



16 June 2016

The Secretary Environment and Planning Committee
Parliament House
Spring Street
East Melbourne
Vic 3002

Inquiry into Fire Season Preparedness

Dear Secretary

Included is my submission to the above Inquiry on a Compact Disc.

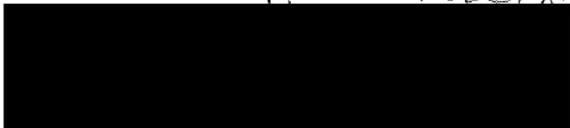
Yours sincerely



David Roy Packham



Please confirm receipt to



DRP

CURRICULUM VITAE

DAVID PACKHAM

NAME

David Roy Packham

ADDRESS

[REDACTED]

TELEPHONE

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QUALIFICATIONS

Diploma of Applied Chemistry (Royal Melbourne Institute of Technology, 1964.) Master of Applied Science (Victorian Institute of Colleges, 1973).
Foundation course in Human Resource Management (Institute of Personnel Management Australia, 1991).

AWARDS

Order of Australia Medal, 1991, for service to the development of aerial ignition techniques for bush fire management.

Fire Protection Association Australia, 2002, The A.V. Viscogliosi Award for Excellent for Outstanding Service to Fire Protection.

MAJOR ACHIEVEMENTS

Co-developer of aerial prescribed burning that has been adopted as a major fire control technique throughout Australia and North America

Co-inventor of the VESDA high sensitivity building smoke detection system that is the most advanced building fire detection system and applied throughout the world.

Initiator of a 30 person year study of smoke from biomass burning that has been used as input data to greenhouse climate models.

Public advocate for the non-evacuation as a strategy to decrease life and property loss during disastrous bushfires.

Consultant to Australian International Development Assistance Bureau as technical leader of the Joint ASEAN / Australia pre-feasibility study on Transboundary Pollution of Haze in ASEAN countries, September 1992.

Member of the Alpine Advisory Committee. Up to 23 May 2016.

EMPLOYMENT ACTIVITIES

Retired from the Australian Public Service however I maintain an active consultancy program and other work associated with rural fires.

Consulted to WorkCover Victoria, the Victoria Police and the Victorian Coroner on the Linton fire incident.

Have completed the first stage on a joint technical assistance study in Indonesia with Fortech, Jaakko Poyry, the Asia Development bank and national Development Planning Agency of Indonesia (BAPPENAS) to develop an investment strategy to mitigate drought, fire and haze in Indonesia.

Provide advice on burning strategy and tactics for prescribed burning on the Mornington Peninsula with Dr Ron Gross.

Flew observation patrol aircraft for CFA 1968 - 1970

Supervised two Honors students, one Masters and two PhD student in rural fire studies.

Briefly a Research fellow in the Monash Department of Mathematics working with Dr Terry Clark from the National Center for Atmospheric Research, Boulder Colorado on a coupled fire /atmosphere meso-model for fire spread.

Recently a Senior Professional Officer in the Australian Bureau of Meteorology as the Supervisor Rural Fire Weather Warning Services. The position involved policy development and research. I had the national responsibility for all the Bureau's fire weather warning services.

Recent major research project is the development of an objective method of forecasting fire danger. This project was conducted by a Ph.D. student in the Department of Geography and Environmental sciences, Monash University. Other current research is investigating the link between global cooling and biomass burning and coupled fire and meso-meteorological models.

PREVIOUS POSITIONS

Previous position was as Deputy Director of the Australian Counter Disaster College (Department of Defence). I was responsible for the professional aspects of the College's activities, which included courses, workshops and seminars on disaster management for about 1200 participants each year. The college had a small research programme and a total staff of 49. That appointment lasted from 1985 to 1987.

For five years from 1980 to 1985 I was a part time lecturer in inorganic chemistry and Director of the National Centre for Rural Fire Research at the Chisholm Institute of Technology (now Monash University).

Between 1962 and 1980 I worked in bushfire research in CSIRO in the Division of Physical Chemistry which has had many name changes including Division of Applied Chemistry and the Division of Chemical Technology. I started in `1962 as a Technical Assistant and was a Principal Research Scientist when I resigned in 1981. My research at CSIRO was centered on heat and mass transfer in bushfires, aerial prescribed burning, smoke chemistry and dispersion, nephelometry, air pollution, fire detection in buildings and remote sensing of bushfires. I maintained an instrument rating for multi-engined aircraft and specialized in the use of aircraft for atmospheric measurement.

EXPERT EVIDENCE

I have provided expert evidence on many matters concerning bush fires.

