

Bushfire Resilient Land and Climate Care

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Executive Summary

Whilst devastating, the recent Australian bushfires provide an opportunity to come to terms with both the legacies of colonisation and the unfolding climate emergency in ways that empower bottom up householder and community level resilience.

Fire is an intrinsic part of the Australian landscape. It has become more destructive since European colonisation, and over recent decades, we have experienced even greater destruction due to accelerating climate change and changes in land use. Australia could, and should, be leading the world in transitioning to a renewable energy base to reduce the root cause of the crisis.

Australian landscapes were once subject to the oldest continual land management practices through indigenous cultural burning practices; stopping these practices has left us with denser, fire-vulnerable forests. Traditional landuses of grazing and forestry that contributed to prevention and control of bushfires have declined across large areas of the country and been replaced by residential, recreational and conservation uses in recent decades that increase our vulnerability to bushfire.

Australia arguably has the best fire-fighting capacity in the world. However fuel reduction burning is currently the default land management tool in reducing fire danger. This is effective in some cases, but not in catastrophic bushfires. The season for safe fuel reduction burning is contracting. Further, burning can lead to lower-nutrient, drier soils with more fire-prone vegetation.

A strategic focus on the urban/bushland interface and rural residential areas where bushfires create the greatest economic and social havoc demands a much broader suit of land management practices than increasing already problematic fuel reduction burning:

- A return to indigenous cultural burning practices, where canopy and soil organic matter are left intact.
- Greater use of grazing animals combined with farming systems that use native pasture species, fire-retardant shelterbelts and silvopasture systems to build soil water- and nutrient-holding capacity
- Managing fuels with chippers, slashers and groomers as well as livestock trampling.
- A greater focus on fuel reduction through decomposition; research is needed on the role of microbes in speeding decomposition, and the effects of lost soil calcium.
- Rehydration of landscapes, using Natural Sequence Farming and Keyline techniques; especially along water courses receiving urban storm water.
- Protecting and managing dense areas of fire-retardant ‘novel ecosystems’ near towns and urban fringes, including non-native species such as willow.
- The ecologically sensitive thinning of forests; utilising the resultant biomass can also reduce our fossil fuel dependence through:
 - Carbon neutral Combined Heat and Power systems to generate dispatchable power at multiple scales, especially local scale.
 - As biochar – a soil amendment providing long-term carbon sequestration, and improving soil water- and nutrient-holding capacity and microbial activity.

Most of these strategies are more labour-intensive than industrial-scale clearing or fuel-reduction burning so are less appealing to government decision makers but have potential to reform and reenergise community-based activity with government support.

While all these strategies have their proponents and opponents, thinning our forests to reduce fire risk and provide carbon neutral, dispatchable, renewable energy to accelerate the shift to a 100%

renewable power grid is by far the most controversial. This idea is seen by most conservationists as inviting another massive degradation of our forests in the pursuit of business as usual. Building confidence that we can manage forests for our own safety and immediate needs while we protect our biodiversity, drawdown carbon and kick the fossil fuel habit is a cultural challenge that requires leadership by environmentalists who understand how the legal fiction of “terra nullius” has distorted the conservation paradigm.

Whatever the hope for adaptive top down responses, households and communities need to become more self- and collectively-reliant as the capacity of centralised systems to manage escalating crises through command and control strategies declines. Community involvement is critical in managing local landscapes for reduced fire threat, especially in the urban/bushland interface. Flow-on benefits include community engagement, empowerment and resilience, and reduced costs to taxpayers. We need a reform of local laws to allow for small-scale community actions to be undertaken with minimal red tape.

At a household level, a well thought-out and practiced fire plan, and retrofits to buildings and outdoor spaces, allows for staying and defending a property as part of a resilient lifestyle that reduces the load on authorities managing mass evacuations.

This vision could bridge an increasingly polarised debate: empowering those on the libertarian right to manage land for the better; offering the green left a viable alternative for local power generation, bypassing international corporations; and providing the ‘sensible centre’ a common sense way forward to allow us to finally be at home in this land.

Introduction

This piece was written in response to the recent devastating Australian bushfires. It highlights win-win opportunities where fire risk reduction measures can also reduce carbon emissions, and build community resilience.

It builds on my earlier work on bushfires including:

- ‘Bushfire Resilient Communities and Landscapes: a discussion paper for Daylesford and Hepburn townships’ (2009) which focuses on my local region, and the strategies that can be undertaken at a local and township level, available [here](#).
- ‘[Reflections on fire – February 2019](#)’ written after the first direct fire threat to our home, Melliadora.
- *The Flywire House: a case study in design against bushfire* (1993/2010), focusing on appropriate building design.
- Two chapters in my book *RetroSuburbia: the downshifter’s guide to a resilient future* on ‘Retrofitting for bushfire defence’ and ‘Household disaster planning’ which are now also available as a pdf download [here](#).

Of course, my work on bushfire resilient design and land management is an integral part of permaculture, a system of regenerative landuse and living based on ethics and design principles that can be applied across many domains of action.¹ I have arranged many of the sections in this piece around restatements of the 12 permaculture design principles to illustrate the systemic thinking that informs this vision. In the interests of getting this work into the public sphere as quickly as possible, I have mostly used non-academic references.²

1 Articulated in Holmgren *Permaculture: Principles and pathways beyond sustainability* (2002); see also permacultureprinciples.com

2 Refences such as the news articles from reputable journalists often have the further benefit of providing further links to relevant research.

Creatively use and respond to change

The national drought and bushfire crisis exposes our increasing vulnerability to natural disasters in Australian land management, economy and society. This demands novel responses, visionary leadership and collective commitments not seen in our nation since WWII. The tension between the need for immediate responses to the crises of drought and bushfire, and the need for longer-term planning to address the underlying drivers has had the effect of paralysing policy.

Our climate and landscape scientists provide the best available advice on the threats, but are less capable in creating solutions. Our farmers have a reputation for innovation and adaptation, but are severely constrained by bank finance and global markets. Our volunteer and professional emergency services are amongst the best in the world, but have been stretched to breaking point.

On the other hand, the intensity of this crisis provides a number of opportunities. Most immediately, the highest level of response demanded of our emergency services has provided experience that previously would have only been seen once in a lifetime.

Crises also provide opportunities for creative responses that were previously dismissed as too radical, expensive or unproven to be considered. Further, this crisis has helped foster wider appreciation for the need to fund research to better understand novel factors and evaluate a greater diversity of strategies. Perhaps most importantly, the sense of solidarity that natural disasters generate increases social capital for collective sacrifices to address both the short term-and long-term issues.

