

## **Background**

While I was not impacted by the recent Queensland bush fires my interest in submitting to this enquiry is driven by my long standing interest in nature, natural processes and their cycles as well as my dismay at the apparent lack of understanding of these issues by governments and advisors.

After growing up on a large north Queensland cattle property, I completed my education with a degree in Rural Science from the University of New England in 1965. That four years of study provided me with a slightly different approach to extensive livestock production and to the interpretation of the various environmental issues encountered on the land. I have since spent over fifty years involved with extensive grazing enterprises in three different environmental regions.

There have long been claims that increasingly severe fires are a result of climate change. Certainly, hotter and drier summers contribute to the creation of conditions that will support hot fires, but there have been numerous other changes since European settlement commenced in Australia 230 years ago.

In order to examine the impact of climate change on the severity of fires, we really need to consider the impact of all changes that have taken place in land and vegetation management since that time. After the introduction of sheep and cattle into Australia's pasture lands, there has undoubtedly been a reduction in the frequency of fires. There are numerous accounts of the early settlers taking measures to control fires.

## **Past and current practices**

Bush fires started by lightning, particularly in grasslands, are a natural feature of Australia and it has a long history of bush fires. It is known that aboriginals used fire to flush out game and systematically burned selected areas of grassland and forest annually in order to concentrate game and assist in hunting. These early Australians knew that burning at certain times of the year (particularly after rain and during the autumn) would result in a cool fire that would provide attractive fodder for marsupials and birds later in that year, concentrating the game into smaller areas. They did not want to see an extensive fire as that would spread game out over a larger area. Each burn acted as a fire break for the following year, meaning that such fires did not often burn extensive areas of vegetation as they were hemmed in by earlier, but relatively recent burns.

While this pattern of burning undoubtedly impacted on the species mix across Australia, we can be confident that fire was no newcomer to Australia's landscape as species of Eucalyptus are present in every corner of Australia and Tasmania. Further, there is very strong evidence that Eucalypts evolved over many years in the company of regular fires, which led to the development of a survival trait in the form of a nutrient store, known as a ligno-tuber, in the base of the tree just below ground level. This energy store facilitates recovery of trees after fire and is a distinguishing trait of the genus Eucalyptus.

As a child assisting with mustering in the 1950s and the big wet seasons of those years, I recall my father and the head stockman always having boxes of wax matches in their saddle bags during the first horseback muster of the year in

April/May/June, and taking the opportunity to burn off patches of old grass whilst searching for additional cattle to add to the mob.

While the resulting small fires produced copious amounts of smoke, they burned slowly because of the moisture still in the grass at that time of the year. This patchwork burning paid dividends later in the year when summer fires often started adjacent to a public road to the east. Whilst the practice of early burns continued it was only in the less accessible parts of the property that bush fires often became a problem. Another period used for deliberate burning was after early storms had heralded an approaching wet season and started grasses growing again. This activity carried some risk as at times a December fire could lead to the loss of pasture that was not intended.

Consequently, my early fire education focused on the use of fire as a tool for the prevention of severe fires. When severe fires did develop, control focused on containing fires along breaks, which could be on public or property roads, creeks and rivers or areas of sparse grass which allowed more effective use of hand beaters. Modern pumping equipment and water tankers were not available to the rural fire fighters on the relatively inaccessible properties in that era.

On relocating to a property in the Winton district in 1973, I made myself familiar with fire prevention and control practices in that area. Despite the properties being well organized in local Rural Fire Brigades it became obvious that in conditions of high wind the only practical method of halting a fire's progress was to burn back from a man-made break or to have wide breaks formed by winter burning of the grass between two parallel graded strips 20 to 50 metres apart. This way, properties were protected from being totally burned out in the event of a bad fire.

In the late nineteenth century a large proportion of Australia's population lived or worked in rural areas, thereby becoming very familiar with nature and its variability and with having to adjust their lives to fit in with floods, fires, cyclones, droughts, extreme temperatures etc. One hundred plus years later such a large proportion of our population lives in the cities and spends much of its time there that people, whilst still aiming to be nature lovers, don't really understand it. Nature can be very harsh and brutal and when we interfere with it, such as we certainly do when we have fire brigades at the ready to rush to extinguish every small blaze started close to an inhabited area, thus ensuring the gradual build up of fuel in bushland adjacent to populated areas. If hazard reduction burning is not carried out from time to time, this can be a 'time bomb' of a large uncontrollable blaze being set.