Supreme Court

S.A. Shire of Stirling, Ash Wednesday 1.Fires 1980.
 W.A. The Toodyay fire
 WA The Roleystone-Kelmscott Fire
 Vic. The Kilmore East Fire 2009
 WA The smoke taint case. 2011

Magistrates Court

Morwell Code The Aberfeldy/Seaton fires 2013/14
 Sale Higgins 2014

Other

The Linton fire deaths, Vic Coroners Court 91999),
 The House of Representatives Inquiry into the Australian Bushfires (1983),
 The Miller Inquiry into the Ash Wednesday Fires, Vic 1983.

Other interests

Environmental conservation, keelboat sailing, bicycle riding, motor sport, flying, landscape photography, wine making and life.

RECENT ACTIVITIES

Appointed to Ministerial Alpine advisory Council.

Consultant to Forestmount for the burning of 80 hectares of windrows contiguous to housing estates in Mt Martha.

Facilitator to the Country Fire Authority, CSIRO and the Bureau of Meteorology in developing a national strategy for satellite measurement of grassland curing as a measure of fire risk.

Guest presenter at a Bureau of Meteorology one week workshop in Hobart on fire behaviour models for fire weather forecasters.

PUBLICATIONS

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smoke. Symp. Fire in the Environment, Denver, USA.

Taylor R.J., Packham D.R., et al. (1973) *Convective Activity above a Large-scale Bushfire*. *J Appl. Meteorology*, 12, 1144-50.

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Evans, L.F. King, N.K., MacArthur, D.A. Packham, D.R. and Stephens, E.T., *Further Studies of The Nature of Bushfire Smoke*. Division of Applied Organic Chemistry Technical Paper No.2, Commonwealth Scientific and Industrial Research Organization, Australia.

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suitable for use in rural firefighting. National Centre for Rural Fire Research, Tech. Paper No. 1 Chisholm Inst. of Technology, Vic., Aust.

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BOOK REVIEW

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SUBMISSION TO INQUIRY INTO FIRE SEASON PREPARDNESS

PARLIAMENT OF VICTORIA.

David Packham OAM MAppSci¹

15 June 2016

Introduction

This is a most timely Inquiry.

Since 2003, Victoria has had more than 3 Million hectares of public land subjected to high intensity bushfires that has caused massive environmental impact, threatened water supplies, a disastrous and tragic life loss and destruction of homes. Yet the response has been that it is inevitable and a product of global warming and lack of more fire fighting resources.

It has actually been due to a policy and practice of allowing the bush to accumulate fuel with out any human input.

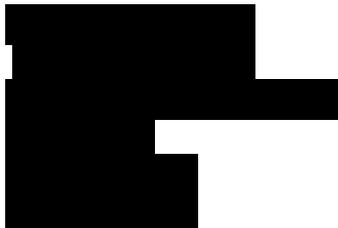
Fire politics has replaced facts, science has been hijacked until it is really “politics by a different means” and leadership has been lost in a maze of legal actions and inquiries, contrived seminars and workshops, public relations craftsmanship and research discourse by press release.

This inquiry may be our last chance to achieve a “healthy and safe” forest environment before the next catastrophic fire expected within the next 30 years.

Our bush environment is now changed from that relinquished by its Australian Custodians in 1788. Our water supplies have been put at risk, many peoples homes and businesses are in danger of being ashed and more hundreds and even thousands burnt alive until our community and its leaders finally reintroduce traditional burning regimes.

The fire threat can be removed but only if notice is taken of the understanding that has accumulated from seventy years of careful fire research, 30,000 years of aboriginal custodianship and the accumulated knowledge and experience of Australians who actually live in the bush and understand fire.

¹David R. Packham



Attached , CV and Publications.s

Recent important books have provided far more than enough evidence for the conclusion that a failure to restore traditional burning will change our environment irreversibly and result in catastrophic fires with loss of water recourses, species and life.

These three major and learned works are...

Gammage (2001), *"The Biggest Estate on Earth: How Aborigines made Australia"*. Allan and Unwin. Won the Prime Ministers prize and also the Victorian Premier's Prize. Simply cannot be ignored.

Jurskis (2015) *"Fire Stick Ecology: Fairdinkum Science in Plain English"* Connor Court. A research forester's plan to save the Australian environment based on critical science and experience.

Adams and Attiwill. (2011) *"Burning issues"*. CSIRO Publishing. Dean of Agriculture, Sydney University and Professor of Botany Melbourne University, respectively. Why fuel management is urgent.

It has been demonstrated by Gammage that human management of our bush is necessary if we are to protect its environment and all who live in it. We must protect "our country"².

I have in this submission provided a statement to the Pearce Inquiry³, an analysis of the physics that explains why the Aboriginal fire management resulted in Australia Felix⁴. Evidence why aircraft attack is ineffective⁵ and other supplementary information for the Committee⁶.

