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Post bushfire observations at the Clarence Environment Centre's project sites, Shannon Creek – Chambigne Nature Reserve

Background

For the past 3 years, the Clarence Environment Centre (CEC) has been undertaking weed eradication and monitoring activities at three sites under the Saving our Species program for the endangered *Phyllanthus microcladus*. They are located about 20km south west of Grafton at Endless, and Shannon Creeks, both on Clarence Valley Council owned land, and at Deep Creek, in the Chambigne Nature Reserve.

Surveys undertaken by CEC during that period have also mapped a significant number of additional sub-populations of *Phyllanthus* in the same general area.

Drought conditions

The Clarence Valley, like much of NSW has been suffering from severe drought. Rainfall measured at Shannondale, which adjoins the Clarence Valley Council property shows that less than half the average rainfall has fallen in 2019 to the end of November. That's just 391mm which, coupled with record high temperatures for much of the past two years has left the bushland severely stressed.

The average annual rainfall measured over the past 40 years at Shannondale is 1,035mm, and the severity of the drought has been compounded by the fact that at the same time the previous year, just 613mm had fallen. (Note, 2018 rainfall ended up just a little below average thanks to over 370mm of rain recorded during 1 week in December, over 300mm of it in one 8 hour period. This deluge caused massive flash flooding and erosion, and most of the water was 'run-off' and had little impact on the drought at that time.)

As a result, when strong westerly winds blew up on 23rd August 2019, the entire tinder dry north coast of NSW lit up, sparking a bushfire catastrophe of unprecedented proportions. That emergency is still raging as we move into Summer and 2020, with no reprieve in sight.

The first fire to impact the area (23rd August), burned the northern third of "Rockview" and the southern half of the latest acquisition of the Chambigne Nature Reserve, burning through a number of Dry Rainforest remnants, including a number containing the *Phyllanthus microcladus*.

The second fire, the Liberation Trail fire, was huge. Starting in the upper Mann River in the Glen Innes LGA on around the 11th November, it destroyed some 50 homes and a school in the Waitalaba village. A day later, it consumed another 50 homes in the Nymboida area, and for the next 2 days threatened the Shannondale rural community, adjoining the Council's property to the north east, and the village of Coutts Crossing. Over the next 2 days the entire balance of Council's 2000 hectare property was reduced to ashes

On-ground observations

The image at right was taken in Dry Sclerophyll forest on Council's "Rockview" property 100 days after the first fire. Note the relatively unscathed nature of the canopy at this point, suggesting the fire possibly moved through the area at night which, in winter, would have seen relatively low temperatures.

However, nothing at ground level was spared, and the drought conditions were such that, 100 days after burning, not a blade of grass or herb growth is visible in the blackened landscape.

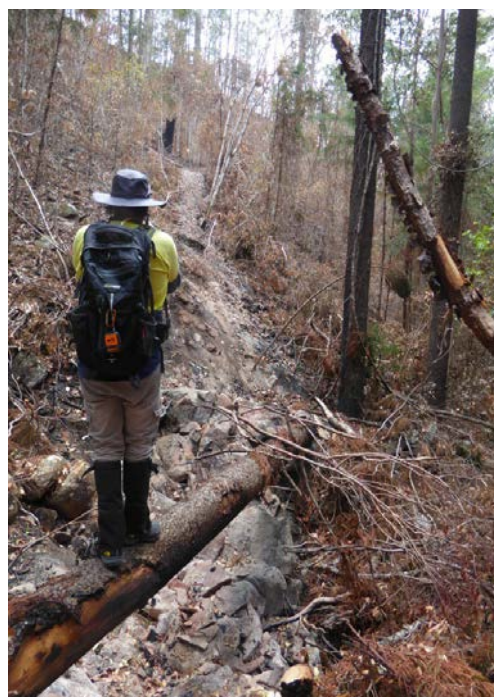


The following photographs were taken on a very steep slope above a deep gully at Shannon Creek, containing Dry Rainforest and the site of one of the managed *Phyllanthus* populations.



As can be seen by the trail of ash up-slope of the log in the left hand image, this 45cm diameter tree has smouldered for some time before burning itself out. The upper section of the log is lying in the rainforest gully to the right of frame in the right hand image.