The impact of such fires is now very severe because many of Australia's burgeoning population wish to reside in lifestyle areas, living "closer to nature". So many of these people do not understand the danger of bush fires, nor of the heat generated. Fires, as I have pointed out, occurred in the past, but when the population was much lower in these areas now being settled, fires often went without notice.

Government bodies are often under-resourced and while politicians like to announce the acquisition of new National Parks and reserves, they often miscalculate or ignore the cost of properly managing those new acquisitions. If they are under-resourced, it is not surprising that the staff are reluctant to carry out hazard reduction burns.

### **Factors that contribute to fire risk**

Several factors come into play in determining the heat and temperature experienced in a bush fire, including:

**a) volume of fuel;**

A feature of many Eucalypts is that their leaves have a short lifespan. The trees are not deciduous, but their leaves are often subject to insect attack such that the plant continually replaces leaf cover, the damaged and old leaves falling to the forest floor. Some species shed their bark annually, as well. Together, along with the refuse of storm damage, these can produce a large volume of combustible material on the ground beneath the tree unless it is periodically removed. The lower fire frequency, in turn, has led to a longer time period for a build up in the mass of flammable fuel in those environments, creating a natural fire hazard waiting to be triggered by conditions of hot weather and high winds.

**b) nature of that fuel;**

A number of common native Australian species (notably Eucalypts, and Tea tree) contain high levels of vegetable oils in their leaves and these high energy oils are readily combustible, producing considerably more heat than does cellulose, lignin and other plant tissue on burning.

**c) supply of oxygen;**

High winds provide the other main ingredient – oxygen -- necessary to produce a very hot fire. Under conditions of high winds, large amounts of oxygen are forced into the burning fuel, creating conditions akin to a blast furnace. When the heat from the ground fire attains a certain temperature it can vapourise the eucalyptus and other vegetable oils and resins present in the litter on the ground as well as in leaf matter growing above on the trees, producing extreme heat and creating a fire rushing through the tree-tops ahead of and igniting the ground fire as it progresses.

**d) relative humidity at the time;**

Drought and summer heat produce conditions of low relative humidity and from a practical point of view this is when fires are most dangerous and difficult to extinguish, especially if other conditions such as high winds exist.

Obviously, fires behave differently under different conditions. e.g. 1) a fire burning up a well-grassed hill will travel very quickly, even in the absence of significant wind and 2) grass fires on the open Mitchell grass downs tend to create their own breeze such that their speed and direction of travel can be quite surprising and unpredictable.

An important consideration for the construction of effective breaks is their width and that should reflect the type, height and density of vegetation adjacent to the break. Unfortunately, in many cases this decision has been removed from the landholder and is now prescribed by a totally impractical vegetation management act. The primary governmental consideration now appears to be that of minimizing the width of breaks in order to limit the quantity of native vegetation cleared in their construction, rather than creating a barrier to fire spread and resulting devastation.

### **Economic Impact of Vegetation and Land management policies**

In the past one hundred and fifty years, as pastoralists established artificial waters such as dams and later, artesian bores to extend the grazing range for their livestock, the marsupial population increased dramatically because of the increase in availability of food and water.

This resulted in an increased stocking pressure on grazing land and forested areas alike and hence a lower frequency of fires in any given area of land. Fewer fires led to a gradual thickening up of native vegetation, because almost all species, particularly Eucalypts and Acacia, are vulnerable to fire when young and it is obvious that under the changed grazing regime more of those young trees are growing out to be mature trees. Grass cover becomes a casualty as shallow-rooted, young trees and grass compete for moisture.

Thickening is evident in most areas of Queensland today and does not require a series of expensive research projects to uncover its existence as it is clearly obvious just driving along many highways across northern and eastern Queensland, in particular, evidenced by the abnormally high number of young trees in the adjacent plant communities. [See Image 1 as an example]

It was particularly interesting observing news footage of the recent central Queensland fires where the smouldering remains of state forest and adjacent grazing leases were dominated by young trees. This is clearly indicated by the stem diameter of the trees present in those ecosystems.

Two properties of which I was a part owner for a period of time, Mulgrave Station, Barcaldine and Cathedral, Winton both suffered from Gidgee (*Acacia cambagei*) incursion on the grazing lands. At Mulgrave, we were able to pull approximately 8,000 ha of this land before a halt was called to pulling by Queensland's Beattie government in 1999/2000 on the pretext that the practice was contributing to 'climate change'.