This is a complicated subject and not capable of understanding on casual reading and thought. Indeed after 54 years of bushfire research I have at last glimpsed at what I do not know. I doubt that it is within the capability of busy people to understand but one must live in hope before the next disaster that will out horror even Black Saturday 2009.

Terms of reference

² Attached, Robinson, *Cleaning up the Country*.

³ Attached *Submission to Mr Tony Pearce*

⁴ Attached *Some observations on the effectiveness of fuel reduction burning in Southern Australia*.

⁵ Attached *ASM1/84 CL215, ASMI/84 Part1*

⁶ Attached. *Eltham's Death Trap*. also Jurskis and Underwood

I have addressed the terms of reference very briefly, sometimes given a key reference in the attachments and would be pleased to expand on any of the issues raised.

The literature, traditional knowledge residing in the Australian Aboriginal, explorers, graziers and pastoralists, foresters, research literature and land managers experience is extensive and cannot be distilled or digested for a short submission.

a. The amount and nature of preventive burning undertaken to date.

A simple question, but with a complex answer which may never be established as anecdotal evidence shows failed burns are included in official records, some times wild fires are included some times not, and usually partial burns are included.

We must not expect accuracy in the reported areas burnt.

My analysis of the Kilmore fire found that 1.6% of forest land had been reported as fuel reduced but personal inspection of some “burnt” areas around Marysville did not seem to be consistent with an actual fuel reduction burn. For strategic purposes a generous estimate of 3% of public land in Victoria can be argued which would result of an undetectable diminution of threat. Insufficient to protect Victoria’s environment its water supplies, assets and lives.

b. Measures in place to ensure preventive burning is undertaken safely.

Due to the build up of fuels over the last two decades it is very difficult to achieve total safety in prescribed burning operations especially as the loss of experienced forest staff and the refusal to adopt techniques developed in Western Australia. The achievement of zero accidents and escapes is difficult and they will continue to fail until there is a professional approach made to both strategic and tactical burn planning and operations⁷.

Accurate prescribed burning guides⁸ are not used, reliance on poor spot sampling of fuel moisture, lack of complete fuel quantity information, use of total burn out techniques, lack of pre burning edging, burning adjacent to high fuel loads, apparent lack of using the flexibility available from high quality weather forecasts⁷ are amongst the many issues relevant here.

c. The effectiveness of protective burns in achieving community safety.

In the South East and West Australian dry forest environment there is no other way to ensure community safety from disaster or mega fires than consistent and sufficient fuel reduction burning at the rate of 2 – 3 fires per decade ⁹. Protection

⁷ See Submission by Forest Fire Vic Inc, this Inquiry.

⁸ Attached, *Red Book*. Front page only of Western Australia’s prescribed burning guide developed over 80 years of fire research, the Red Book. World’s best guide applicable to most of Victoria’s forests is deliberately ignored.

⁹ For example Ward, Attached

from milder fires will be achieved with small selected “strategic” burns but will fail in the “Black Saturday” scale mega fires.

There is no other solution to the risk to our Alpine Parks that have been changed by the three million hectare fire since 2003. The difficulty is that the techniques for coping with the post alpine fires are unknown as we have never been in this situation before. That is the Alpine doomsday **bomb**.

d. The impact of preventive burns on protected species.

I have no expert knowledge on this subject except to observe that if the traditional regime (about 3 fires per decade, Ward page 130)¹⁰ then the threatened species may well have survived because the resulting forest environment suited them.

e. The impact of preventive burns on ecological vegetation classes.

A very complex subject and I have little academic knowledge but over the last 50 years have observed the lack of fire causing serious degrade in the dry sclerophyll forests of SE Australia and the improvement in the WA Southern forests as a result of several decades of careful Fuel Reduction Burning (FRB). The work of Jurskis and also Adams and Attiwill are most informative on this question.

f. The impact of preventive burns on the climate.

I spent a year researching this question¹¹ and concluded that the lack of indigenous traditional burning around the world over the last 500 years or so has lead to an increase in the Earth’s Atmospheric average temperature by 1°C.¹¹. Such work does not include the effect of an increased concentration of cloud condensation nuclei, which would affect cloud cover leading to cooler temperatures. The details are attached in a paper to an international Fire Weather Conference held in Lorne Victoria.

g. The targeting of preventive burns statewide.

The obfuscation that has existed due to the controversial nature of the fuel reduction burning question has limited our ability to provide a reliable answer to this question. I make a personal anecdotal comment from my own observations.