It is clear that established interests and entrenched ideological positions of many institutions and groups will be challenged, changed and overturned by the intensity of the crisis.

While the temptation for “we told you so” moments is obvious, there is also a need for humility all round in accepting uncertainty and risk.

Drivers of bushfire

Stepping back from the current crisis, most experts on bushfire recognise several deeply entrenched drivers that cannot be easily solved. My summary of these drivers is:

- prehistoric co-evolution of Australian plants, animals and landscapes adapted to fire
- the loss of ancient and persistent management of fire and landscapes by indigenous peoples
- complex disruption and disturbance of these ecological and cultural balances in the last 250 years, including dehydration of landscapes through stream course erosion and degradation
- loss of population from farming communities reducing person-power to manage land and respond to bushfire
- declining use and management of local grassland and forest biomass over the last 75 years with expansion of national parks and reserves, revegetation of the suburban rural interface, expanding rural residential development, and tree-change and sea-change lifestyles and eco-tourism in natural environments
- climate change to generally less rain and more erratic rainfall patterns, higher evaporation rates, longer and more frequent droughts, increasingly energetic weather systems with harder to predict patterns, and greater incidence of lightning strikes.

While most of these factors provide context, or potential for policy intervention and community action over time, over the last two decades the debate has mostly been simplified down to needing to reduce biomass fuelling the bushfires versus the effects of climate change. We need to have more nuanced conversations about the issues.



Design from patterns to details to address the climate emergency

For many Australians who accept and understand the climate science consensus, this looks alarmingly like one of those tipping points where positive feedback loops in the global system tip us into the climate cooker, with or without a fossil fuel powered economy to drive the process. While less frightening in scale and intensity than the accelerating methane release from arctic warming,³ the potential of more bushfires leading to more greenhouse gas emissions leading to more climate change is a conclusion that is hard to escape. Fire historian Stephen Pyne speaks of us entering the Pyrocene rather than the Anthropocene geological era.⁴

Most climate modelling assumes that regrowth after bushfires will sequester roughly the same amount of carbon dioxide as was released in bushfires, but this seems wishful thinking to me. As an example, the box-ironbark forests of the inland slopes of the Murray Darling basin sequester far less carbon than those of the Great Dividing Range. Ongoing fires and climate change driven drought will move places on the Divide such as Daylesford (where I live) towards the conditions in areas such as Bendigo (on the edge of the semi-arid zone) resulting in a substantial net release of carbon dioxide.

We may be condemned to accelerating cyclical burning of the wetter, forested and inhabited parts of our continent for as many decades as it takes to permanently change landscapes and soils so they no longer grow the biomass that sustains such intense fires.

For many people with a life-long commitment to nature conservation, the grief from these realisations is intense. For the large numbers who have faced terror on the fire line, defending their homes or sheltering helplessly without knowing if their homes and animals are gone, their anger is understandable. The past pattern of victims' anger being focused on proximate causes has shifted. This time, there is palpable anger directed towards fossil fuel corporations who have managed to stall effective action to radically reduce carbon emissions, and governments who have dishonestly hid behind plans or mantras about doing our bit.

After decades of restraint by scientists and policy experts in drawing a direct link between climate change and specific natural disasters, the gloves are now off. Threats against scientists and public servants who speak out are no longer working. The public credibility of government claims that Australia is playing its part in reducing GHG emissions is in tatters. The crisis has confirmed assessments suggesting that Australia is one of the most vulnerable OECD (developed) countries to climate change, while we rank alongside Norway and New Zealand as one of the nations with the greatest potential to respond to climate change⁵

In this context, why aren't we leading the world in the rapid transition to a renewable energy base, especially as our national resources are so great relative to our population?

3 Ahmed, N (2013) "[Seven facts you need to know about the Arctic methane timebomb](#)" *The Guardian*

4 See "[The Pyrocene](#)" on his website stephenpyne.com

5 Latimer, C (2018) "[Australia one of the countries most exposed to climate change, bank warns](#)" *Sydney Morning Herald*

Produce no waste with 100% renewable energy

Of course the answer lies in the huge part of our wealth that currently comes from exporting coal and gas, which has been increasing for decades. We are one of the fossil fuel superpowers of the world, at least per head of population.⁶ The reluctance of governments, both Liberal and Labour, to ignore the fossil fuel lobby and lead the world in a renewable energy revolution is not just fuelled by ideological scepticism about climate science. Economic and social factors are also drivers. For example, claims by gas fracking supporters that bans on exploration and development will lead to rising gas prices raise concerns about consumer backlash. Further, claims that these prices will see the collapse of food processing industries in this country scare regional politicians who understand that value-added processing using cheap energy is one of the few options for maintaining regional economies hit hard by climate change.

While the reality of the solar and wind rollout in Australia has already been impressive, despite the chaotic policy context, scepticism remains in many elite circles about whether improving technology and declining costs can overcome the emerging problem of providing stabilisation for a 100% renewable grid (let alone electrifying transport, mining, and manufacturing to use 100% renewable power). While fear mongering about the renewable energy targets of state governments being the cause of rising costs and more frequent blackouts is mostly nonsense, the electricity grid is, along with the internet, the most complex system industrial civilisation has created. Both developed over time from simple beginnings. It is unlikely that grand plans to rapidly restructure the grid around 100% reliance on intermittent power sources will happen without cost increases and/or breakdowns. As recently as the 1980s, such interruptions could have been tolerated economically and politically, but today there is a real concern that relatively small declines in the reliability in the grid could tip the country into recession, if not depression, and thus tip governments out of power.

Tragedy of the commons

More fundamentally, if Australia succeeds in going 100% renewable, will that return us to a climate with normal rather than monster bushfires? The answer is clearly no – a textbook case of “the tragedy of the commons”.⁷ The best we can hope for is that visionary leadership, industrial know-how and community alignment in Australia will provide an example that will help countries less endowed with natural, financial and social capital to rapidly follow suit. On the other hand, the world could respond to such an example in the way they did with Iceland going 100% renewable with abundant geothermal energy: alright for them but not applicable or scalable to the really big economies.

In any case, given how late this still-speculative national and global response is in coming, it is clear that we will still be dealing with worsening climate change driven disasters for decades to come. This will require capital, human and natural resources at the same time as the 100% renewable transition is making vast resource demands, and our agricultural systems require more intensive infrastructure while generating declining yields.

