Three Chain & Kreeck Roads Native Grasslands Restoration

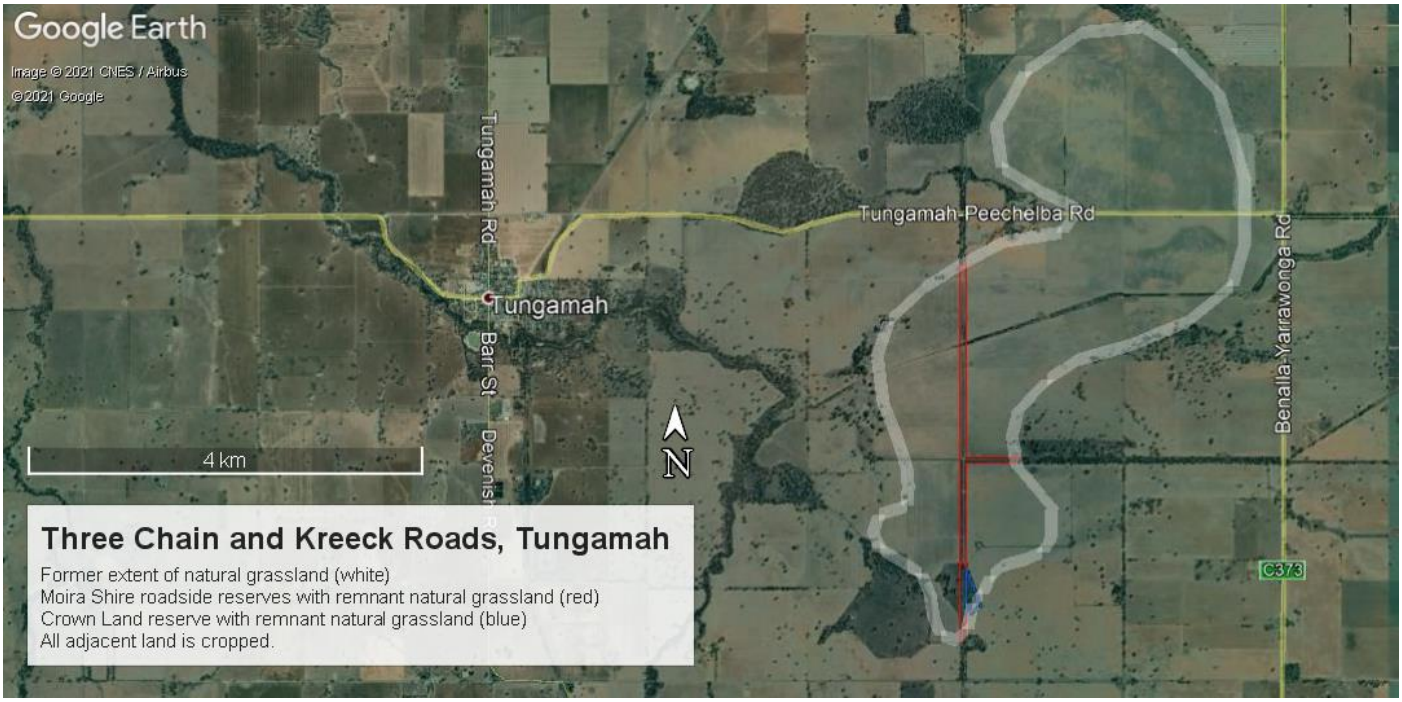
A joint project of Moira Shire, Goulburn Valley Environment Group, Goulburn Broken Catchment Management Authority and the Country Fire Authority

First ecological burn April 7, 2021 A report for Moira Shire Sally Mann April 19, 2021

Where is this place?

Three Chain and Kreeck Roads are east of Tungamah between the Tungamah-Peechelba Rd and Pelleubla Road and between the Boosey Creek and the Benalla Yarrawonga Road. They have wide road reserves (3 chains or about 60 metres wide) with remnant vegetation along most of their lengths.

The natural vegetation of the area prior to European occupation was a mix of grassy woodland, grassland and seasonal swamps and drainage lines. The white outline in the diagram below shows the probable original extent of natural grassland in this area and how these roadsides contain most of the little that is left (red).



Why is it valuable?

Three Chain and Kreeck Roads reserves are now the only remaining areas of native grassland vegetation locally. Other areas of remnant grassland have been identified on Moira Shire road reserves: near Barmah, between Yielima and Beari, south of Nathalia, near Youanmite and more extensively in this area (Cook 1997), but all have declined or been damaged since then.

Three Chain and Kreeck Roads grasslands have also declined and been damaged, but they remain the largest and best example of Natural Grasslands of the Murray Valley Plains (Listed as *Critically Endangered,* EPBC Act 1999) in Moira Shire.

