

Water bombing and magic bullets.

by Roger Underwood

Back in the summer of 1960/61, when I was training to become a forestry officer, I was unlucky enough to be caught up as a firefighter in the great bushfires of that year. In the Dwellingup Fire, three towns were burnt out; a further town was burned out at Karridale, and in the lower southwest a massive fire took out thousands of hectares of beautiful karri forest south of Pemberton. This last fire was only contained when it ran into the southern ocean near Windy Harbour.

It was in the wake of these fires that I first began to glimpse the depth of the ignorance about bushfires that was then, and is still today, evident in Australian society.

This was demonstrated by a series of letters to the editor published in The West Australian newspaper in which well-meaning citizens proposed solutions to the bushfire problem in south-west forests. Many of these suggestions were so outlandish as to be laughable – for example, one writer urged the government to construct low stone walls all through the forest, modelled on the drystone walls he had seen on the moors of Scotland. Another advocated the installation of a reticulated sprinkler system over millions of acres of forest. How construction and maintenance of this system was to be funded, and where the water was to come from, were not explained.

More recently I recall a Perth environmentalist proposing that the government should station an army of firefighters permanently in the forest throughout the fire season, day and night. They would be so numerous, and so well placed, that any fire that started could be attacked and suppressed within minutes of starting. There was no suggestion as to how this army was to be recruited, trained, sustained in the field and paid-for. Given that a fire in heavy fuels in the jarrah forest, under quite normal summer weather conditions, can escalate from a spot fire to a crown fire in about fifteen minutes, I estimate that the number of firefighters needed to cover the two million hectares of forest would need to be of the order of 4 million men.

And only the other day I read a proposal from a learned professor at the Australian National University, that the entire Australian forest estate be crisscrossed with parallel roads, two hundred metres or so apart, allowing the intervening strip to be regularly subjected to controlled burning, thus enabling wildfires to be contained in the low-fuel strips. No thought was given to the cost of building and maintaining the roads, especially in mountain country, let alone the fact that it would not work. Fires in heavy fuels in eucalypt forest can throw spotfires for kilometres, making any network of narrow fuel reduced strips just as meaningless as a low stone wall.

The modern equivalent of these stories are the calls for the government to increase its fleet of aerial water bombers, specifically the gargantuan DC10, or Very Large Air Tanker (VLAT). There are letters to the editor nearly every day, supported by calls for more and larger aircraft from retired politicians on talk-back radio, representatives of the aviation industry and journalists. Water bombing aircraft are also beloved of the uniformed firemen who dominate our emergency services, because they are the ultimate expression of "wet firefighting". Wet firefighting is fighting fires with water; uniformed firemen everywhere have been trained to know it is the only approach.

Thus, the water bomber is seen as the magic bullet, the answer to the bushfire maiden's prayer.

Interestingly, nothing along these lines is heard from the land management fraternity (of which I am one). We advocate fire prevention and damage mitigation, with desperate firefighting seen as the last resort, only needed when an effective land management program has broken down. We understand that forest fires must be fought "dry", that is, with bulldozers constructing containment lines. In this approach water is used for mopping up the fire edge, not for constructing the edge, which (in forest country) it cannot do. We regard the growing reliance on water bombing as a foolish approach to bushfire management.

Here I need to pause briefly and remind myself of the cautionary words of my father (who was a scientist, a philosopher, a teacher and a man of great tolerance): "Roger," he admonished me one day when I was sounding off about something, "there is a big difference between being a fool and being simply miss-informed."

This is all very well. But when it comes to bushfires, the misinformed are now in charge, or they are subject to political influence and manoeuvring by lobby groups who have no interest in effective bushfire management, such as the Australian greens. Misinformation thus leads to foolish decisions, and these in turn lead to bushfire disasters.

The calls for investment in more and bigger aerial water bombers rather than in effective pre-emption of bushfire damage is a classic demonstration of misinformed people making foolish proposals. Every experienced fire fighter in Australia (and in the USA and Canada) knows that water bombers can never control an intense forest wildfire.

