

Submission Number: NND.001.01128

Submission Of: David Falvey

Your Details

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What is your submission based on? I am making this submission based on my professional knowledge, qualifications or experience or on behalf of a group or organisation

What is your area of professional expertise?

If you are lodging your submission on behalf of a group or organisation, what is the name of the group or organisation?

Your Submission

In your experience, what areas of the bushfire emergency response worked well?

I made a full submission to the Royal Commission on 17 April. Reference number is NND.001.00413.

I have been sent a copy of the submission by the Howitt Society Inc, lodged today, 28 April.

I fully endorse the proposition put forward therein, namely "Reducing fuel loads is a key to improved outcomes with wildfire". I also believe, and my submission supports the Society's proposition that "the management of fuel loads through a broad scale fuel reduction burning program" and "To be effective the broad scale FRB (fuel reduction burning) program needs to treat between 5% and 10% of the forest area annually.

The photos in the Society's submission tells the whole story and more than complements the photos in my original submission.

In order to cross reference my previous submission, I attach a synopsis of NND.001.00413

In your experience, what areas of the bushfire emergency response didn't work well?

In your experience, what needs to change to improve arrangements for preparation, mitigation, response and recovery coordination for national natural disaster arrangements in Australia?

Is there anything else you would like to tell the Royal Commission?

Do you agree to your submission being published? Yes I agree to my submission being published in my name

Supporting material provided:

Synopsis of a Submission to Federal Bushfire Royal Commission.pdf

Synopsis of a Submission to Federal Bushfire Royal Commission by Dr David A Falvey

Stored Energy Release - Key to Understanding *all* Natural Hazards

- The bushfire hazard is just one in a range of natural hazards that, in particular, have touched Australia for thousands, if not millions of years.
 - other significant natural hazards include flood, cyclone, earthquake, landslide and tsunami.
 - *In hindsight, I include drought and cases of extreme (damaging) weather.*
- The earthquake hazard is the best studied, characterised and risked.
- All the above natural hazards, *including drought, etc*, are, or can primarily be characterised by their available excess energy → *eg*, earthquake magnitude.
 - following **event trigger**, a proportion of that stored, or anomalous energy is released – measured as the actual event **magnitude**.
 - when transformed and modified by geographic and environmental factors, resulting earth and biosphere disruption is described as hazard **intensity**.
 - = the timescale of energy release can be anywhere from seconds (earthquake) to days (bushfire) to years (drought).
 - any interaction of the intensity of a hazard event (its expressed force) with humans and their built structures is the hazard event **impact**.
 - = too often, examination of hazards begins with intensity, or “severity” (impact), without looking behind at the physics of energy transfers.
- Comprehensive study of these four characteristics, in historical context, is required to assess *hazard risk*, or geographic *probability of occurrence*.

The 2019-2020 Bushfire Season - neither Anomalous nor Exceptional

- Any assertion that recent “anthropogenic climate change” has caused the “severity” of the current bushfires can be addressed by basic examination of Australia’s drought and fire history since the mid-19th century:
 - this strongly suggests a random pattern in both hazards, over at least 170 years, unrelated to any current perceptions of recent “extreme weather”.
 - the worst drought remains the Federation Drought of 1895 -1903.
- Over the same period, bushfire events have occurred at close to random
 - but with increased *impacts* since late 20th century, in line with increased population, expansion of National Parks and higher infrastructure density.
 - the worst, defined by magnitude, was the 1974-1975 bushfire season.
- A key indicator of extreme weather, the Southern Hemisphere Accumulated Cyclone Energy (ACE), is essentially unvaried between 1970 and 2015.