As far as we know, there are more threatened plants on these roadsides than at any other grassland or grassy woodland site in the eastern Northern Plains– including in conservation reserves.

They include:

- Plains Leek Orchid, Grey Billy-Buttons and Emu Foot which are *Endangered;*
- Yellow Tongue Daisy, Inland Daisy, Long Eryngium, Swamp Star and Pepper Grass which are *Vulnerable*;
- Smooth Minuria, Small Water-Ribbons and Rye Beetle-Grass which are *Rare*;
- and Buloke which is a Flora and Fauna Guarantee Listed species due to its rapid decline across Victoria.

Species that are not threatened elsewhere in Victoria but are rare in the eastern Northern Plains include:
Golden Moths, Yam Daisy, Plover Daisy, Lobe-seeded Daisy, Golden Billy-buttons, Lamb's Tails, Leafy Templetonia, Rough Burr-daisy and Swollen Spear-grass.

What are the threats?

Some of these endangered plants have not been seen in recent years. The reasons for this are complex, but broadly it's because the natives are being outcompeted by weeds.

Weeds were introduced by the grazing of stock on adjacent land and the associated cultivation, fertilising and sowing down of improved pasture. Stock were occasionally grazed on these roadsides until fairly recently. While hoof damage, the wind and their droppings allowed weeds to establish on the roadsides, the stock also ate the weeds, keeping the vegetation sparse and allowing the natives to persist. Over the last 20 years or so, crops have replaced pasture and there are no local stock so the weeds have not been reduced by grazing.

Most of the weeds are annuals such as Bearded Oat, Wimmera Ryegrass, Ox Tongue and Paterson's Curse. All of the native plants are perennials. As a broad generalisation, perennials produce few seeds, are reluctant to germinate and slow to grow, whereas annuals seed abundantly, germinate readily and grow rapidly. Native perennials don't need many nutrients, grow steadily and persist for many years, but can be starved of moisture during the growth spurt of the annuals. This often prevents flowering and sometimes kills natives in dry years.

The abundant growth of annuals can smother smaller natives and the litter that accumulates can prevent the soil-seed contact necessary for native seeds to germinate whilst providing nutrients for a new generation of shallow-rooted annual weeds. Bulky annuals and a thick litter layer can also harbor mildews and pests such as Red-legged Earth-mite and cut worms which can decimate native plants.

Perennial weeds are also a problem. Onion Grass, also introduced by stock, gets thicker when it is not grazed or burnt and gradually excludes natives. Phalaris, Paspalum and Couch grass might have come with stock too, but the

Phalaris is concentrated where drains have been constructed and the Couch Grass and Paspalum are concentrated along the edges of the roads and paddock entrances. Road and drain maintenance, the introduction of road-making material and damage from vehicles will continue to spread weeds.

As well as weeds taking moisture, the site is now drier because an extensive system of drains removes surface water that would have once filled the swamps and the gilgais and replenished sub-soil moisture. The site is also drier due to global warming which is reducing winter rainfall and increasing evaporation. We can't block the drains or stop global warming, but we can work to reduce weeds to ensure that the natives can utilise all the moisture that is available.

Why burn the grassland?

The main reason to burn is to reduce annual weeds by killing both live plants and the seed on the soil surface.
A burn can also:

- reduce further weed invasion by removing the litter and its store of nutrients;
- reduce pests by removing food plants, litter, and destroying eggs and larvae;
- enhance germination of native species by providing heat to crack seed coats, smoke to break dormancy and bare soil to allow establishment and
- make control of perennial weeds much easier because with lots of bare ground after the burn and vigorous re-growth, weeds are easy to see and there is much less off-target herbicide damage.

Burning grasslands also greatly reduces fuel loads and wildfire intensity by removing litter and standing dead weeds (Bull 2011). Managed native grassland vegetation can act as a break in fast-travelling grassland fires.

When to burn?

Two opportunities are available.

1. At the end of the fire restrictions in April.

Ideally the winter-growing annual weeds have germinated but there is sufficient dry biomass to carry the burn. If there has been rain during the summer, there will also be green native vegetation. Some soil moisture is preferable to avoid damaging soil life however open cracks should still be available so that small animals can escape the flames. The right timing will produce a fire that moves at moderate speed and removes all dead material but does not damage the growing tips of native grasses. The soil should be cool to touch as soon as the flames pass.

At this time, most croppers have burnt their stubble but not yet sown crops. Access to paddocks is possible so a more complete area can be burnt and the risk of escape is minimal.

