

Science and decision making – the McArthur model as a case study

We all agree that science holds the key to managing the impact of bushfire on people, assets and the environment. Our planning and risk reduction strategies, our emergency systems and equipment all need to be managed with a sound understanding of fire behaviour and what contributes to the risk of destructive fires. However there is considerable disagreement on what makes up a reliable, accurate model of fire behaviour and what actions actually reduce risk. For example, on the one hand there is strong support for intensive fuel reduction programs in natural areas to protect communities and assets. Others argue that too many fires too close together not only destroy ecosystem functioning but actually make the landscape more fire prone. However, when we realise that the science of global warming is fully accepted and actively included in fire management research and planning, we can see the benefits of coming to common ground.

The debate about fire management can become very heated and personal. It is complicated by intra-community tensions as well as local and national politics. As a community we need to find our way through the complexities and tensions of current fire research in order to make informed comment on fire management. The McArthur Index provides an excellent case study for the issues we face.

When McArthur became the first full-time fire control officer for the Snowy Mountains area in 1951, he began more than twenty-five years of studying the behaviour of fires in a wide range of fuel types, devising systems for rating the danger of fires under different meteorological conditions. These systems became an essential tool for rural bushfire brigades; they were adopted by the Bureau of Meteorology in forecasting fire-hazard conditions; and they were recommended by the United Nations Food and Agriculture Organisation for use in developing countries. McArthur also prepared guidelines for controlled burning, a practice he regarded as essential in containing fires in native forests. Much of his data was derived from field exercises on Black Mountain with forestry students and as part of CSIRO research programs.

Since his death in 1978 the McArthur model has been studied, refined and expanded and is the basis for fire predictive tools such as Phoenix and Vesta. McArthur's preference for large scale hazard reduction burns in natural forests is almost part of fire management DNA. So how has his model stood up to the test of time?

There is no point critiquing his work in the context of today's science. His work was important because it moved the thinking of the time from intuition and individual experience to solid scientific observation. But let us remember that at the time McArthur was doing his best work, the car of choice was the huge American gas-guzzlers with long shiny fins and tiny back seats. Today we drive cars that

focus on safety, reduction of carbon emissions as well as the school-drop off and needing big car boots to carry our shopping. Driving a Yank Tank these days is an expensive hobby, not a practical way of moving around.



McArthur did his research on Black Mountain, conducting small burns and interpreting the implications of his data into large scale burns, still a very valid scientific method. He would not have dreamt of the power of LIDAR (Light Detection and Ranging) which can 'read' a forest right through all its layers and – correctly interpreted – even classify tree species. He could not have conceived of the work done by our own Jason Sharples and Rick McReadie who broke the rules of weather prediction and placed portable weather stations in gullies to collect data at a micro scale across different weather events and then harnessed the data to explain previously inexplicable fire behaviour.

At the time of McArthur's work the ACT had no accurate vegetation maps. He had only a very broad idea of what was out there. Now we are part of citizen science where any of us can download GPS data on the sighting of a specific orchid, butterfly or eagle. We can only speculate as to what McArthur would have done with all this data. Would he still have supported large scale prescribed burns for forests? Working in an era which still had not recognised Aboriginal people as Australian citizens, what would he have made of our growing respect for indigenous burning practices? I like to think he would have been intensely excited by what is unfolding in the bushfire science field but we can only speculate.

We have a different task. We need to understand the insights and ideas which the new data and research have made possible in our time. We need to listen carefully, examine critically and think deeply about what science is now telling us.

More than that though, we need to see the cultural context in which science has always operated. We have to accept that science on its own cannot make our decisions for us. We need to understand the values which we bring to the table and acknowledge the different values which others might have. With respect and openness we, as a community, might be able to develop effective risk management strategies for the future which value and protect us, our assets and our environment.

Christine Goonrey

Convenor
Bushfire Management: Balancing the Risks Symposium
July 2017