Consider these factors:

Firstly, because of atmospheric turbulence and smoke, water bombing aircraft cannot get at the seat of a rampaging forest fire; they must stand off from the head, and then the drop is evaporated by radiant heat well before the flames arrive;

Secondly, in tall, dense forest, the water drop often cannot penetrate the canopy in sufficient volume to make a difference - it is intercepted by the tree crowns. This occurred over and over again in the recent fire in ash forest in the Otway Ranges in Victoria - the water simply did not get to the ground.

Thirdly, water bombers cannot (or do not) operate at night and under high winds, the very conditions when the most damaging forest fires occur. Three of the last four towns to burn in WA, and both towns that burned in Victoria in 2009, burned at night.

Fourth, water bombing is extremely dangerous for aircrew as the aircraft are operating at low altitude, in uncontrolled airspace with poor visibility. It is only a matter of time before there is a shocking accident and an aircrew fatality.

Water bombing can also be dangerous to people on the ground. If the drop from a Very Large Air Tanker is made from only marginally too low, the huge tonnage of water is capable of smashing houses and vehicles and killing firefighters;

Fifth, water bombers use vast quantities of fresh water, probably one of the most precious resources in Australia, especially in Western Australia where the current drought is over 30 years in duration and reservoirs and ground water aquifers are drying up. Sea water could be used, provided the tankers have access to it, but dropping salt water onto catchment areas or farms would only add to the problems caused by the fire.

Finally, the whole business is obscenely expensive. The merest little helicopter water bomber costs a dollar a second for every second it is in the air, while the "Elvis" firecrane hired from the USA is about ten times more expensive. The Very Large Air Tanker operating out of NSW this year is said to cost nearly \$50,000 an hour for every hour it is in the air, and not

much less when it is simply on standby on the ground. And to this must be added the cost of the smaller aeroplane that flies ahead of the VLAT to mark its dropping target.

I have no idea what the "carbon footprint" of a VLAT is, as it has never been mentioned, especially by the environmentalists who are so enamoured of it, but it must be significant.

I am not completely against water bombing. I am happy to see a small number of light water bombers stationed around the southwest, because they can do useful work assisting ground crews in the control of relatively mild-intensity bushfires, and under some circumstances can "hold" a fire in a remote spot until the ground crews arrive, or can drench a house threatened by a grass fire. What I oppose is the ramping-up of the business to the extent we are now seeing in Australia, along with all the publicity that suggests this is not just a good thing, but is the responsible thing to do (when the opposite is the case). And I hate the sheer waste involved, not just of dollars, but the futile dropping of precious fresh water onto a raging forest fire, making not one iota of difference.

How well I recall the most recent bushfire in Kings Park in Perth. The air was thick with water bombing helicopters and fixed wing aeroplanes, dropping load after load of water, but the fire was only contained when it ran into the Swan River. Remembering this reminded me of the words of Stephen Pyne, the world's foremost bushfire historian and commentator: "Air tankers are primarily political theatre, and only secondarily part of fire control. They have their place. But they dislodge attention from truly effective measures".

My frustration over all this is made more acute by re-reading the analysis of the trials of the DC10 VLAT by the CSIRO. After a number of water dropping trials, the CSIRO concluded:

1. Most of the drops featured a distinct pattern of break-up of the drop cloud in which a series of alternating thick and thin sections could be seen. The resulting drop footprints exhibited a corresponding pattern of heavy and light sections of coverage. Many of the light-coverage sections within the footprints were observed to allow the fire to pass across them with minimal slowing effect on spread rates.
2. Two drops delivered in open woodlands (as opposed to heavy forest) penetrated through the canopy and provided a good coverage of surface fuels. One of these drops rained gently through the canopy under the influence of a headwind. Another drop caused severe damage, snapping off trees ...This drop could have potentially injured people or damaged buildings..

The CSIRO scientists also looked at the effectiveness of the DC10 dropping fire retardant chemicals in the forest across the path of the headfire, a technique frequently recommended by supporters of aerial tankers. They concluded that this approach would only succeed for very low intensity fires, due to the ease with which a more intense fire would spot over the retardant line.

Overall, the CSIRO's conclusion of this study was that:
on the evidence collected, this aircraft is not suitable for achieving effective [bushfire] suppression under most Australian conditions.

