Can Wildland Conflagrations Be Stopped?

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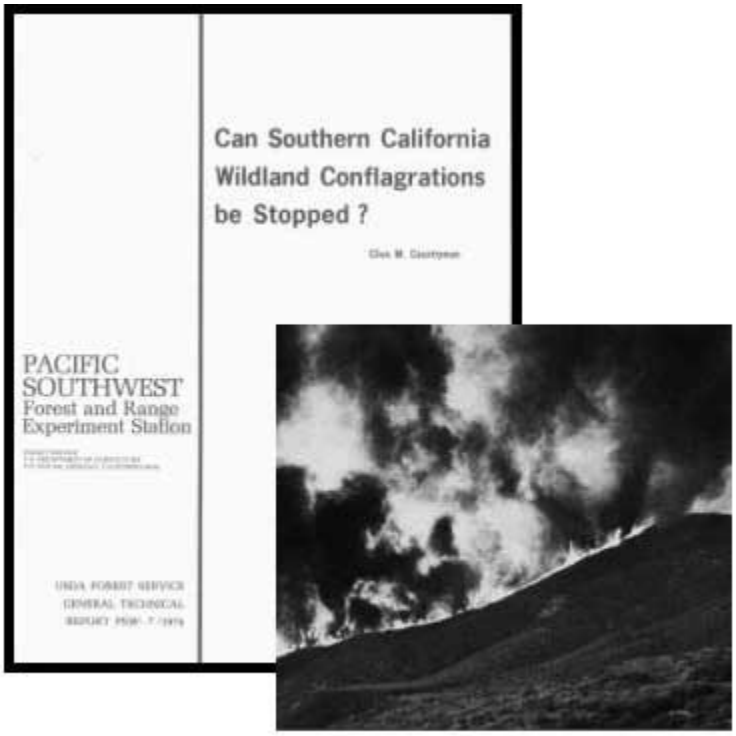
Conflagration *– A popular term for a large, fast-moving wildfire exhibiting many or all of the features associated with extreme fire behavior.*

Merrill and Alexander (1987)

"Can Southern California Wildland Conflagrations Be Stopped?" (Countryman 1974) is the title of what I feel is one of the more important publications on the subject of fuels management presently available[1]. The publication was written by Clive M. Countryman, a noted wildland fire behavior scientist with the USDA Forest Service based in southern California from 1941 until his retirement in the late 1970s.



This publication was written following the 1970 fire season in California (and no doubt was prompted by it) in which 16 lives were lost, more than 200 000 ha of land was burned over, and some 700 homes were destroyed. Countryman's (1974) 11-page publication consists of three major sections involving 17 sub-sections each of which directly imparts a statement or conclusion worth noting:

The Fire Problem

- Climate, Fuels, Topography, and People Create Fire Problems
- Relatively Few Fires Become Conflagrations
- Conflagrations Are Most Frequent During Santa Ana Winds
- Suppression of Santa Ana Fires is Difficult

Fire Control as a Solution

- Fire Prevention Has Limited Value
- Effect of Organizational Problems on Fire Size is Small
- Firefighting Techniques and Equipment are Not Adequate
- Increased Fire Control Force is Only a Partial Answer

A Solution Through Fuel Modification

- Rotational Burning Creates a Mosaic of Age Classes
- Adverse Effects
- High Costs
- Possible Increased Fire Hazard
- Fuel-Breaks Provide Strips of Modified Fuel
- Fuel-Type Mosaics Can Lower Energy Output
- Fuel-Type Mosaics Can be Created in Many Ways
- Fuel-Type Mosaics Are Not a Quick Cure
- Complete and Coordinated Planning is Essential

The abstract from Countryman's (1974) publication serves as an excellent summary (bolding added for emphasis):

In southern California, many fires start and burn under conditions that permit their control with little burned acreage and fire damage. In contrast, under other conditions of weather and topography, on a small group of fires, control is relatively ineffective; they become large and destructive. A major reason for these "conflagration fires" is the extreme difficulty of stopping the head of a hot, fast-running fire in dry fuels and strong winds. ***No radically new concept of suppression can be anticipated*** *[2]. The best prospect for alleviation of the problem is modification of the vegetation to reduce fuel energy output. In a fuel-type mosaic containing large areas of light fuels, where conventional suppression will be effective, potential conflagrations could be brought under control while relatively small. Creation of the fuel-type mosaic will require coordinated area-by-area planning and a variety of techniques.*

In the concluding section of his publication entitled "Complete and Coordinated Planning is Essential" Countryman (1974) notes:

In essence, the envisioned fuel modification will replace the present wildland vegetation patterns with planned and managed ones. To achieve this, complete and coordinated plans must be developed. As fire does not recognize administrative boundaries, such planning will involve not only fire control agencies, but also local governments, land use planning commissions, and sometimes private interests. Social, economic, land use, and environmental impacts must be determined and evaluated, and the best combinations of fuel modification to achieve adequate fuel-type mosaics for a given area established. Inputs into these plans will be needed from fire contro[3]l and fire behavior experts, meteorologists, land-use planning specialists, economists, landscape architects, plant ecologists, biologists, recreation planners, and wildland research groups.

