of Rare and Threatened (Plants, Fauna, Invertebrates) in Victoria.

r = rare v = vulnerable e = endangered c = critically endangered k = poorly known in Victoria n = near threatened

Origin * = Not native to Australia

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Williams, Nicholas SG., editor. Marshall, Adrian J., editor. Morgan, John W., editor. (2015). *Land of Sweeping Plains: Managing and restoring the native grasslands of south-eastern Australia*. CSIRO Publishing, Clayton South, Victoria

Credits
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Today's remnants, grassland types and links to other communities

Astonishingly, despite this recent history, remnant grasslands still exist (albeit in modified form) more or less scattered across the Northern Plains, with the biggest and best remaining areas in the drier north and west, mostly west of the Campaspe River. Remnants are typically found on roadsides and railway easements, miscellaneous public land and also on pockets of private land that escaped destructive disturbances like cultivation and over-grazing by stock. Some of these areas, such as Terrick Terrick National Park on the (non-irrigated section of the) Patho Plain (Figure 1) between Echuca and Mitiamo, are examples of ex-farmland recently acquired as reserves in a landscape that only a few decades before supported very few protected areas. Beyond the Patho Plain, other prominent clusters of recently protected grasslands include the Wanderers Plain (Figure 4), a lower rainfall region on the lower Avoca River flood plain between Quambatook and the Kerang Lakes at Bael Bael (Map 1).



Figure 1: The verdant plains, one of the largest remaining areas of least modified semi-arid grassland can be found at Terrick Terrick National Park on the Patho Plain adjoining the low granite ranges once covered in Callitris pine grassy woodland. This reserve is ex-farmland, including some paddocks that have never been cropped, and habitat for numerous threatened plants and animals. Image: Paul Foreman

These semi-arid grasslands are characterised by a mix of cool and warm season perennial tussock grasses such as Wallaby Grass *Rytidosperma* spp., Spear Grasses *Austrostipa* spp. and Spider Grass *Enteropogon acicularis*. The characteristic feature is the mix of perennial (Common Everlasting *Chrysocephalum apiculatum*, Rough Burr-daisy *Calotis scabiosifolia*, and Swainson Peas *Swainsona* spp.) and annual herbs/wildflowers (e.g. Paper Sunray *Rhodanthe corymbiflora*, Australian Carrot *Daucus glochidiatus*, and Small-flower Goodenia *Goodenia pusilliflora*), saltbushes (e.g. *Maireana* spp., *Atriplex* spp., *Chenopodium* spp., and *Sclerolaena* spp.) and sub-shrubs (smaller, partly woody shrubs such as Variable Sida *Sida corrugata*, and Woolly Buttons *Leiocarpa panaetioides*). The best-quality remnants are typically the largest in area, with high species diversity, a less-dominant weed presence and are less vulnerable to changes in biomass throughout the year. If uncultivated, remnant areas can support an abundance of bulbous plants or geophytes such as lilies (*Arthropodium* spp. *Hypoxis/Paurida* spp. *Wurmbea* spp., and *Bulbine* spp.), and the much rarer orchids (*Diuris* spp., *Pterostylis* spp., and *Prasophyllum* spp.)



Fig 2. *Swainsona murrayana* Slender Swainson-pea. Image: Paul Foreman

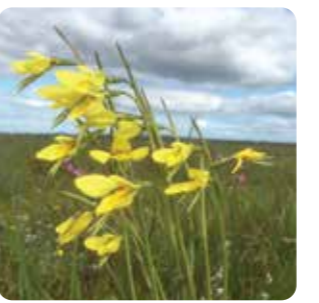


Fig 3. *Diuris protena*, Northern Golden Moths. Image: Paul Foreman

and Yam Daisy *Microseris walteri*. Historic evidence suggests both native and exotic grasses have benefited from a change in disturbances following European occupation. The best remnants have inter-tussock spacing maintained by fire, grazing and drought, leaving room for a greater abundance and variety of wildflower herbs.