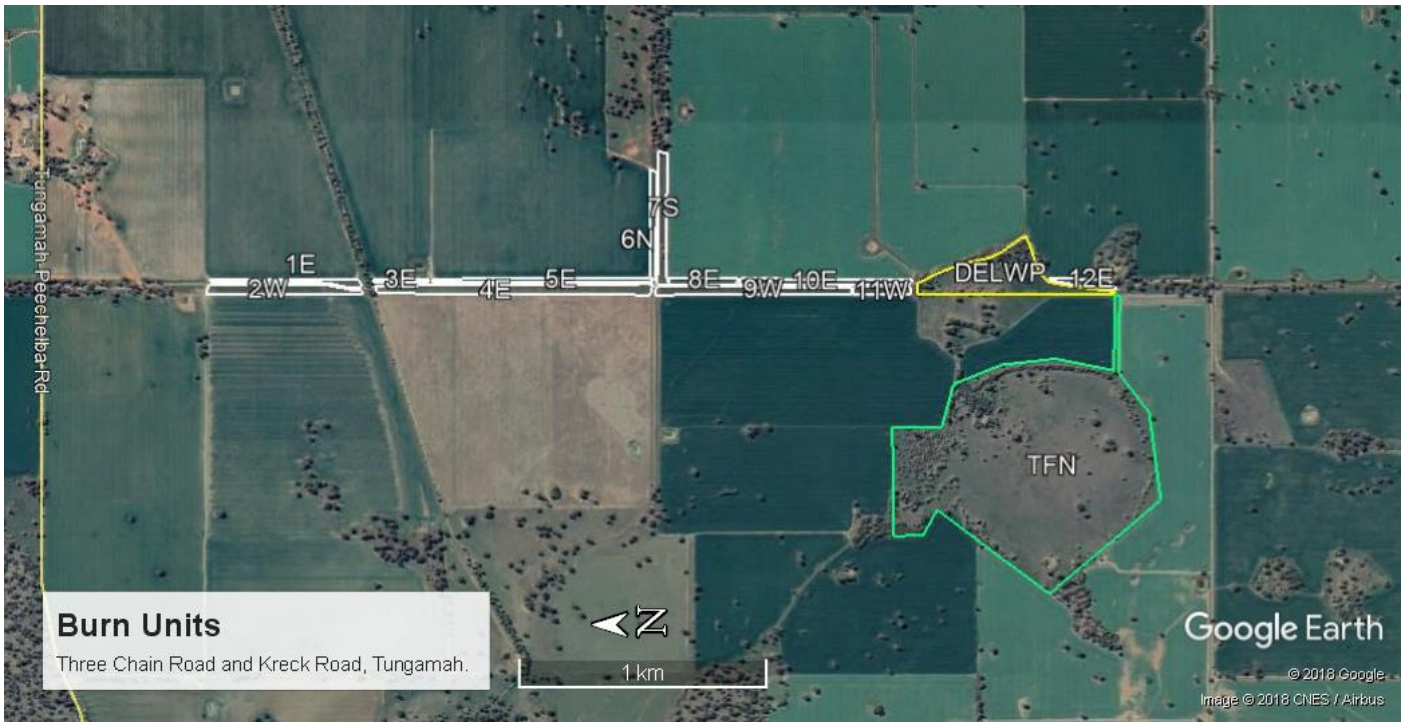
2. In October or November when annual grasses are starting to hay off.

An advantage of burning at this time is that weed seed can be destroyed before it falls to the ground. However, it can be hard to find a time when the mostly green vegetation will burn without the fire being hard to control. At this time also, many natives are flowering, there are usually no cracks in the soil and there are usually crops of similar flammability in adjacent paddocks.

Where did we burn?

Only about a third of the total grassland area was burnt. The roadsides were divided into burn units: sections of roadside divided by farmers' paddock entry roads that could be burnt separately. On this occassion, units 8 & 10 on the east side and units 9 & 11 on the west side were burnt. Unit 10 was previously assessed as being of relatively low quality, units 8 & 11 are of medium quality and unit 9 is of high quality.

We expect there will be different responses to the burn in areas of different vegetation quality.



Who conducted the burn?

This burn was conducted by the Tungamah and St. James volunteer fire brigades, largely as a training exercise for newer members.

The burn was planned and overseen by Mitch Emmett, CFA Native Vegetation Management Officer, who chose the date and time, measured the conditions, planned the burn accordingly and directed the volunteers. Mitch also took responsibility for contacting local landholders and placing road traffic warning signs.

Moira Shire Council supported the principle of a controlled burn on the roadsides for conservation purposes. A 'Works within Municipal Road Reserve' permit and landholder details were provided to the CFA in accordance with Division 1 section 20 of the CFA ACT 1958.

Moira Shire are grateful for the work undertaken by the CFA and its volunteers as it will enhance the conservation values of the roadside, reduce fuel loads and help address landholder concerns.