The framing of our situation as a climate emergency with reference to the threat of Nazi Germany and Imperial Japan⁸ reminds us that rapid realignment of the economy around new priorities is possible if the threat is existential and there is social alignment around the cause and its solution. The idea of self- and collective-sacrifice, or at least “tightening of belts”, for some long, but still hopefully limited,

6 And even more so if our coal and gas exports are taken into account; see Swan, T (2019) [High Carbon from a Land Down Under](#) The Australia Institute

7 Originally articulated by Hardin (1968), “tragedy of the commons” refers to the tendency for individuals to over-exploit common resources.

8 McKibben, B (2016) “[World at war: we’re under attack from climate change—and our only hope is to mobilize like we did in WWII](#)” *The New Republic*

emergency is a message that makes some sense, at least in its ability to be conveyed and understood by the public. While many involved in climatic science and activism fervently hope that the intensity of the drought and bushfire crisis is enough to force that social realignment, there are many more conscientious objectors to a war on climate change than there were against Australia joining the Allies in WWII. (For instance former prime minister Tony Abbott, who has recently said the world is in the grip of a climate cult.⁹)



Integrate rather than segregate to bridge the cultural divide

Amongst the more common alternative explanations for the bushfire crisis is the failure to manage the land, especially our native forests. In its more extreme incarnation, “The Greens” are blamed for preventing fuel reduction burning even though no mainstream environmental organisation has ever campaigned against some level of fuel reduction burning as advocated by fire control experts. However it is true that traditional landuses of grazing and forestry, which contributed to the prevention and control of bushfires, have declined across large areas of the country. They have been replaced by conservation, recreational and residential uses in recent decades, increasing our vulnerability to bushfire.

For some people, mostly in rural Australia, the collapse of these traditional ways of managing fire risk – as by-products of grazing and forestry livelihoods – and the rise of bureaucratic inertia and costs of doing what rural communities and practical public land managers once did on their own, is a source of intense frustration. It is often seen as “green tape”, driven by urban sensibilities and values.¹⁰ For so many farmers and self-employed people, the experience of regulatory restriction over recent decades has been suffocating and disempowering.

In modern Australia informed by environmental values, there is a widespread perception that we stuffed the country by clearing bush, that recovery of nature and its ecosystems services is best achieved by leaving it alone, and that harvesting forests is the most destructive of our landuse systems. This widespread perception, stronger in the city than the country, is one contributing factor in our collective failure to actively manage our forests.

The fight for the forests and Terra Nullis

Ever since Routly and Routly’s seminal 1973 publication *The Fight for the Forests*, campaigns to protect native forest from logging, especially old growth forests, has generated more sweat, tears and even blood than any other issue in the history of the environment movement. Tasmania has been the epicentre of that civil war,¹¹ while the Victorian state government’s plan to phase out native forest logging by 2030¹² is one of the last stages in this long conflict. But this is a pyric victory because so far this fire season 10 million hectares, mostly native forest, has been incinerated nationally along with most of the wildlife across those vast firegrounds. The forest will grow back, but if climate change-driven dehydration of our landscapes and wilder weather are increasing the intensity and frequency of bushfires, then our forests are doomed, more certainly than they would be from the most adverse impacts of logging.

9 Israel Public Broadcasting Corporation interview 15 December 2019

10 See for instance the detailed comment by Dick Adams in response to Alexandra & Bowman (2020) “[There’s no evidence ‘greenies’ block bushfire hazard reduction but here’s a controlled burn idea worth trying](#)” *The Conversation*

11 This gripping story of the players in one of the more dramatic expressions of that war shows the legacy that stymies our ability to sensibly manage our forests: van Tiggelen, J (2014) “[The destruction of the Triabunna mill and the fall of Tasmania’s woodchip industry](#)” *The Monthly*

12 Willingham, R (2019) “[Victorian Government announces multi-million-dollar plan to end native logging by 2030](#)” *ABC News*

This situation is making climate grief a very deep emotional hurt for many people, but we need to step back from the emotion, and the technical pros and cons of native forest logging and fuel reduction burning, to consider the very idea of actively managing native forest. I have always seen the conventional Australian environmental aversion to forest management as misplaced and an expression of “Terra Nullius”, the false legal doctrine of an unmanaged land that provided the British with a legal excuse to take land from indigenous people without recognition of prior sovereignty. This ideology of “lock it up and leave it alone” has allowed state governments to cut funding they once provided for forest management. While the conservation movement has always advocated more money to manage national parks and other reserves, this has not inspired the activist energy and demands that converting more state forests into national parks has. What money is available has mostly been spent managing recreational use and controlling exotic species, rather than on active management.

Australia is now understood by paleo-ecologists to have been shaped by human impact for perhaps 100,000 years. Land use historians (such as Bill Gammage¹³ and Bruce Pascoe,¹⁴ amongst others) have documented an interlocking network of cultural landscapes that may be the oldest cultural landscapes in the world! Archaeological and other evidence suggests that this persistent and intensive management of local territories is at least five or even ten thousand years old.¹⁵ The idea that our landscapes would naturally recover their pre-European characteristics by leaving them alone is ecologically naïve on two levels. Firstly, because the pre-European state was a husbanded balance, as far from any wilderness as the hedge-rowed fields of England were from the primeval post-glacial forests. Secondly, the diverse impacts and novel species that came with European invasion fundamentally reset the ecological chessboard in ways we are still trying to understand.



Observe and interact to manage forest fuels

Pre-European landscapes comprised ubiquitous open grassy woodland, wide open grassland, wetlands and heaths, forming a mosaic of vegetation systems managed by careful use of fire and indirect control of grazing animals. In higher rainfall areas, especially on the east coast, copses of fire-retardant rainforest were protected from fire and acted as firebreaks, as did large swamps and wetlands, which have mostly been drained in the modern landscape. Our modern forests are almost universally far denser, with both small and stunted canopy trees (mostly eucalypts), than any pre-European forest.¹⁶ Today in high rainfall areas, thickets of understory shrubs confine bushwalkers to tracks, while in our low rainfall areas there is little or no grass or herbaceous understorey under the dense eucalypt canopy, allowing water to run off the landscape as fast, or faster, than off open, grazed paddocks.

Fuel reduction burning remains the primary tool in reducing bushfire damage to forests, although the season for safe fuel reduction burning is contracting. Fuel reduction burning allows firefighters to be more effective and safer on the fire line, and protects farms and settlements from damage. While the body of research supporting these efforts in all states is extensive, more recent evaluations of the evidence¹⁷ suggests fuel reduction burning provides some assistance to firefighters in controlling moderate-intensity fires but for the very intense catastrophic bushfires that cause the most ecological damage, and destruction of assets, livestock and loss of life, the effect is marginal at best.