It is these largest least-modified, and better-connected remnants that are also the best habitat for keystone and iconic grassland fauna such as Plains-wanderers, Hooded Scaly-foot, Tessellated Gecko and Fat-tailed Dunnarts (see Wildlife of Native Grasslands on Victoria's Northern Plains by Chris Tzaros). Grassland conservation involves balancing the long term habitat needs of all species, both plants and wildlife, which requires careful collaboration between



Figure 4: The Wanderers Plain, extensive remnants of the original treeless vegetation can also be found on the lower Avoca River flood plain just west of the Kerang Lakes at Bael Bael. This image from TfN's Korrack Korrack Grassland is the first of a succession of recent acquisitions of former uncropped farmland that now comprises a network of thousands of hectares of protected land between Bael Bael and Quambatook. This is also semi-arid grassland, but compared to the Patho Plain, and the areas of temperate grassland further south, this region is on the margins of the Mallee and receives even lower rainfall. The image shows the sparser structure of the vegetation, the dominance of saltbushes and other sub-shrubs/shrubs such as Black Cottonbush (*Maireana decalvans*) and Thorny Lawrenzia (*Lawrenzia squamata*). While there is a lot of bare ground between plants, there are also plenty of opportunistic native annuals such as Paper Sunray (*Rhodanthe corymbiflora*), Golden Sunray (*Hyalosperma glutinosum*), and Stiff Cup-flower (*Pogonolepis muelleriana*). Image: Norm Stimson@enviro images

land managers throughout the region and an on-going effort to understand how the ecosystem works, and how it can be protected and restored in the context of social/community values.

In the higher rainfall temperate grassland areas, remnants are especially scarce and mostly restricted to public land where frequent burning is recommended; mimicking traditional Aboriginal burning. The best of these sites are dominated by the summer-active Kangaroo Grass *Themeda triandra* interspersed with perennial wildflowers such as Lemon Beauty-heads *Calocephalus citreous*, Blue Devil Eryngium *ovinum*, Sheep's Burr-daisy *Acacina echinata*, Common Woodruff *Asperula conferta*, Cut-leaf Burr-daisy *Calotis anthemoides*, and Branching Bluebell *Wahlenbergia multicaulis*.

Grasslands intergrade and are inter-dispersed with Seasonal Herbaceous Wetlands (SHW), seasonal or intermittent freshwater wetlands dominated by a range of amphibious herbaceous plants (and some specialised shrubs) and usually few to no trees (Figure 5).

Conservation and threats, and how to help grassland plants and their habitat

These Northern Plains grasslands (both the temperate and semi-arid forms) are listed under Commonwealth and Victorian legislation and are considered one of the country's most significant and threatened ecosystems. Strategic acquisition of the best remaining remnants is critical to mitigate the risk of destruction by ploughing and cropping, especially following ownership change. And increasingly, grasslands are also being protected under conservation covenants that allow continued farming practices consistent with their conservation (i.e. stock grazing tuned to ecosystem ecology and no cropping). Despite the massive changes since European arrival, successful conservation programs in recent decades have shown progress can be made based on persistence, collaboration and science. In the future it is hoped further progress will be possible by marrying the best of Aboriginal and European knowledge systems.

Today, stock continue to be used to maintain plant and wildlife habitat diversity on both private land and reserves, although fire based on traditional Aboriginal burning practices is being revived and adapted as a complementary management strategy in appropriate places. The long overlooked and mostly unburnt temperate grasslands of higher rainfall zones are a good example of where the return of burning will result in fuel reduction, conservation outcomes and the revival of traditional practices on Country).

Without this frequent biomass reduction (via careful stock grazing or burning) remnants are vulnerable to litter build-up, weed invasion and even tree/shrub encroachment.

Protecting remnant native grasslands on the Northern Plains is an ongoing conservation priority. A growing number of landowners/farmers in the region have placed Trust for Nature conservation covenants over native grassland paddocks that they own, to ensure their ongoing protection.

The Northern Plains Conservation Management Network is a community group based on the Northern Plains of Victoria that works in conjunction with Trust for Nature, Parks Victoria and other organisations to help raise awareness of grassland conservation with farmers and the general public, using the Plains-wanderer as the flagship species.