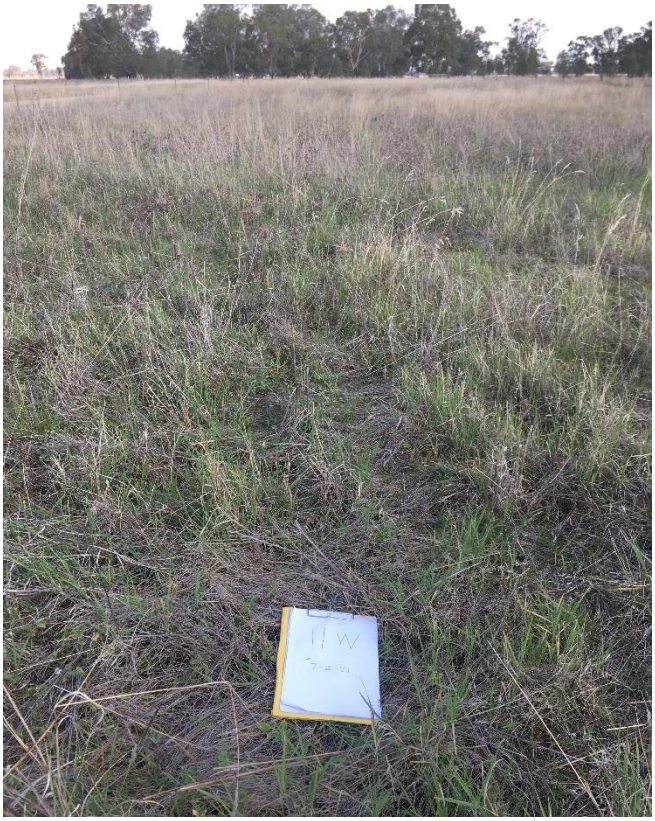
How did the burn go?

The west side of the road was burnt first, starting at about 5:30 pm. The result was perfect: all the litter and vegetation burnt, except for the stems of the more robust native grasses and herbs. Very few weed seeds that had survived the fire could be found on the soil surface.

Then the east side of the road was burnt. This burn was less thorough (but still good) because the wind had dropped and humidity had increased. A patch close to the boundary fence at the south end could not be made to burn as it had too little fuel: it had been sprayed out previously and was mostly bare ground with the annual grassy weed Witch Grass (Panicum capillare).

Burn unit 8 *on the west side is medium quality with a mix of annual grasses and native grasses. Most of the green growth in the photo is summer-growing native grasses.*

Burn unit 9 *on the west side is high quality with a mix of native grasses and herbs. Most of the green growth in the photo is native grasses and herbs such as Cut-leaf Burr-daisy and Common Everlasting.*



Burn unit 10 *on the east side is low quality with a high component of annual grasses. Witch Grass is still green from early autumn rain and Bearded Oat seedlings are already 5 to 15 cm high.*

Burn unit 11 *on the west side is medium quality with a mix of annual grasses and native grasses. Most of the green growth in the photo is summer-growing native grasses.*

CFA volunteers about to commence the burn.

Back burning from the road in burn unit 10. Vehicles could drive in paddocks for damping out fences because they were empty of crops.

Unit 9 at the end of the burn. A complete burn of all vegetation would have been ideal because there would be no weed seed to blow back into the grassland, but the road verge had insufficient dry matter to carry a fire.

Annual weeds were completely burnt whether dry or green.

Litter was completely burnt and very few weed seeds were found on the soil surface.

Native grasses lost their leaves and stems were scorched but the plants were not killed.

This Berry Saltbush was partly scorched (right-hand side) and partly unburnt (left hand side).

What happens next?

We will watch to see how the vegetation responds over the growing season. As winter-growing perennial weeds such as Phalaris, Hawkbit and Flatweed re-grow we will spot-spray them. We expect that annual weeds will be reduced by burning and won't treat them, although any Paterson's Curse seedlings that appear will be sprayed too.

Thirty monitoring sites have been set up to measure how the vegetation changes in response to burning (and weed treatment) over the longer term. This will help with decision-making for when to burn.
We hope to burn the rest of the grassland areas in coming years and to regularly burn this vegetation to maintain its healthy condition into the future. Future burns and weed control will be adjusted in response to the findings.

This work will be secured by a barrier to prevent further vehicle damage and signage that explains the importance of the grasslands. We hope to complete this work in the second half of 2021.

Goulburn Valley Environment Group have applied for a Biodiversity On-ground Action Grant (effective July 1st 2021) to fund weed work in the burnt area and to hold a field day to explain the importance of the site and why burning is a valuable management tool for native grassy vegetation.

References

Cook, D., 1997. *Roadside Survey of Native Grasslands in Moira Shire*. Unpublished report, Moira Shire.

Bull, H., 2011. *CFA Fire Ecology Guide to Environmentally Sustainable Bushfire Management in Victoria*, Country Fire Authority Victoria.

Robinson, D., 1998. Priorities for Nature Conservation Reservation and Management in the Eastern Northern plains of Victoria, Goulburn Valley Environment Group.