The remarkable thing about this is the fact that the log was a living healthy tree, a Spotted Gum which should have survived the fire with its crown, like others around it, unscathed. Instead, the bud laden branches are now lying in the gully. It is possible that the tree had butt damage which allowed the fire to take hold, but it's impossible to say since the base of the tree was burned into the ground. However, there was no "pipe", a common condition of trees on these low fertility soils, or trunk damage, just healthy living tissue, so I can only assume the moisture content of the trunk was so low, as a result of the drought, that the fire was still able to consume it, even in winter.



That was not an isolated occurrence, many smaller trees suffered the same fate, but also one giant Steel Box, measuring over 1 metre diameter (see trail of ash in image above). Again it is possible the trunk was partially dead. However, branches lying unburned in the gully, still had leaves attached indicating that at least some of the tree contained living tissue, all of which burned.

Impacts to *Phyllanthus microcladus* at Saving our Species management sites Shannon Creek managed site

The 2 dry rainforest gullies at Shannon Creek contain several threatened flora species, as well as *Phyllanthus microcladus* (Bush Sauropus) which is currently a Saving our Species managed site.

We are pleased to report that, while the fire has 'trickled' all the way down through the rainforest into the gully, particularly along the upper reaches, that most of the *Phyllanthus* plants appear to have survived relatively unscathed. This is because the species mainly occurs along the rock-strewn floor of the gully, and denser rainforest areas where the fire hasn't burned. However, damage to the rainforest itself has been significant, with time telling the full extent and long term impacts.

Of course it has been speculated that the reason why it only occurs in those fire-protected areas is because it has no tolerance to fire. Therefore, we have tagged a number of plants that have been burned, in order to observe whether they do recover.

However, the canopy has been significantly thinned through a combination of falling trees, and the drought which has resulted in massive leaf fall, so the resulting increase in exposure to sunlight and summer heat during the coming months will no doubt tell the final story.



The above image shows a fortuitously un-burned slope on the left while the right hand bank has seen ground cover and shrub layer burned all the way to the gully floor. However, with canopy thinning and a hot dry summer is forecast, the final outcome will only be known when the drought finally breaks.

Deep Creek managed site

I am pleased to report that, thanks to some remarkable effort by fire-fighters using 'rake-hoes', and the use of aerial application of fire retardant, fire was successfully kept out of the highly vulnerable sandstone outcrop known as Chambigne Nature Reserve west, and in doing so managed to keep the fire out of the Deep Creek managed site.

At the same time, most of the Deep Creek West Dry Rainforest has also been spared from burning, with fire only getting into the upper gullies. So at this stage there appears to be no losses of *Phyllanthus microcladus* within the Deep Creek catchment.

Endless Creek managed sites

Regrettably, the Endless Creek site has suffered badly, with almost all subpopulations burned. I have tagged numerous burned, seemingly dead, plants with plans to monitor those into the future to see if there is any recovery (see image at right and below right).

I did observe a small number of surviving *Phyllanthus* at the Deep Creek monitoring site, which is surprising given the fire burned right through it (see image below).



Again the recovery, or otherwise, of plants after burning will be part of the coming year's monitoring program, along with any regeneration from seed (assuming funding is continued, something that is yet to be confirmed).

The Dry rainforest at Deep Creek has been badly impacted by the fire, with many Hoop Pines, particularly younger (shorter) trees burned to a point where they will likely not recover.

A specimen of the endangered vine, *Cynanchum elegans*, has also likely been lost with its site impacted by a hot fire.

The ground in the images is brown, rather than the expected black following a bushfire. That is because of the enormous leaf fall from the Hoop Pines following the fire. In fact so thick is that mat that another fire could run through the site today.



A thick layer of Hoop Pine leaves lying on the ground, and standing pines and other rainforest trees and shrubs, covered in dead foliage, pose a real fire hazard, with logs still smouldering three weeks after the fire.



General comments

All of these bushfires proved to be unstoppable, a situation across our project areas made worse by the fact that the overwhelmed Rural Fire Service had to prioritise asset protection. With few homes in the area, and none inhabited, the fires were allowed to burn virtually unattended.