Those not directly managing grasslands can get involved by supporting various organisations, volunteering time and expertise, and, of course spreading the word among the broader community. Everyone has a stake in looking after our unique grasslands.



Figure 5: Seasonal Herbaceous Wetlands (SHW) at TfN's Glassons Grassland dominated by Swamp Billy-buttons (*Craspedia paludicola*) and Drumsticks (*Pycnosorus globosus*) and scattered Broughton Pea (*Swainsona procumbens*). These ephemeral wetlands intergrade with the wetter Grey Soil grasslands which differ in that they only flood intermittently and tend to be dominated by grasses like Rigid Panic (*Walwhalleya prolata*) and Plump Spear-grass (*Austrostipa aristigulumis*) and where typical wetland plants are absent or rare. Image: Damien Cook



Map 1: Geographic extent of Victoria's Northern Plains grasslands showing the two semi-arid grassland hotspots at Patho and Wanderers Plains. (Note: These grasslands aren't endemic to Victoria and extend into the Riverina and south west slopes of NSW where they follow similar biogeographic patterns linked to patterns of climate and land use history and where they are just as threatened.)

Perennial Tussock Grasses (cool & warm season) T/S

Where: T = Temperate, S = semi-arid



Rytidoperma caespitosum Brown-top Wallaby-grass (KN)
Austrostipa gibbosa Spurred Spear-grass (PF)
***Austrostipa aristiglumis** Plump Spear-grass (MC)

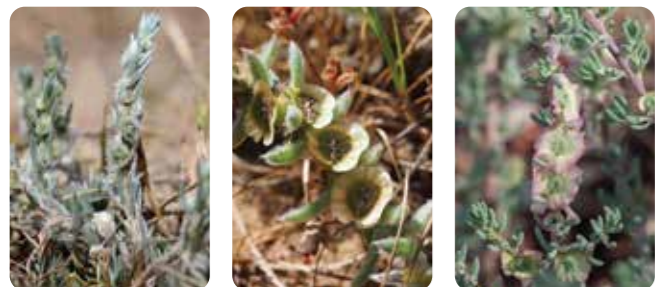


Enteropogon acicularis Spider Grass (LW)
Chloris truncata Windmill Grass (KH)
Walwhalleya prolata Rigid Panic (DF)



Themeda triandra Kangaroo Grass (BD)
Austrostipa scabra var. scabra Rough Spear-grass (KH)
Dicanthium sericeum Queensland Blue Grass (PP)

Perennial Saltbushes (Herbs and sub-shrubs) S



Maireana pentagona Hairy Bluebush (GG)
Maireana excavata Bottle Bluebush (EN)
Maireana decalvans Black Cotton-bush (KN)

Perennial Saltbushes (Herbs and sub-shrubs) S

Where: T = Temperate, S = semi-arid



Atriplex semibaccata Berry Saltbush (TJD)
Sclerolaena diacantha Grey Copperburr (PF)
Enchylaena tomentosa Ruby Saltbush (PF)

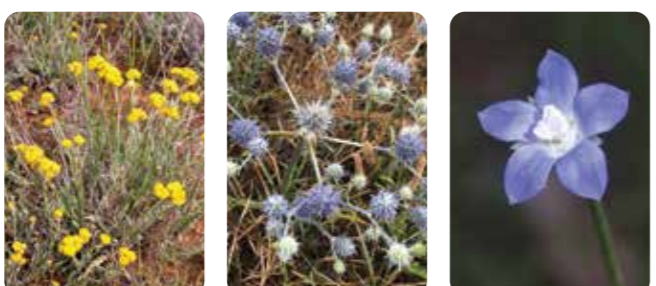


Sclerolaena napiformis Turnip Copperburr, EN, ce, L (PF)
Maireana humillima Dwarf Bluebush (PF)
Maireana cheelii Chariot Wheels, VU, v, L (PF)

Perennial Herbs T/S



Calocephalus citreus Lemon Beauty-heads (PF)
Swainsona procumbens Broughton Pea (PF)
Calotis scabiosifolia Rough Burr-daisy (PF)