Around Central Gippsland there has been some extensive, high quality burns in the Holey Plains Forest Park and the Mullindung State Forest. These burns have been well targeted to interrupt future fires travelling out of the Strezleki ranges.

However in East Gippsland I have observed so little fuel management as to leave the area totally exposed to mega fires. Most distressing has been the failure to manage fuels in the Alpine country.

An interesting personal observation in April 2015 when flying a light aircraft low over the Mallee where accusations have been made of extensive and

¹⁰ Attached, Ward PhD. See pages 130 -

¹¹ Attached , *Packham and Tapper*

irresponsible fire was to observe only one modest burn which appeared more to be a result on multiple lightning strikes.

Areas at high risk e.g. Noojee seem to be totally without substantial protection.

h. The resources available to ensure that adequate preparation is undertaken.

Again I am not in a position to provide other than anecdotal observations. From observing the resources thrown at prescribed burns in my local area there is surplus manpower on the day of the burn e.g. counting of eleven crews for a local burn that appears to have been about 20 hectares.

In Western Australia we typically had four ground crews, one supervisor and co-ordinator and one aircraft crew for a 6000 acre (2500 ha) burn in high quality southern forest Jarrah.

The suspected misuse of resources needs to be looked at by the State Auditor as it appears that expensive weekend burns are favoured.

i. The coordination of such planning and preparation with other departments and agencies across government.

I have little direct knowledge except to suggest that this may be one contributing reason for the dangerous and future fatal and deteriorated condition of a lot of the State's roadside vegetation. This is major life risk in Victoria, and I for one do not wish to see a school bus trapped on a ti-tree invaded road in a fire and incinerated.

j. The nature and level of emergency response.

I restrict myself to considering bushfires. Extensive large scale fire experiments in the Nowa Nowa forest of Gippsland (CSIRO Project Aquarius) established that fire attack fails above 3 megawatts per meter Byram fire intensity. Up to that intensity the Victorian capabilities were better than in any other fire prone area in the world. Above that intensity fire fighting in forest area has been shown to be ineffective. Moderating weather or lack of fuel determines the outcome.

In grass fuels, the situation is better as the limit to fire suppression appear to be closer to 10 Megawatt per metre. Skilled flank attack has had some remarkable success in the Western District of Victoria.

Fire accelerates in intensity from a single flame to an intensity of around 70 -100 Megawatts per metre in a very short time measured in minutes in Extreme and Catastrophic weather conditions. Regrettably research into fire acceleration worldwide has not yet been very helpful. The time below the 3 MW/m extinguishment intensity is very short.

If sufficient local very fast reponse can be on the fire flank in seconds then extinguishment can and has occurred. If assisted by pre burnt roadsides and the attendance of many farmer's private units success is a frequent outcome.

Recently, however, there has been a very unfortunate change, Tankers have become very large, complicated and slow. They have taken large turnout times and more widely dispersed so that the travel time is longer. With the prohibition of private units to respond to local, even neighbour fires and the wait for aircraft directions have resulted in failure of initial attack on extreme days to be the usual result.

As I gathered an awareness of community disaster response I became familiar with the work of Enrico Quarentalli and Scanlon on disaster response and later with the evidence given and the report provided¹² to the Bushfires Royal Commission by Herman B. Leonard which was mostly ignored by the Royal Commission which has allowed a centralisation of command, coordination and control functions at the expense of local response. This deterioration in our capabilities will continue and result in a bigger, more complicated ineffective disaster management system until the direction is reversed and the conclusions of Prof Leonard are taken seriously. That will be resisted because massive empires, large flows of uncontrolled money and careers have been established within the central system.

Such massive systems have always failed in disasters and will continue to do so.

k. The relevant administrative and organisational structures in place within the department.

I have nothing to add to my comments immediately above.

L Impact of land tenure.

I simply respond that “ if you own the fuel, you own the fire” (Cheney).

Conclusion

This inquiry is possibly our last chance to mitigate the certain disaster that could kill thousands ¹³. Please, for the sake of our environment, Melbourne’s water supplies and the lives of those who live in rural Victoria take up the firestick made available to us by the traditional custodians of our country.

¹² See Attachment, *Leonard*. VBRC EXP 3031.001.0018 also TV evidence in the Royal Commission Transcript.

Prof. Leonard is the George F, Baker, Professor of Public Management in the John F. Kennedy School of Government and the Elliot I. Snider and Family Professor of Business Administration in the Harvard Business School.

¹³ See www.preshtigo.fire.info also see the close call in Western Australia, the Cyclone Alby (1978) fire which was prevented from becoming another Preshtigo disaster by the extensive fuel reduction burning program, then 15-18%p.a. At the rural urban interface see the analysis in Packham and Malseed “Bushfire Death Trap).