



**Australian Government**  
**Chief Scientist**

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**Bushfire and Natural Hazards CRC**

**2020 Laurie Hammond Oration**

***Fire, flood, storm and cyclone:  
applying science to the challenge***

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**Online keynote address**

**\*\*\*Check against delivery\*\*\***

Thank you Katherine, and my warmest acknowledgement of the presence today of Laurie Hammond's wife, Catherine, and family.

Let me start by sharing a vivid description of one of our nation's worst bushfire disasters:

"The speed of the fires was appalling ... Blown by a wind of great force, they roared as they travelled. Balls of crackling fire sped at a great pace in advance of the fires, consuming with a roaring, explosive noise, all that they touched. Houses of brick were seen and heard to leap into a roar of flame before the fires had reached them".<sup>i</sup>

This is a passage that speaks to us.

But it was actually written more than 80 years ago, describing the Black Friday bushfires of 1939 that devoured some two million hectares of Victoria and claimed the lives of 71 people.<sup>ii</sup>

The devastation was so shocking that it prompted a Royal Commission – a landmark bushfire inquiry in Australia.

Its report makes interesting reading for the highly vivid descriptions – as you can see in the quote with which I began my speech – and for its brevity. At just 36 pages, it's a lesson in conciseness.

It is also instructive.

Its findings shifted the terms of the national debate, and helped change the approach to fire management practices.

As Chief Executive of the CRC hosting us today Richard Thornton puts it, that 1939 Royal Commission was "the first real attempt to gain a deep understanding of the causes and consequences of a major bushfire".<sup>iii</sup>

This search for understanding continues unabated. And I'm delighted to note in front of this audience that Mary O'Kane, who delivered the inaugural Laurie Hammond Oration last year, is chairing the NSW Bushfire Inquiry. As soon as I heard of Mary's appointment to co-lead the inquiry, I knew that she would do a fantastic job – as she did when she was a member of my panel for the 2017 review into the national electricity market.

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In the search for practical and effective solutions to bushfire and natural hazards, science and translational research are critically important.

Because, as Laurie Hammond was so fond of saying: utilisation is everything.

With that philosophy, it is no surprise that Laurie was a strong supporter of the CRC model – and eagerly took up the position of inaugural Chairman of the Bushfire and Natural Hazards CRC to guide management to their first successes.

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As we deal with the consequences of our devastating black summer, we have once again been prompted to examine Australia's ability to prevent, mitigate and respond to natural disasters.

But now, we have the added overlay of climate change intensifying some of these disasters.

This intensification is acknowledged at the highest levels.

In January, in a major speech at the National Press Club, the Prime Minister acknowledged “the need to take action to reduce global emissions, to mitigate the risk of climate change”. And he continued, “It’s not in dispute.”<sup>iv</sup>

Noting Australia’s history of “investing in the technology of resilience, the science of resilience,” the Prime Minister announced that he had tasked the CSIRO to prepare a Report on Climate and Disaster Resilience to outline practical measures to protect our natural assets. And he asked me to Chair an expert advisory panel to support that work.

The Government’s acknowledgement of the impact of climate change was captured in the very first sentence of the report’s terms of reference. Just four words:

“Australia’s climate is changing”.

Unequivocally, the government accepts this.

Unequivocally, there are two areas we need to address: adaptation and mitigation.

I'm honoured to be engaged on both of them.

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First, adaptation.

The CSIRO Report on Climate and Disaster Resilience will be reviewed in due course by national cabinet, but in the meantime it has been considered as evidence by the bushfire Royal Commission, where I appeared as a witness two weeks ago.

This CSIRO report considered the increasing challenges climate change is likely to throw at us over the next 20 years.

We focussed on what I call *acute* disasters.

These are like acute diseases such as measles – they last a short time, come on rapidly, and can be accompanied by horrific symptoms.

Acute disasters include bushfires, floods, extreme hailstorms and cyclones. But not the *chronic*, or prolonged, disasters such as drought and coastal erosion.

The CSIRO report noted that there has been enormous progress over many years, informed not just by Royal Commissions and Inquiries, but also by a huge body of research.