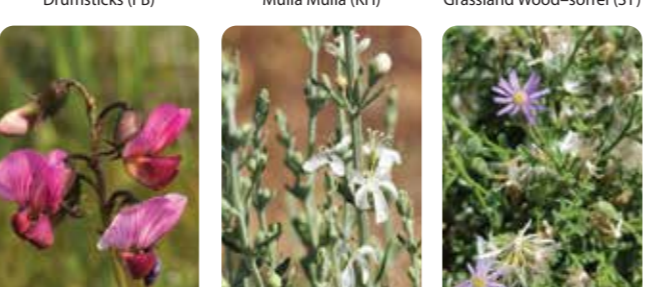
Chrysocephalum apiculatum Plains Everlasting (PF)
Eryngium ovinum Blue Devil (PF)
Wahlenbergia multicaulis Branching Bluebell (RB)

Perennial Herbs T/S

Where: T = Temperate, S = semi-arid



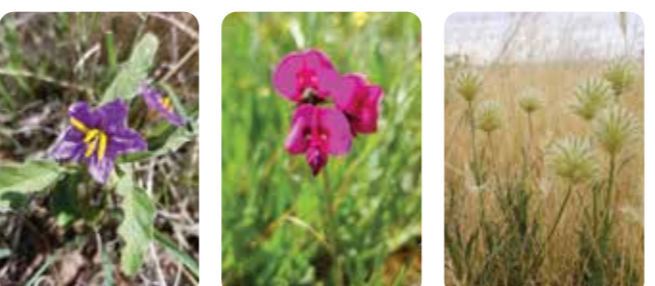
Pycnosorus globosus Drumsticks (FB)
Ptilotus exaltatus Mulla Mulla (KH)
Oxalis perennans Grassland Wood-sorrel (ST)



Swainsona murrayana Slender Swainson-pea, VU, e, L (PF)
Teucrium racemosum Grey Germander (KH)
Vittadinia cuneata Fuzzy New Holland Daisy (DGW)



Swainsona plagiotropis Red Swainson-pea, VU, e, L (EN)
Leptorhynchus squamatus Scaly Buttons (RB)
Convolvulus angustissimus Blushing Bindweed (KH)



Solanum esuriale Quena (KH)
Swainsona sericea Silky Swainson-pea, v, L (KH)
Ptilotus macrocephalus Featherheads (KH)

Perennial Herbs T/S

Where: T = Temperate, S = semi-arid



Asperula conferta Common Woodruff (EN)
Linum marginale Native Flax (MCB)
Vittadinia gracilis Woolly New Holland Daisy (DGW)



Goodenia gracilis Slender Goodenia (CL)
Cressa australis Rossinweed (JM)
Ranunculus lappaceus Australian Buttercup (SF)

Geophytes (Bulbs and tuberous plants) T/S



Bulbine bulbosa Bulbine Lily (PF)
Arthropodium minus Small Vanilla-lily (RR)
Wurmbia dioica Common Early Nancy (CL)



Pauridia glabella var. glabella Tiny Star (KN)
Microseris walteri Yam Daisy, r (PF)
Diuris protena Northern Golden Moths, e, L (PF)

Annual Herbs S

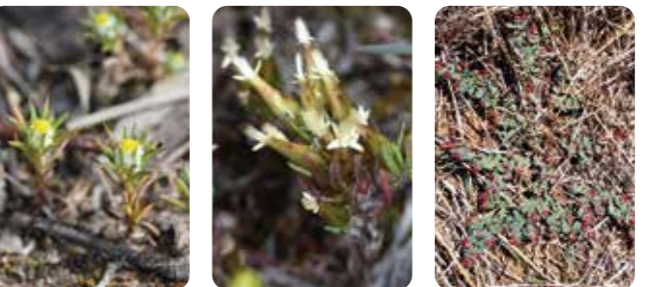
Where: T = Temperate, S = semi-arid



Triptilodiscus pygmaeus Common Sunray (NF)
Goodenia pusilliflora Small-flower Goodenia (AO)
Daucus glochidiatus Australian Carrot (KH)