13 Gammage, B (2011) *The Biggest Estate on Earth* Allen & Unwin

14 Pascoe, B (2014) *Dark Emu; Black seeds: agriculture or accident* Magabala

15 Kohen, J (1995) *Aboriginal environmental impacts* UNSW Press

16 Rolls, E (1981) *A Million Wild Acres* Nelson

17 Penman et al (2020) “[A surprising answer to a hot question: controlled burns often fail to slow a bushfire](#)” *The Conversation*

Unfortunately, there is also some evidence that repeated fuel reduction burning leads to loss of nutrients, reduced ability of the landscape to store moisture¹⁸ and an ecological drift to more fire prone vegetation. The benefits of fuel reduction burning fade after a few years, but the time taken for the forest to recapture lost nutrients is generally longer, so we may be degrading the land for a temporary reduction in fuel levels.

There is currently great hope that learning and applying indigenous burning patterns could reduce these adverse side effects and enhance the ecological value of fuel reduction burning. The single most significant change would be burning smaller areas with lower-intensity burns that do not scorch the canopy and leave soil compost intact. However, such approaches would be far more labour intensive, something our economy and society is geared to avoid at all costs.

Any consideration of fuel levels that sustain the spread and intensity of bushfires must also consider drought. Extreme drought is not just a lack of rain; increases in temperature and wind, and lower humidity, can increase evaporative losses to a much greater extent than decline in rainfall. Potential evaporation (or “open pan evaporation”) is greater than rainfall almost everywhere in Australia. It is our dry air and lack of good groundwater accessible to trees that is more important than low rainfall in making Australia so arid. Unprecedented average temperatures drive potential evaporation higher.

In grasslands, reduced growth and higher grazing pressure from livestock and wild animals can reduce fuel loads during droughts. However over-grazed dry paddocks still burn, while better management by farmers in recent decades (feeding hay and grain, agistment or destocking) has seen more paddocks covered with dry grass rather than just bare dirt. This conservation of dry biomass can sustain hot and fast fires. Deep-rooted summer-active native pastures, management-intensive rotational grazing, drought-hardy shelterbelts of fire-retardant trees, and rehydration of our streams and water courses are some of the strategies to reduce the impact of fire in our farm landscapes, at the same time as sequestering carbon on a scale to match our fossil emissions.¹⁹ These landholder-led, low-tech but high-skill land management techniques associated with Holistic Grazing, Organics, Natural Sequence Farming, Keyline and Permaculture fit well with conservative governments’ preferences for carbon sequestration over carbon abatement but also run afoul of the Agribusiness lobby that stands to lose markets for GM seeds, fertilisers, toxic chemicals and complex tech that only they can provide. For example, silvopastures of fodder trees and grazing livestock have been estimated to be one of the most broadly applicable low cost landuse systems to sequester carbon.²⁰ Most animal fodder trees are also low fire hazard or fire retardant.

These agricultural win-win solutions to both the proximate problems and the systemic drivers of drought and bushfire are worthy of more detailed discussion, but my focus here is on our forests: regrowth and old growth native; state, corporate and privately owned; national park; and novel ecosystems on our urban fringes.

Forests accumulate biomass over longer cycles than grasslands and respond to drought by shedding foliage. Decomposition in normally damp ground stops and short-lived shrubs such as wattles can die en masse. Consequently, fuel levels can rise rapidly, overwhelming any previous fuel reduction, be it by a gardener raking up leaf litter or a forester doing broadscale fuel reduction burning.

18 Tulau J & McInnes-Clarke S (2016) [Fire and Soils: A review of the potential impacts of different fire regimes on soil erosion and sedimentation, nutrient and carbon cycling, and impacts on water quantity and quality](#) State of NSW

19 Massy, C (2017) *Call of the Reed Warbler* UQP

20 Hawken, P ed. (2018) *Drawdown: the most comprehensive plan ever proposed to roll back global warming* Penguin Books

In rainforests and wetlands with permanently moist soils, unprecedented drought can create huge fuel loads in areas that would normally act as firebreaks to stop or slow the spread of wildfire. Thus the observations of unprecedented fuel loads by many in rural Australia may be more an indicator of drought severity than of land manager negligence.²¹



Use and value a diversity of pathways to reducing fuel

The focus on fuel reduction burning has tended to blind even experienced land managers to the continuous process of fuel reduction by decomposition. Decomposition rates are commonly understood to be a fixed function of climate: rapid with moisture and heat but stalled without moisture. But this ignores the importance of fuel arrangement in retaining moisture, as well as animal digestion and, most invisibly, invertebrate and microbial cultures that do most of the job of decomposition (including in the guts of animals and in soil rearranged by burrowing and scratching animals).²²

We need a massive increase in research on fuel reduction by decomposition, drawing on indigenous knowledge and the traditional knowledge of farmers and gardeners, especially those following organic principles. This was suggested in a submission to the Black Saturday Royal Commission by Professor Stuart Hill²³ but was ignored at the time as too fringe an idea.

Another more speculative factor in forest flammability is the loss of soil calcium leading to plant biomass that is less easily decomposed by microbes. While this process is well understood in organic agriculture, it is still unresearched in relation to our forest ecosystems.²⁴

Fuel arrangement is a well-recognised factor in determining fire behaviour. We only need to think of the difference between how a pile of crumpled paper burns compared with a book to understand why this important factor is incorporated in standard forest assessment tools along with fuel levels. Shrubs, ribbon bark and other ladder fuels can carry a ground fire into the crown of the forest, while creeping grasses and herbaceous groundcovers are less likely to support a canopy fire.²⁵

On farms, slashing and mowing are accepted as effective strategies to reduce intensity and spread of fire by rearranging grass from vertical to horizontal, even if no decomposition occurs. In forests fringing residential areas there is increased use of chippers and grooming heads on excavators to reduce grass, understory fuels and small trees to mulch.

Grazing animals also rearrange forest fuels. Apart from converting grassy fuels (and in the case of goats and deer, shrubby fuels) to microbe-rich manure, animals help reduce fire hazard by physical trampling of finer fuels. The use of goats to manage vegetation is beginning to be recognised as an ecologically benign alternative to herbicide, especially on the urban bushland fringe and along watercourses. Because goats are naturally phobic about wet feet, they don't damage delicate wetland or stream banks, and their pellet manure is less polluting than sloppy cow pats.

While goats and other grazing animals tend to create and maintain open grassy forests, ecological succession to closed canopy dense forests of fire-retardant species can create barriers to the spread of fire across open farm landscapes and into rural residential areas and townships.

21 In the same way that eucalypt leaf litter covering a garden in a bushfire vulnerable area doesn't mean the owner hasn't done seasonal fire maintenance.