Research driven for nearly the past 20 years by the Bushfire and Natural Hazards CRC and its predecessor.

Research driven by our universities and government research agencies.

Research driven in response to the needs of the members of AFAC.

But at the risk of sounding like a broken record repeating the mantra of past Chief Scientists, we must do more.

We need to continue to invest heavily in climate and natural disaster research because our circumstances in Australia continue to evolve; be they community expectations, the siting of buildings and infrastructure, the construction materials used, or our unique and evolving climate.

As the CSIRO report said: "We need to build back better. Resilience needs to be embedded as an explicit consideration in all future planning

for agricultural and urban land use, and zoning and investment decisions.”

Earlier this year, the Minister for Industry, Science and Technology Karen Andrews, asked me to develop a mapping report of Australia’s bushfire research and technology capabilities.<sup>v</sup>

My office and I consulted widely.

We confirmed that Australia is internationally recognised for its bushfire-related research. Bibliometric analysis indicates that Australian research ranks second in the world in terms of publications, with particular strengths in fire ecology, health impacts, prescribed burning, and modelling and predicting fire behaviour.

Further, Australian research into engagement with communities on bushfire preparation is very highly regarded, with operational agencies taking a key role in setting the agenda for research, and translating it into practice.

And, no surprise, our report found that technology is key.

Next-generation technologies. Such as software that can simulate bushfires in different weather conditions, fire histories, vegetation or fuel loads.<sup>vi</sup>

The CSIRO report notes that there is no nationally consistent operational bushfire model and identifies an emerging model named *Spark* as the most future-proof, fire-behaviour modelling platform. The report recommends that *Spark*’s ongoing development be centrally resourced, to embrace new technologies such as artificial intelligence for real-time prediction.

Other recommendations include: more sophisticated satellite and aircraft-mounted observation technology to see through smoke and cloud; domestic production of fire-fighting foams, gels and retardants; more research into the complex area of hazard reduction including cultural burning; improved building standards for new properties; and supporting the mental health of first responders and community members.

Of course, today's research base and capability is a big step up on what we had in 1939, when the Royal Commission sadly concluded that much of the evidence was "quite false" and "little of it was wholly truthful".

Today, our researchers have a wealth of reliable bushfire-related data that is open to scrutiny and cross-checking, and available to inform future research.

And technological advances available now are beyond anything imaginable in the 1930s.

Cumulatively, our research translated into action is having a significant impact.

And we *are* learning.

Consider this: the two million hectares burnt in the bushfires of 1939 are dwarfed in comparison to the more than 17 million hectares lost during our recent black summer.

And yet, deaths directly linked to our recent black summer bushfires are fewer than half of those in 1939.

Any bushfire-related death is a tragedy; technological advancements are ensuring these tragedies are not more prevalent.

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The lifecycle of managing climate and disaster resilience can be characterised as:

- planning and preparation
- the immediate response and recovery, and finally
- the application of our learnings to build further resilience.

As noted in the CSIRO report, we constantly need to do more to understand the future risks and plan for them.

As such, I was delighted that, just last month, the Government committed nearly \$90 million to scale up funding for critical research into bushfires and natural hazards through a new, world-class research centre.

Building, of course, on the foundation of the Bushfire and Natural Hazards CRC.

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So far, I've been talking about adaptation. Now let's talk about reducing the scope of the problem in the first place.

As I mentioned at the start of my speech, we also need mitigation.

For that, we must dramatically reduce greenhouse gas emissions.

The Government has signalled its intent to do so, taking a technology-driven approach.

To that end, in February, I was asked by the Minister for Energy and Emissions Reduction, Angus Taylor, to Chair a Ministerial Reference Panel to advise him in the development of Australia's first annual Low Emissions Technology Statement. Coming soon to a website near you.

Our approach is to build on our research base and comparative advantages to lead the development and adoption of low emissions technologies across the economy: in industry, in agriculture, in the built environment, in transport and in electricity generation. With the goal of enabling their deployment *at scale* so that they will be cost competitive with the high emissions incumbents.