Much of the technology needed to create fuel-type mosaics is now available, is being developed, or is susceptible to development through research[4]*. Many of the techniques by which type conversion can be done have been demonstrated to be feasible. What is needed now is a comprehensive action plan that will effectively bring this technology to bear on the one factor controlling fire behavior that can successfully be managed and manipulated – the fuel.*

To some, the extensive "monkeying with nature" required to replace the present wildland vegetation patterns with planned and managed ones may seen abhorrent. But the impact of man and man-caused fires has already had a massive effect on the natural vegetation, so much so that it is difficult if not impossible to specify what a "natural" vegetation pattern in southern California really is. And this impact will continue as long as conflagrations are a part of the environment. The only alternative to planned and managed vegetation patterns in southern California appears to be acceptance of the great economic damage, threat to human life, and the unpleasant esthetic and environmental effects of unmanageable wildfire.

It's worth noting Countryman's (1974) emphasis on the importance of "human factors" in reaching solutions to the conflagration management problem. Thirty years later, fire historian Dr. Stephen Pyne (2004) has advocated that "science-based-only solutions" are not enough and that effective wildland fire policy must integrate ethics, economics, aesthetics, and values. Accomplishing this will require consensus amongst many people and this undoubtedly represents the greatest challenge for wildland fire management in the future.

As Countryman points out in the introduction of his publication, "California does not have an exclusive corner on the large-scale, high-intensity fires often called conflagrations or conflagration fires … Other regions also have large wildland fires from time to time". In my view, many of the fundamental principles stressed by Countryman can be considered quite applicable to Alberta and other regions of Canada.

The original printed copies of Countryman's (1974) seminal publication were exhausted many years ago. Fortunately it has recently been made more readily available (at the request of the USDA Forest Service by the author) as a PDF that can be downloaded from:

http://www.treesearch.fs.fed.us/pubs/viewpub.jsp?index=7573

To answer the question posed at the start of this essay: Can Wildland Conflagrations be Stopped? No, not entirely given the magnitude of the task at the landscape-scale (Amiro et al. 2001; Alexander 2002). One would be a fool to think otherwise. However, there is every reason to believe that through strategic fuel management planning we could influence the total number and size of the occurrences as well as their geographic distribution and thereby mitigate the impacts of too much of the "wrong kind of fire" (Pyne 2004).

In Canada, we should take advantage of the lessons of the past (and lessons relearned) experienced by others like those in Southern California so we don't have to learn them first hand the hard way. Surely we have moved on from "it can't happen here" to the questions of when and where will it happen.

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[1] Copies of this publication were included with the handout prepared for the FERIC sponsored Fuels Management Workshop held at the Hinton Training Centre in Hinton, Alberta, October 6-8, 2003 (Alexander 2003). Interesting enough, some two weeks later, California experienced the "Fire Siege of 2003". By the time the 14 largest fires were extinguished, 24 lives were lost, 3710 homes destroyed and over 300 000 ha were blackened (for further information see: http://www.fire.ca.gov/php/fire_er_siege.php and http://www.wildfirelessons.net/ICTs/LLCICT_SoCa_Final_Report_121903.pdf).

[2] While aerial ignition technologies for wildland fire suppression had been developed and in use by this time, the aerial or flying drip torch (as originally developed by former Canadian Forestry Service fire research scientist John Muraro) and its widespread use had not yet emerged.

[3] Rogers (1942) points out that: *Fire fighters have for many years employed the technique of "running the fire into an old burn" for the purpose of making control easier. This practice has been used in the chaparral of southern California with considerable success. Foresters have realized in the past the effect of the length of time that elapses between reburning of areas ... This effect is particularly important in the control of fires in the chaparral type.* See also the case study by Salazar and Gonzalez-Caban (1987).

[4] See for example the publications by Bentley (1967), Green (1977, 1981), Green and Newell (1982), and Roby and Green (1976). In addition, strides were also made in wildland-urban interface fire education (Moore 1981; Radtke1981) and in the management of firefighting resources (Chase 1980).

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