Bushfire warnings by calculator

'The fire danger will be very high tomorrow.' We've all heard that remark during summer weather forecasts, but probably without stopping to wonder how the danger is calculated. The present procedure is cumbersome, but Dr Wilf Crane of the CSIRO Division of Forest Research has devised a rapid technique that requires only a hand-held calculator.

The fire danger in Australian forests and grasslands is calculated from principles developed by Mr Alan McArthur in the mid 1960s when he was

Director of the Forest Research Institute, a forerunner of the Division of Forest Research. These formulae have been built into 'circular slide rules', made up of concentric rotating cards.

Just as a photographer revolves a disc on a light meter to line up the combinations of exposure time and aperture size appropriate to the available light, so a forester turns the cards of the slide rule in accordance with the prevailing conditions in order to obtain a value for the fire danger. This value is generally publicized in the form of a hazard rating: low, moderate, high, very high, or extreme.

The really cumbersome part of the operation involves obtaining the figures to feed into the slide rule. Calculating one of these, the drought index, proves particularly laborious.

You must start from the last day on which the index was determined, then adjust the figure step by step to take into account each subsequent day's rainfall and temperature, following complex rules and referring to tables. The relative humidity, too, must be obtained from tables.

Once all the necessary information has been assembled, it enables you to calculate not only the fire danger but also the likely rate at which a fire would spread, on both level ground and slopes, the flame height, and the 'spotting distance' up to which new fires may break out, lit by airborne burning vegetation.

The danger and behaviour of grass fires may also be predicted.

People who routinely carry out these calculations include foresters dealing with both bushfires and controlled burns, fire brigades, local councils, bureaus, and a growing number of farmers anxious to contain their fires when they burn off stubble or sugar cane.

Dr Crane has taken the sweat — and much of the risk of error — out of these computations by writing a program that can be handled by advanced pocket calculators.

To use it, you must supply the same meteorological and other information, of course, but the calculator replaces your slide rule, charts, and tables. If you want it to work out the drought index and relative humidity, it will do that for you in a tiny fraction of the time you would spend leafing through tables.

A few programs have been developed in North America, especially to assist firefighters, but Dr Crane's is the first to be prepared for Australian conditions. The program has been written for a Hewlett Packard HP41CV, but can be used with any programmable calculator or computer with a memory size of at least 2000 bytes. The HP41CV displays the results of its calculations in words and numbers; for example, the display may read: 'FIRE DANGER = 25 VERY HIGH'.

To use the program you don't need any knowledge of programming; the program remains stored in the calculator's memory even when the calculator is switched off, or it may be kept on small magnetic cards.

If you attach a printer to the calculator, you obtain a printed record of the information that you supplied (air temperature, wind velocity, and so on) and of the calculator's answers.

For further information contact Data Science Pty Ltd, P.O. Box 484, Fyshwick, A.C.T. 2609.

LETTER TO ECOS

One Tree Reef

I write to correct an error in the recent article by Andrew Bell on Landsat imagery of the Barrier Reef. While his error is not central to the subject of his article I believe it important that the record be set straight. In his article, Mr Bell does not mention, and thereby substantially undervalues, the role of the University of Sydney in coral reef research. We, not the University of New South Wales, operate the One Tree Island Field Station, and we possess substantial staff expertise in aspects of coral reef science.

The Australian Museum commenced research at One Tree Reef by expedition in 1966, and built the first building of the One Tree Island Field Station in 1971. The operation and ownership of that station was transferred to the University of Sydney at the end of 1974, and we continue to operate this station. Prior to taking over the One Tree station, this university had developed research strength particularly in certain aspects of coral reef biology, but also in coral reef geology and geography.

Our activity in these areas has strengthened in recent years, and (with James Cook and Queensland Universities) we are one of three universities with substantial involvement in coral reef research by permanent staff and the ability to provide adequate postgraduate and post-doctoral training in this field.

The bibliography from our One Tree Island Field Station now contains over 120 titles, mostly technical reports in international journals, but including two books. Scientists whose Ph.D. degrees derived from research done at One Tree Reef are on the staffs of the Lizard Island Research Station, the Australian Institute of Marine Science, and Griffith and Sydney Universities. Not a bad record for an 11-year-old field station with a resident staff of one. Sydney University intends that this level of involvement in coral reef science will continue.

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