The low emissions statement will set out a pathway for researchers, investors and policymakers to advance and learn together, to make space for discussion within the wider ecosystem in which policy is developed, and to foster a mutual understanding and respect for each other.

Which leads me to the broader question of how science is informing public policy.

It is, of course, a difficult balance.

Scientific input does not automatically lead to a particular policy approach. There are always other considerations, such as: is it realistic? Will it be supported by the community? Can we afford it?

That doesn't mean the scientific evidence is any less important. It just means that it will be one of several inputs, a key one, taken into account by policymakers.

To compete with the other inputs, science has to put its best foot forward.

Which means building on the existing expertise using open lines of communication.

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Indeed, as I reflect on my time as Australia's Chief Scientist, the special ingredient across all projects I have undertaken has been broad and deep consultation.

Consultation with the research community, with investors, with industry.

And also, with the government ministers and policy advisors for whom a report is intended. Taking their opinion into account *does not compromise independence*. The independence of a report comes from the courage and experience of the Chair and the panel members.

Every time we go through a round of consultation, I come out wiser.

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As it happens, I learned the importance of consultation for *policy development* when I attended a workshop in 2009 chaired by none other than Laurie Hammond. The purpose of the workshop was to guide the planning for a proposed Commonwealth Commercialisation Institute, the conceptual forerunner to today's Accelerating Commercialisation program and the whole-of-government advisory board: Innovation and Science Australia.

I vividly recall the superb way that Laurie stood at the front of the room and coaxed opinions and experiences from us. Consultation done artfully.

Katherine Woodthorpe, you were in the planning workshop, too, and I am sure you will agree.

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I would also like to take this moment to step sideways, and acknowledge the contribution of another master of the dark arts of consultation and

collaboration, Dr Tony Peacock, who recently announced his retirement as CEO of the Cooperative Research Centres Association.

Tony, with his wry and dry-witted style, has made a huge contribution to the Association and its support for the CRC program and the Australian businesses involved.

And, like Laurie, Tony is a practitioner of consultation and transparency.

This is the approach that will feed our success in future research into bushfires and natural disasters and help us to find the best way forward in the planet-wide mission to reduce greenhouse gas emissions.

It's been a tough year. Unprecedented bushfires, followed by devastating floods and now the coronavirus pandemic.

If we've learned anything, it's that disasters can and will happen – and even though you might have predicted them and even sounded the alarm with sometimes unsettling accuracy, they still seem to surprise us every time they arrive.

We don't know what might come next. But we do know that we must adapt and we must mitigate.

We do these things best when we invest in research.

When we invest in technology.

When we consult widely and inclusively.

And when we come together across state borders to share what we know.

In this, our National Science Week, and as Australia's Chief Scientist, I am honoured to have been able to continue the legacy of Laurie Hammond through this oration.

The work of the Australian research community is vital.

It delivers the goods.

May the Force be with you.

Thank you.

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<sup>i</sup> 1939 (Victoria): Report of the Royal Commission to inquire into the causes of and measures taken to prevent the bush fires of January, 1939. L.E.B. Stretton. Available at [https://digitised-collections.unimelb.edu.au/bitstream/handle/11343/21344/112962\\_1939\\_Bushfires\\_Royal\\_Commission\\_Report.pdf?sequence=1&isAllowed=y](https://digitised-collections.unimelb.edu.au/bitstream/handle/11343/21344/112962_1939_Bushfires_Royal_Commission_Report.pdf?sequence=1&isAllowed=y)

<sup>ii</sup> <https://www.ffm.vic.gov.au/history-and-incidents/black-friday-1939>

<sup>iii</sup> <https://www.smh.com.au/environment/climate-change/lessons-learnt-and-perhaps-forgotten-from-australia-s-worst-fires-20190108-p50qol.html>

<sup>iv</sup> <https://www.pm.gov.au/media/address-national-press-club>

<sup>v</sup> <https://naturaldisaster.royalcommission.gov.au/publications/exhibit-27-001001-rcn9000780001-office-chief-scientist-bushfire-research-and-technology-mapping-australias-capability>

<sup>vi</sup> <https://firepredictionsservices.com.au/> accessed 5.8.2020