Unfortunately, the CSIRO did not look at the Western Australian situation, where there are significant operational constraints. As far as I know we have only two airfields in the south west that the DC10 can use - Perth Airport, where it would compete for airspace with passenger jumbo jets, and the military airfield at Pearce which is well north of the south-west forest zone, giving long ferry times between drops. Furthermore, the operation of the DC10 requires a staff of over thirty, most of whom are doing nothing for most of the time. During a

fire attack, the VLAT is led in by a second aircraft, whose job is to mark the drop zone. This is further crowding the air space over the fire. Turn-around re-fuelling and water or retardant reloading of the VLAT between drops takes up to an hour on the ground ... by which time the fire could already have outflanked the initial drop.

Despite all this, calls for the acquisition of a DC10 water bomber continue to come in thick and fast.

The explanation for this popularity was given to me by a Californian fire chief with whom I became friends at an international conference on bushfires in Washington in 2011. There was not a single bushfire professional in the USA who supported the massive investment in aerial water bombing that has occurred in recent years, he said. In the first place it was known that they were ineffective on anything but a relatively mild forest fire, and even then only operated as support to firefighters on the ground. In the second place, their cost was so great that every other part of the fire and forest management system had to be sacrificed to fund them.

On the other hand, my friend explained, the whole shebang had taken on a political and media life of its own. Nobody cared whether or not it was cost-effective; the important thing was that it made fantastic television and the politicians and emergency service chiefs who ordered them could bask in a glow of popular acclaim, and adulation in the media. City people, with no bushfire experience or any understanding of the effectiveness of the water bombers, are seduced by their glamour and drama. Water bombing, as a friend remarked, is not firefighting but "theatre for the masses".

As I write, the support for water bombers in Australia is becoming almost hysterical. The Gold Medal goes to radio compere Ian McNamara of "Macca on a Sunday Morning" fame. He said it is a "no brainer" not to have multiple air forces of water bombers stationed all over the country, the more the better. This opinion is supported by the greens who see the water bomber as a substitute for fuel reduction burning, which they hate.

However, the most insidious contribution to the water bombing issue comes from an alliance between the Australian aviation industry and Australian journalists. The aviation industry sees the ramping-up of aerial firefighting simply as good business. They have no interest in its effectiveness ... their game is to sell or hire more aircraft, and the bigger and more expensive the aircraft, the better. And they need no advertising program! This is provided for free by the Australian media.

The approach of the aviation industry is reprehensible, but understandable, because it is the way salesmen and business lobbyists always operate. What is not acceptable is the way the love affair between journalists and aerial water bombers is leading to terrible investment decisions by governments. Cost/effectiveness is never discussed. It is enough that water bombers make grand television and dramatic pictures. The West Australian newspaper these days rarely has a photograph of a firefighter. Every fire story is accompanied by a picture of a water bomber, sweeping in overhead and ejecting its load of water. The West Australian also has aviation correspondent Geoffrey "Biggles" Thomas, who writes a regular column. He is an unabashed supporter of the aviation industry, and blatantly promotes investment in more and bigger water bombers.

I realise I am wasting my breath. With the adulation of the media, the lobbying of gullible politicians by the aviation industry, the support from populists like "Macca", and the

influence of the greens and the uniformed firemen, the outcome is foregone. By next summer Western Australia will be mimicking the basket-case jurisdictions in Victoria and NSW, and will be acquiring more helicopters, perhaps even the proven-to-be-useless DC10. All of this will be funded by a multi-million dollar budget ... while at the same time, resourcing of fuel reduction burning and other programs for improving bushfire prevention, damage mitigation and townsite protection, will languish.

I do remember my father's words - you cannot call someone stupid who is merely misinformed. But in the bushfire world I have seen, too many times, the dangerous outcomes that flow when the misinformed make foolish decisions.

As I wrote elsewhere a year or so ago:

... the most fundamental tool of the bushfire manager is not the fire tanker, the bulldozer, or even the water bomber. It is the match. The only way to minimise fire intensity and damage is by reducing the amount of fuel before a fire starts. Military people refer to this approach as the pre-emptive strike - we call it fuel reduction.

I also remind myself of the words of the great Victorian forester and administrator Alf Leslie. He had a favourite saying: "When it comes to public policy, stupidity nearly always wins".

Never is this better illustrated than in the way our bushfire authorities and the greater community have been seduced by the glamour of the water bomber. This is the ultimate in stupid policy: a publicly funded program that is obscenely expensive but basically useless.

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