22 Such as wombats, betongs and lyrebirds

23 Currently offline

24 See "Mineral fertilisers for building soil" in Holmgren, D (2002) *Permaculture: principles and pathways beyond sustainability* pp 76–77

25 Zylstra, P (2016) "[New modelling on bushfires shows how they really burn through an area](#)" *The Conversation*

The study, documentation and management of novel ecosystems²⁶ along stream courses and residential fringe areas, which receive enhanced stormwater and nutrient flow, has been a major focus for me over four decades. There is great potential in combining natural succession processes with small-scale interventions along stream courses to slow, spread and sink urban stormwater. Well-recognised techniques that are standard practice by civil engineers in Water Sensitive Urban Design²⁷ can be used, as can the more radical but low-cost interventions pioneered by Peter Andrews and others in rural areas.²⁸ The Mulloon Creek Catchment project in NSW has been an important pilot project taking these approaches to the catchment scale with support from government.²⁹ Such approaches to rehydrating our farm landscapes have great promise in addressing the drought and bushfire crisis and in recreating the “chain of ponds” wetlands that characterised the indigenous landscapes before their erosion into today’s incised streams and gullies that most Australians assume are natural.

Unfortunately, rural and urban fringe Landcare projects over recent decades have been the main force removing these more water- and nutrient-holding, and fire-retardant species from the landscape and replacing them with local, native, sclerophyll, fire-enhancing species. I have been one of a small number of environmentalists who have publically challenged this use of taxpayers’ money, toxic chemicals and community labour to damage the environment in the name of restoring indigenous nature.

Willow removal programs across the rural landscapes of the southern states are probably the most damaging of these programs. In terms of bushfire risk to settlements, such programs in urban fringe areas have set back the huge potential of these areas to turn the apparent problem of urban stormwater and nutrient flow into fire-retardant novel ecosystem rainforests that are not only bushfire barriers, but also beautiful shady forests and natural air conditioners on a massive scale.



Thinning forests: *using and valuing renewable resources and services*

In forests managed for timber, thinning is essential to produce large trees suitable for sawlogs in less than a human lifetime. It is the easiest and lowest risk way to accelerate the ecological maturity of regrowth forest, whether that regrowth has resulted from logging, fire or other disturbance. In regrowth eucalypt forests, too many trees is far more common than too few.

In my observations and study of regrowth forests over nearly 50 years, I have seen no evidence that dense regrowth eucalypts left alone are returning to the open grassy parklands or tall wet forests of indigenous times. Small, stressed trees slowly losing the fight for light tend to hold less moisture and work as ladder fuels. As the canopy dies, eucalypts typically send out epicormic shoots up the trunk which then die, creating more ladder fuels. Our forests are full of these small, stressed and dying trees as a result of past cycles of logging and fire.

Pine trees naturalising in bushland from plantations do the same, creating highly flammable forests.

Fuel reduction burning can aid the progression to more open forests, but on many occasions fuel reduction burning simply damages more of the remaining trees and leads to new cycles of epicormic growth and shrub thickets.

26 Novel ecosystems are self-organised association of plants and animals that colonise and stabilise disturbed or degraded environments showing many of the systemic characteristics of long co-evolved ecosystems; see for instance Hobbs et al eds (2013) *Novel Ecosystems* for an academic overview of the topic

27 See for instance Melbourne Water’s “[Introduction to WSUD](#)” (2017)

28 See Peter Andrews’ [Natural Sequence Farming](#) website

29 See “[Mulloon Creek Catchment](#)” on the Soils for Life website

This is too big a subject to discuss in any depth here, but I believe thinning our forests, especially those regrowing from bushfire, is perhaps the most necessary management. However it is currently restricted to a few private forests and a dwindling number of trials in our public forests.

Traditionally, the justification for thinning was the improved value of sawlogs the forest would yield in the future, but in Australia, cheap wood from old growth public forests has undermined the economic logic of thinning regrowth. Paper pulp and fuel wood are the traditional uses of removed trees, which allay the costs of thinning, but the export wood pulp industry became the driver of large-scale clear-felling and degradation of our forests over the last half century. Thus the idea of using forest waste has poisoned the discussion in Australia about the desperate need to thin our forests.

Most forest managers agree that removing small, stunted and damaged trees to provide more space for well-formed trees to grow larger, reduces the fire hazard after an initial increase (due to the debris from thinning).

Recent proposals from the timber industry and unions to thin forests close to settlements for fire hazard reduction have been met by strong pushback from some forest ecologists and environmentalists³⁰ and support from forestry scientists.³¹

This conflict about the benefits or otherwise of thinning is like the debate about fuel reduction burning. Just as indigenous cultural burning practices are low-intensity, small-scale and sensitive to multiple values, ecological forestry uses more labour-intensive patch thinning, with greater proportion of felled wood extracted for use, and a greater proportion of leaf and bark returned to the forest floor by chipping or other techniques. The industrial scale and monoculture of mind pursuing one rather than multiple values is the source of the most of the problems.

The high-rainfall wet sclerophyll ash forests are the epicentre of this conflict. Dense regrowth after logging or intense fire tends to create strongly competing stands of tall, straight saplings that start to radically self-thin around age 15, leaving standing dead stems, dry bark and other elevated fuels. Studies by ecologists of ash forest burnt on Black Saturday show clear evidence that these young regrowth forests fuelled the most intense fires, while forests over 100 years of age were much less likely to support intense fire.³² Other research over many years has shown regrowth forests use more water while old growth ash forests yield more water to Melbourne's water catchments.³³

These lines of argument have, very reasonably, been used to argue for the end to old growth logging. The growing issue is what to do with the large areas of regrowth forest from industrial logging and those created by escalating hot and large bushfires of recent decades.

Mostly the debate is reduced to one of industrial-scale thinning when the trees are large enough to justify a return from pulpwood or biomass energy versus "lock it up" in national parks under the assumption that over time it will return to a less fire prone and more ecological valuable forest. The first will ensure ongoing loss of ecological values with debatable reductions in fire hazard, while the second will lead to dense forests destined to burn in repeated cycles of hot crown fires, even without accelerating climate change.

Thinning our forests to wider spacings may also allow native tree species to survive a drying climate with longer and more severe droughts for the decades, if not centuries, into the future. Fewer trees at wider spacing is a more ecologically benign and practical adaption to a dryer climate than more

30 Foley, M (2020) "[Scientists warn forest industry plan could increase fire risk](#)" *Sydney Morning Herald*

31 Keenan, R et al (2020) "[Forest thinning is controversial, but it shouldn't be ruled out for managing bushfires](#)" *The Conversation*

32 Taylor, C et al (2014) "[Victoria's logged landscapes are at increased risk of bushfire](#)" *The Conversation*

33 Lindenmayer & Taylor (2018) "[Logging must stop in Melbourne's biggest water supply catchment](#)" *The Conversation*

intensive efforts to accelerate succession to more dry-tolerant species, or simply letting our forests die through repeated cycles of hot fires and dense regeneration.