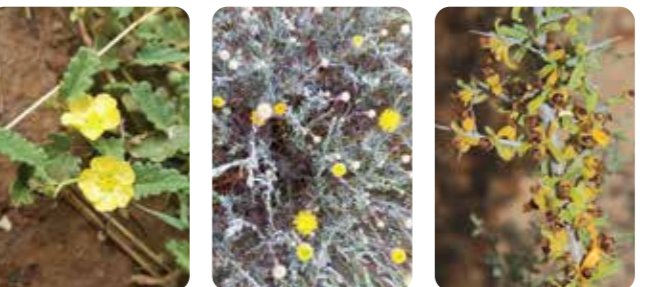


Hyalosperma glutinosum Golden Sunray (KH)
Wahlenbergia gracilentia Annual Bluebell (DGW)
Rhodanthe corymbiflora Paper Sunray (KH)



Pogonolepis muelleriana Stiff Cup-flower (RR)
Rhodanthe pygmaea Pygmy Sunray (RB)
Euphorbia dallachyana Caustic Weed (KH)

Sub-shrubs, Rushes, Sedges T/S



Sida corrugata Variable Sida (AO)
Leiocarpa panaetioides Woolly Buttons (KH)
Lawrenzia squamata Thorny Lawrenzia (RB)

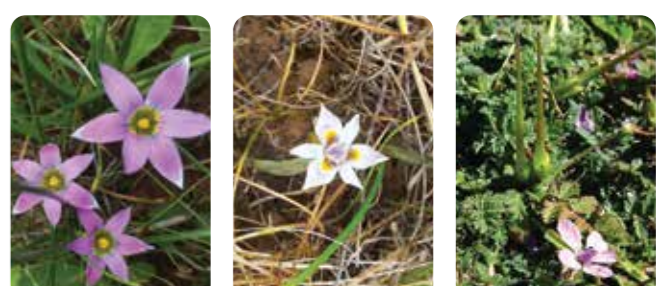
Sub-shrubs, Rushes, Sedges T/S

Where: T = Temperate, S = semi-arid

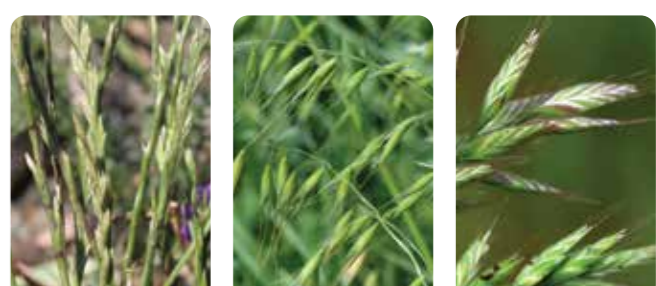


Juncus subsecundus Finger Rush (KS)
Eleocharis acuta Common Spike-sedge (ES)
Lomandra effusa Scented Mat-rush (MD)

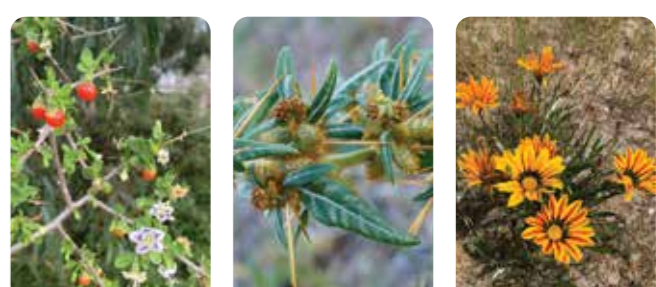
Common Weeds T/S



***Romulea rosea** Onion Grass (PF)
***Moraea setifolia** Thread Iris
***Erodium cicutarium** Common Heron's-bill



***Lolium rigidum** Annual Ryegrass
***Avena fatua** Wild Oats
***Bromus hordeaceus** Soft Brome



***Lycium ferocissimum** African Boxthorn
***Xanthium spinosum** Bathurst Burr
***Gazania linearis** Gazania