This is a specious argument and in fact, it could be strongly argued that the pulling of standing timber can be a positive for combatting climate change as the fallen timber becomes a carbon store and mechanism for the recycling of carbon back into the ecosystem through the decaying pulled timber on the ground, taken into the soil over time by natural processes including the activity of termites. Fifty years ago the pulling of scrub was often followed by burning of the fallen trees to facilitate access and mustering. Today helicopter mustering obviates the need to burn allowing maximum benefit to the land from the process of pulling.

The pulling of the land on Mulgrave accompanied by aerial seeding of pasture species transformed a useless scrub into productive pasture, capable in a reasonable season, of fattening cattle to a high quality carcass or producing a very good clip of wool.

The Queensland Government's very restrictive vegetation management laws were in effect when my family purchased Cathedral in 2005 and we have suffered since from the encroaching Gidgee. The property has probably lost 5% productive capacity per

year since we purchased it and can do little about this steady decline because of the restrictions placed on treating thickening and incursion, making it an uneconomic proposition, bearing in mind the value of the land before and after, given the prospect of drought and probable time before a return on capital.

The most cost effective method of thinning/clearing is with two tractors and a heavy chain, but there is a blanket ban on this method. Further, it becomes totally impractical if selected trees need to be saved simply because they are older than some arbitrary age arrived at by the bureaucrats. Under the earlier legislation, designated strips left uncleared, as was the previous requirement, created shade lines and wildlife corridors to help preserve habitat.

Another economic downside of the Veg. Management Laws is that they have shut down the rural industry in country towns that was managing the vegetation thickening – quite a significant loss to small towns that do not offer a lot of employment opportunities.

## **Actions**

Because of the threat to life and property, governments cannot continue to allow settlement in fire-prone areas and then not take steps to manage the thickening vegetation and heavier fuel loads that develop. If rigorous and focused prevention plans are adopted and followed rather than reacting when fire is on the doorstep, residents in such areas will live much safer lives at a much lower cost to the community and governments.

Vegetation Management legislation should be based on reputable science, rather than on green-group ideology and advocacy. There is no doubt that native vegetation has been thickening across Australia for well over one hundred years as a result of pastoral practices. Instead of preventing landholders from taking remedial action, government legislation should be aimed at encouraging and facilitating such.

## Prevention

- Increased resourcing of Queensland Parks and Wildlife Service and other government bodies responsible for land management.
- The construction and maintenance of effective fire breaks on government land. The breaks should be of a width and design that prevents fires from igniting across that break. [It may be necessary in certain circumstances to allow extra wide breaks or a break bordered by a 200m strip of thinned and slashed vegetation, for example].
- Allow private land holders to construct the breaks and to take the fire prevention measures they consider necessary and can justify.
- Engage in regular hazard reduction burning necessary to protect given parcels of land.
- Develop and implement hazard reduction programs for the various parcels of land managed by government that **must** be followed each year. Obviously, programs will need to be modified annually to be appropriate to variable climatic conditions and fuel loads from year to year.
- Forested areas adjacent to populated zones should be carefully monitored and remedial action taken as necessary.

## Images



Image1: Thicketing near Pentland Qld from Flinders Highway showing a mass of Eucalypt seedlings in the company of one larger tree (but probably less than thirty years of age).

Image 2: Mother Gidgee (*Acacia cambagei*) tree with seedlings at Cathedral in Mitchell grass. April 2016



Image 3: Advanced seedlings at Cathedral 2016 in a Mitchell grass pasture demonstrating the next stage of encroachment.



Image 4:  
Young Gidgee trees having eliminated grass in the middle of the thicket. A favourable wet season will germinate more seeds from the store in the ground and the encroachment will continue.

Marsupials prefer shade and the Mitchell grass adjacent to the thicket is eaten by kangaroos very early in the year, such that the trees are unlikely to be impacted by fire.

Image 5: Senator James McGrath inspecting an advanced monoculture of Gidgee (*Acacia cambagei*) trees on the stock route 30kms west of Winton, April 2015. Many of these trees probably germinated following the big1974 wet season.



The four preceding images, though not taken at the same spot, should give an indication of the way thickening of native vegetation and encroachment of grasslands progresses.

## Summary

1. Changes in land management practices are the main reason for the severity of bush fires experienced today rather than any other factor.
2. Current Vegetation Management legislation in Queensland is preventing landowners from reversing or even stabilizing that trend.

I thank the committee for the opportunity to put my views and observations made over a long period of time of living and working with nature.

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