If thinning is done in relatively small patches, short-term fire hazard can be reduced by timing thinning to before the wet season, processing tree heads to mulch, and the removal of all larger wood from cut trees. This would maximise the benefits of thinning and minimise the risks and adverse impacts. Thinning is most likely to be beneficial on drier slopes and ridges, while wet forests along stream courses should, where possible, be managed to accelerate succession to rainforests capable of enhanced decomposition rates. As with all forestry operations, small-scale, persistent and more skill- and labour-intensive management is best, but our economy is geared to do the opposite.



Apply self-regulation and accept feedback to prevent unsustainable harvesting

While the *terra nullius* mindset in the environment movement has been a contributing factor in this tragic inability to manage our forests, it is more a legacy of misguided public policies, a lazy and short-sighted timber industry, and a forestry profession adrift from its noble origins and largely extinct in our universities.

In some ways, the prospects for a culture of sustainable forest management in this country seems more remote than it did in the 1980s when Landcare promised to create a new generation of farm foresters integrating ecological and production values on private land.³⁴ Is it possible that the climate emergency, especially in the form of wildfire, might be the driver of a new push for active, continuous, small-scale management of our forests?



Manage the edges and value the marginal communities where the action is

In the aftermath of the 2009 Black Saturday, I wrote *Bushfire Resilient Communities and Landscapes*, a 52 page report to our community (and Council).³⁵ It focused on personal, household, local community and landscape-scale responses for building resilience to bushfire in the context of climate change, peak oil and economic challenges. A decade later it remains relevant for how our, and similar, fire-vulnerable communities can respond, rather than accepting increased dependence on command and control by government.

Fire researcher David Bowman and land use policy expert Jason Alexandra has more recently articulated the need for strategic focus on managing the urban bushland interface,³⁶ where most of the threats to life and property occur, as a realistic goal. The modification of vegetation structure, and even composition, would have broader community support in such areas. The imperative to reduce air pollution and hazard from fuel reduction burning suggests a wider use of some of the other options mentioned above.

The suggestion of community involvement in actively managing public land has the potential to achieve several wider societal benefits, such as:

- Increasing community engagement with the natural environment in ways that might involve more enlightened self-interest than typical urban fringe Landcare projects or volunteer firefighting

34 The work of Rowan Reid through the [Otway Agroforestry Network](#) and the [Master TreeGrower Program](#) is an exemplar of what might have transformed rural Australia.

35 Available at holmgren.com.au

36 Alexandra & Bowman (2020) “[There’s no evidence ‘greenies’ block bushfire hazard reduction but here’s a controlled burn idea worth trying](#)” *The Conversation*

- It is less risky and physically demanding than volunteer firefighting.
- Contributing to a confident culture of small-scale, labour-intensive forest management where ecological, social and economic values might be balanced.
- Reducing costs to the taxpayer as those living close to bushland take more responsibility for reducing the threat.
- Encouraging resilience and confidence in planning for bushfire leading to more residents capable and prepared to stay and defend.

This last benefit could be the most important as the climate emergency deepens.

For a nation (and global civilisation) facing an existential threat, individual, household and community level resilience will have to be rebuilt to at least the levels that were normal in the first half of the twentieth century. This current bushfire crisis has exposed the obvious weaknesses of small households dependent on 24/7 communications, power, fuel, food, medicine and credit. While the current levels of dependency of our population may have been good for driving growth in the money economy, it has also accelerated resource depletion and pollution while undermining resilience.

The media naturally focuses on the extraordinary outpouring of volunteer responses to the crisis, but the logistics of looking after relatively modest numbers of people in small towns when the centralised systems break down is a sobering reminder that the best technology and the biggest budgets are no substitute for the self- and collective-reliance that comes from rebuilding household and local food, water and energy systems.

Ideally our nation will continue to provide support for more threatened small settlements but residents of these communities will need to be more self- and collectively-reliant as the capacity of centralised systems to manage escalating crises declines.³⁷ These communities can become leaders in developing the bottom-up solutions that will increasingly be needed in the urban bushland interface of our larger cities.

The temptation for a centralised command and control response to bushfire is very appealing, especially to those in power and corporations that stand to benefit from disaster capitalism.³⁸ Wiser leaders would use the power of the state and technical capacity of corporations to support greater community capacity for sensitive management of local areas.



Biomass energy: *obtaining a yield* from managing the bush towards a safe climate

But does any of this address the root cause of the climate crisis? And can it do so in ways that make sense to those who remain sceptical about the science, or at least the benefits of fossil carbon austerity?

For a Swede or Austrian warmed by the local district heating plant that is over 90% efficient and emits close to zero pollution, the connection would be obvious. Australia should be using low impact methods to thin regrowth forest – fire ravaged and otherwise – to make a more fire-safe landscape and provide renewable biomass energy for combined heat and power (CHP).³⁹ Biomass energy is dispatchable,

³⁷ The “Brown Tech” scenario of my *Future Scenarios* (2007) suggested governments would focus resources on armouring infrastructure in the capital cities and regional centres while progressively withdrawing services from smaller rural centres.

³⁸ As documented by people such as Naomi Klein (*The Shock Doctrine: the rise of disaster capitalism*, 2007) and Rebecca Solnit (*A Paradise Built in Hell*, 2009)

³⁹ Combined heat and power (CHP): a fuel burning technology linked to an electrical power generator, with recovery of waste heat for other uses

which means it helps solve the problems of a grid-dominated by intermittent renewable sources such as wind and solar. Far cheaper than batteries, or grandiose speculation about green hydrogen, wood is the obvious fuel that could help us kick the fossil fuel habit. Thinning forests will not stop bushfires, but it will reduce the intensity of forest fires and increase the likelihood of larger, well-spaced trees surviving fires.

In recent decades, interest in wood waste as a renewable energy source has been vigorously opposed by environmental groups. This has been based on the understandable fear that it would be an excuse for another round of degradation of our regrowth forests. In Europe where management of forests has been far less contentious, forest biomass has always been an important source of energy, and over the last two decades, CHP at the household, village and grid level has grown almost as much as wind and solar. Sweden gets more of its energy from forest biomass than oil; a substantial contribution to the more than 53% of its energy that comes from renewable sources (Australia gets less than 10% from renewables).⁴⁰ In doing so, the total area of forest has increased and the average age of forest trees (a good indicator of ecological maturity) has also increased.⁴¹ If this is economically viable and ecologically acceptable in Sweden, where forests grow slowly (and wages are as high as in Australia), why is it seemingly impossible in Australia with six times more forest and much faster growth rates in our most fire-prone taller forests?