Today’s Climate has Happened Before and Will Again

- There is clear evidence of natural climate variability of at least $\pm 1^{\circ}\text{C}$ relative to today, throughout the last 1,000 years. Looking further in the past:
 - peak Holocene (0 – 10,000 yrs bp) temperatures were cyclically from $\frac{1}{2}^{\circ}\text{C}$ cooler, up to 2-3 $^{\circ}\text{C}$ warmer than today;
 - during the coldest part of the last Ice Age (10,000 – 110,000 yrs bp) global temperatures were at least 6-8 $^{\circ}\text{C}$ colder than today;

- at the peak of the previous interglacial (110,000 – 130,000 yrs bp) global temperatures were at least 3°C hotter than today.
- There's no doubt that natural climate change is continuing today, and warming,
 - probably in conjunction with a roughly equivalent contribution from human-induced global warming.
 - no evidence or theory directly connects bushfire frequency or magnitude to any natural and/or anthropic global warming.
- In summary, there is no unequivocal link connecting extreme weather events to, or "having caused" the 2019-2020 bushfire season.
- Thus, it is highly unlikely that climate change model-based strategies aimed at reversing "global warming", solely by cutting fossil fuel use, will have any profound mitigating effect on bushfire risk, magnitude, intensity or impacts.

Bushfire Magnitude - Fuel Load Conversion from Chemical to Thermal Energy

- The real "culprit" is the stored chemical energy in the whole forest system, – the fuel load – and its, generally partial, conversion to thermal energy upon ignition.
- Interaction of the burn with the landscape and potential modification by weather expresses magnitude as the intensity, *and*
- When burn intensity interacts with humans and structures, the result is impact.

Only Some Fire and Emergency Services Routinely Control Fuel Load

- WA and ACT Emergency Services are 2 examples of State/Territory agencies with bushfire control policies and operations based on fuel load control
 - some success is achieved by burning, slashing and chemical means.
- Other agencies seem to be less committed and thus sometimes less successful.
- Practical solutions to immediate bushfire risk management and control lies in fuel load reduction strategies, especially ground fuel, augmented by fire breaks.

Current Bushfire Research Rarely Connects Magnitude, Intensity and Impact

- The Bureau of Meteorology and various academic research centres have focussed on the contribution of "fire weather", in particular;
 - weather influences fire intensity, but does not govern fire magnitude.
 - this "focus" flows on, wrongly, to relating current bushfire impacts to anthropogenic (human induced) climate change.
- CSIRO has, however, given attention to fuel load, and its underlying contribution to fire magnitude, but still ties impact to "fire weather".
- This contrasts with long-established, seismological science that has reduced and mitigated worldwide earthquake impacts,
 - based on a quantitative understanding of the hazard and its distribution,
 - successfully delivering integrated risk assessments and management,
- Cataloguing historical bushfire fuel loads, estimating event magnitudes, and analysing the hazard along seismological lines, should define responses,
 - leading to planned reduction of magnitude and consequent intensity by incipient fuel load management, *and*
 - mitigation of bushfire risks and impacts.
- *Climate is not weather; modelling is not forecasting; casual empiricism is not proof.*

Coordination of, and Responsibility for Natural Hazard Preparedness, Event Response and Reconstruction is a Key Commonwealth Role

- Bushfire preparedness is paramount and is a National responsibility.
 - whilst bushfire *fighting* should remain a State/Territory responsibility,
 - supported by the ADF, requiring ADF training and preparedness.
- The Federal Department of Industry, Innovation & Science (DIIS) should lead coordination of natural hazard policy, operational coordination and research,
 - modelled on the Department of Health role in the current Covid19 crisis,
 - through an Australian Natural Hazard Protection Committee
 - = equivalent to the Australian Health Protection Principal Committee.
 - absorbing oversight of current Federal agency hazard research, monitoring, risk assessments, and public information.
 - covering earthquakes, tsunamis, geomagnetic events, *and* bushfires.

Scientific Leadership in Bushfire Preparedness, Research Coordination and Scientific Advice

- Geoscience Australia (GA), an established research, survey and monitoring agency, within the DIIS, should take lead responsibility for integrated bushfire research, hazard monitoring, risk assessment and advice to Government,
 - in close collaboration with the CSIRO, BoM, State/Territory agencies and research organisations, and
 - provide information, maps and advice, as changing conditions demand.
- The GA Chief Executive should chair the Australian Natural Hazard Protection Committee, and report to COAG through the Minister for Industry, Innovation & Science.

Dr David A Falvey
28 April, 2020