Habitat trees have been the big loser, with conditions so dry that anything with a damaged trunk or dead branch is likely to catch fire and then, like the threatened Square-fruited Ironbark on the left, burned from the top down.

Even trees in open paddocks with heavily grazed surrounds like the ancient Red Gum below, were not immune to the flames



Again and again I came across living trees that had been felled and the fire has continued to burn the moist living timber, such are the current drought conditions. As can be seen by the trail of ash in the image below, the fire has taken hold of a seemingly healthy Spotted Gum, burned through the base and then continued to burn out the roots underground and burn its way along the trunk

This 45cm diameter tree has smouldered for some time before burning itself out, possibly after a small shower of rain that fell in the area a week or so after the fire. The dead foliage still attached to the branches are evidence that the tree was living and seemingly healthy



It is possible that the tree had butt damage which allowed the fire to take hold in the first instance, but that's impossible to say since the base of the tree was burned along the roots into the ground.



Devastation is everywhere, and hollow dependent fauna are the big losers

There was no "pipe", a common condition of trees on these low fertility soils, or trunk damage, just healthy living tissue, so I can only assume the moisture content of the trunk was so low, as a result of the drought, that the fire was still able to consume it, even before the heat of summer.

This would appear to be an appropriate juncture to mention fire frequency, and the uninformed commentary from certain sections of the community who blame the fires on the National Parks service for not burning enough of the Parks' estate.

Legend

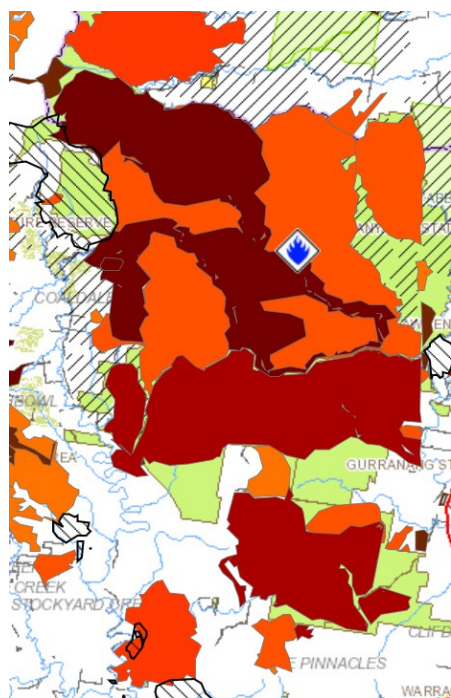
- Nature Reserve
- CVC Property Boundary
- 2016 Fire
- 2014 Fire
- 2013 Fire
- 2011 Fire
- 2010 Fire
- 2008 Fires
- 2006 Fires
- 2002 Fires
- Watercourse

0 2.5 kilometres

The map displays the CVC Property Boundary and various fire events from 1999 to 2016. The legend identifies the following categories:

- Nature Reserve:** Indicated by a green hatched pattern.
- CVC Property Boundary:** Indicated by a red line.
- Fire Events:**
 - 2016 Fire:** Grey hatched pattern.
 - 2014 Fire:** Red hatched pattern.
 - 2013 Fire:** Green hatched pattern.
 - 2011 Fire:** Yellow hatched pattern.
 - 2010 Fire:** Pink hatched pattern.
 - 2008 Fires:** Yellow hatched pattern.
 - 2006 Fires:** Red hatched pattern.
 - 2002 Fires:** Blue hatched pattern.
- Watercourse:** Indicated by a blue line.

The map shows several fire events, with labels indicating the year or years of occurrence. For example, a large pink area is labeled '2010 & 2014', and a large grey area is labeled '2016'. A scale bar indicates distances up to 2.5 kilometres.



forest structures and making them more flammable.

It is significant to note that not one of those fires originated on either of the two said properties, all having ignition points on neighbouring properties or beyond.

This is a pattern occurring throughout the Clarence Valley, with Yuraygir National Park; Fortis Creek-Banyabba reserves (see map at left); Nymboida - Ramornie National Parks; Sherwood, Koukandowie and Tallawudja Nature Reserve, and other parks across the region, all being regularly burned out by arsonists, or fire escaping from neighbouring properties.

My own observations concur with a plethora of scientific research which concludes that continuous burning is changing

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