While complete combustion of wood returns all carbon to the atmosphere, the extra growth in the retained trees in the forest sequesters that carbon for many cycles of thinning before we have mature forests of very large trees. What our descendants do with that magnificent legacy we can leave for them to decide.

Using waste heat locally

Like burning any fuel, the conversion to electricity has thermodynamic limits with the majority of the energy released as waste heat. In Europe, CHP systems generally use that waste heat as hot water to provide district heating in medium density housing. In Australia the need for heating is less and our settlements are more spread out.

Finding new creative ways to use the waste heat has the potential to fuel a growth in farm- and community-scale food production and processing, timber drying and other activities that could further boost local economic resilience. For example, in higher rainfall southern and upland regions, vegetable production is very seasonal but simple poly tunnels⁴² with bottom heat from small biomass power plants could provide sustainable, out-of-season local produce. As cycles of thinning lead to larger trees, small-scale timber milling of larger thinnings could yield timber for drying in simple solar kilns boosted by waste heat. Sawdust from mill waste could be used as substrates for culinary and medicinal mushroom cultivation.



Catch and store biomass as biochar: burning to cool the planet

Variations of wood burning technology can pyrolyse the wood, burning off the volatile gases and leaving charcoal, which has a myriad of uses. The most significant use is as a soil amendment – biochar – that increases the water- and nutrient-holding capacity while providing high-density housing for the beneficial microbes necessary for organic agricultural and healthy ecosystems. Unlike ordinary organic matter that progressively decays, this biochar is permanent carbon taken out of the atmosphere.

40 For a slightly dated overview of Sweden's bioenergy use see Bayer (2013) "[Sweden's Bioenergy Success Story](#)" at renewableenergyworld.com

41 See "[The forest and sustainable forestry](#)" at sweedishwood.com

42 Small-scale greenhouses fashioned from arches of polypipe covered with UV stabilised plastic sheeting

This process done on a global scale is one of greatest hopes for saving humanity from the climate cooker. Unlike dreams of sequestering carbon dioxide gas from power stations in mine shafts and bedrock fractures, biochar is exactly what our landscapes need to help in rehydration and sustainable nutrition of plants, animals and people.

Other ways to sequester carbon with well-managed rotational grazing of livestock have already been proven by innovative farmers around Australia, and these proactive ways to capture carbon are more philosophically attractive to those on the rural right than going cold turkey on fossil fuels. Similarly, forest biochar and energy is potentially attractive to the bushies who see the bushfire crisis as due to a lack of forest management. Unlike nuclear power, or even wind power, wood energy is viable at multiple scales. In Europe, there are wood power stations from less than one megawatt to 500 megawatts (the size of a coal fired power station). It is quite possible to retrofit our coal fired power stations to run on wood. An excess of renewable fuel in this country really is a case of “the problem is the solution”.

Community biomass energy using *small and slow solutions*

But by getting carried away by visions of Australia powered by wood energy, we could end up feeding our forests into the maws of giant power stations to maintain business as usual: a case of turning the solution back into the same old problem, through visions of grandeur and greed. Australia needs to start small with biomass energy from the forests fringing our cities, regional towns and small settlements to provide local jobs in green power generation and biochar-enriched organic horticulture and to make those communities more fire safe. These are the same areas that fire chiefs and ecologists agree are the best areas to reduce fuel loads. However, doing so by conventional fuel reduction burning increases the risk of damage to property and health, as well as nuisance and amenity hazard, and reduces capacity of these peri-urban bushlands to absorb urban stormwater and nutrient runoff. Most importantly, the rapid succession to novel ecosystems of native and non-native fire-retardant species in many of these urban edge bushlands is set back by fuel reduction burning.

Thinning, combined with mulching and/or animal grazing and supplementary planting with fire-retardant species is a better option than fuel reduction burning in most cases.

Rather than a corporate driven model for such activities, I envisage a community energy model already common in Europe and pioneered in this country by Hepburn Wind.⁴³ Modest-scale production to match the scale of power needs, and the capacities of adjacent forest areas, without the need for clogging our rural roads with trucks carting chips or logs, are all elements of a distributed land management and energy generation system. Just as we have with rooftop solar, we need to roll out local grid-feedback power to suit the scale of the available resources and communities, rather than an economically rationalist push to upscale biomass energy to maximise competitiveness in the larger renewable energy market. Initially, it should be the community engagement, resilience and fire safety aspects of managing our local bush that are supported by government incentives and funding.

This community energy model might allow the large numbers of ordinary Australians living close to bushland to regain a sense of ownership in managing their patch in ways that directly reduce our dependence of fossil fuels while creating local jobs healing the greenie/ redneck divide in our communities.

Comparison between neighbouring communities will provide a learning cycle, limiting the chances of overharvesting or poor forest management and building wider community confidence in the potential to manage our broadscale and more remote regrowth forests in ways that improve our forests, reduce the impact of wildfire, reenergise our failing rural economies and communities and radically reduce our fossil carbon emissions.

43 hepburnwind.com.au

Unifying vision

This vision of a sustainable small-scale forest economy at the interface between public forest and settlement will depend on support from government if it is to make any real contribution to safety in a worsening climate, a significant dent in our GHG emissions, or sequester substantial quantities of carbon as biochar. The crisis of faith in the national government response to the bushfire crisis only months after being re-elected is an opportunity to explore new ways to bridge the gap between those who prioritise dealing with the root cause and those that favour addressing the immediate symptoms.

For those on the libertarian right, especially in the bush, this is an opportunity to again feel empowered and supported to manage the land for a better, safer and more local future. For those on the green left, mostly in the city, this is an opportunity to support community owned energy from our own resources rather than just hoping that foreign corporations will cover the country with wind turbines and solar panels imported from China. For those in the sensible centre, a common sense vision would renew faith that we can care for our fellow citizens in the bush, care for the country and make meaningful steps to build resilience and address the underlying causes of climate change. Where is the national leadership that can grasp this opportunity to bring our country together?

A Permaculture Life



Care of Earth



Care of People



Fair Share

Everything in this essay is informed by a lifetime lived according to permaculture ethics and design principles. Our early articulation of permaculture in the 1970s⁴⁴ recognised forests as a model for transformation of agriculture landscapes that would produce abundant food, fibre, fodder, and fuel without excessive dependence on fossil fuels and toxins. Careful and persistent management of natural forests has always been central to permaculture teaching⁴⁵ but its adoption by environmentally aware Australians has been minimal in a cultural context of the *terra nullius* mentality. Over decades of consultancy work, my suggestion to landholders to carefully thin native forest on their properties to enhance ecological and timber values, reduce fire hazard and improve amenity, has mostly been greeted by surprise if not scepticism. Tree protection regulations by environmentally progressive councils have also prevented clients from implementing such sensible interventions in many cases.

On the home front at Melliodora⁴⁶ on the edge of Hepburn Springs we have been developing and managing our one hectare for permaculture productivity to support a life of voluntary frugality.

For thirty years we have been tree planting, track making and animal grazing on adjacent public land to enhance ecological functions and amenity. Bushfire protection and rehydration of the landscape have been foremost motivations. Last season, our place and wider community were threatened by drought and bushfire that revealed both strengths and weaknesses in our efforts.⁴⁷

Twenty five years ago we partnered in developing the Fryers Forest Ecovillage on 120 hectares in the heart of the box forests near Castlemaine. Greenies with chainsaws actively managing native forest for the future is but part of the vision that has become a shared reality for those living there.

A small start-up business GoatHand is currently partnering with the Hepburn Shire in trials to implement some of the ideas flagged in my *Bushfire Resilient Communities and Landscapes* report.⁴⁸

44 Mollison & Holmgren (1978) *Permaculture One* Corgi

45 Often referred to as “Zone 4” in permaculture

46 See Holmgren, D (2005) *Melliodora: Hepburn Permaculture Gardens, a case study in cool climate permaculture* Holmgren Design Services

47 “[Reflections on fire – February 2019](#)” at holmgren.com.au

48 Holmgren (2009), available at holmgren.com.au

These and similar small direct actions are emblematic of modest efforts by others to sensitively work our home territories in ways that reflect ecological and energetic realities.

A call to arms: rednecks with rakehoes and greenies with chainsaws

But this essay is also a call to arms for residents already on this path to increase their efforts to take more care and responsibility for their own immediate environment, both within and beyond the boundaries of white fella land law that bushfire does not respect. For those on rural properties there are a plethora of house, garden and farm adaptations that can allow well-prepared households with good gear and practised fire plan to stay and defend. It remains to be seen what evidence emerges from research on these latest fires but I remain personally committed to the stay and defend strategy based on science and a personal commitment to place. In any case, more distant public forest may be a source of ember attack but it is still the set of the inner zones around a house and the presence of at least one able-bodied person that are the more important factors in determining whether a property is destroyed.⁴⁹

RetroSuburbia for the masses

If we are living somewhere we believe is not defensible, then, from a permaculture perspective, we should question whether it is a sustainable place to live. Consideration of these thorny issues over several decades contributed to my RetroSuburbia⁵⁰ strategy for *in situ* adaption to challenging futures. For those of us on the urban bushland fringe, once we have our own house and property in order, with a well thought out and practised fire plan that prioritises staying and actively defending, there are two complementary strategies to enhance our ability to defend our space, minimise load on centralised emergency response and recovery teams, and contribute to community rebuilding.

Self-organised and self-governing use of the commons

The first strategy is to network with neighbours to increase collective capacity and plans.⁵¹ Management of adjacent public land is a meaningful action that brings together those devastated by thoughts of our climate legacy and those focused on action to deal with immediate threats. We should resist strident claims that public land is the weakest link in our resilience – managing the Common is a great opportunity to recreate the lost art of community self-governance. Rather than asking for permission, we should get on with the job, getting the social licence from neighbours and others directly affected by what we do, and be less concerned with the legal licence. This is a message I have been giving around the country through my “Aussie St” story,⁵² part of my RetroSuburbia work; a parallel strategy to help Australians survive and thrive in the challenging future that is already unfolding.



Local law reform for public land use: *apply self-regulation and accept feedback*

These spontaneous actions need to be supported by the reform of local laws that currently prohibit or require permits for even the smallest meaningful interventions. Thus the second strategy is to lobby for local law reform. Local governments should radically reduce their red tape in an act of faith in their communities’ abilities to self-regulate in the face of the climate emergency.

49 See Webster, J (2000) *The Complete Bushfire Safety Book* (pp 77–78) for a review of the evidence that the presence of able-bodied people is by far the most significant factor in determining house survival.

50 Holmgren, D (2018) *RetroSuburbia: the downshifter’s guide to a resilient future*, Melliodora Publishing

51 The Country Fire Authority’s [Community Fireguard](#) groups provides a good starting point

52 Chapter 2 in *RetroSuburbia* and presentation available to view at holmgren.com.au

In our local community we have proposed⁵³ that by default, no permits are required for action on public land if the following conditions apply:

- the actors are local residents working on land adjacent or close to where they live
- the actions are not part of a formal business, nor government funded or bank financed
- the actions do not involve toxins or machinery of greater than 5kW power
- potentially affected residents have been consulted.

Council officers could retrospectively issue a permit with conditions, or prohibit an action, if there are either a substantial number of complaints from affected locals and/or there are adverse impacts on public infrastructure, environmental values, public safety or amenity that are greater than the environmental and resilience benefits from the action.

We need to accept that small adverse impacts are a necessary part of a collective learning process for modelling a genuine bottom-up response, which is essential to inform any more formal response and support from government. While the case for greater regulation of the actions of global corporations is stronger than ever, we need to acknowledge that red tape, and worry about bad outcomes from small and local actions in non-monetary economy, are inhibiting the self-organising potential of our nation to respond to challenging futures.

In the process, we have a chance of redirecting government responses away from those that simply support more disaster recovery capitalism and throw taxpayers' money at hardening our infrastructure in the false belief we can beat mother nature.

Despite elevated expectations that governments will lead and save us, and a massive baggage of dependencies and vulnerabilities, the drought and bushfire crisis has thrown up countless stories about the self-organising generosity of spirit, a preparedness to take calculated risks and the ability to think and respond to reality as it happens. Those capacities remain our greatest collective assets that we can harness to show the world that Australians are not just spoilt brats consuming more than our fair share of resources, demanding ready-made solutions, and putting our own greed before the needs of future generations.

Regenerating land and community resilience begins with places and people prepared to lead by example, modelling the cultural shifts necessary to simultaneously mitigate and adapt to the unfolding climate crisis.



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January 2020*

⁵³ see submissions to Hepburn Shire Council at hepburncommunity.org including [my submission](#)