EVALUATION OF CONTROL BURNING WITH FALSE COLOUR AERIAL PHOTOGRAPHY

by F.J. Bradshaw

During January of this year a trial was conducted to test the usefulness of Ektachrome Infra-red film for evaluating the success of aerial control burns. The aim was to map the area in four classes:

(a) not burnt
(b) scrub burnt
(c) scorched
(d) defoliated

Vertical photographs were obtained using a 70 m.m. camera borrowed from the R.A.A.F. The bulk of the photos were taken from an altitude of 10,000 feet giving an approximate scale of 40 chns/1". Photographs were non-stereo, providing for about 5% forward overlap for linking purposes only. An additional run at 25 chains per inch was also obtained for each job to test the usefulness of the larger scale.

Eight burns were covered totalling 123,000 acres and ranging from early to late burns, in Karri and Jarrah areas

Prior to field checking, a number of points on the photos were selected and interpreted as one of the four classes. These points were then located and the correct type recorded. A measure of reliability was therefore obtained and is listed below for the selected jobs.

Job	Forest Zone	Average Days Since Burn	% Correct
B 1	Jarrah	73	77
N 2	Jarrah	90	65
M 5	Karri	73	85
P 9	Karri	45	95

This measure of reliability agrees well with the general impression when interpreting the photos. i.e.

1. That the Karri zone is easier to interpret than the jarrah because the original dense and more vigorous vegetation provides better contrast.

2. Period since burning is important since much of the effect of burning is masked if there is too much recovery before photography.

The most difficult boundaries to differentiate are burnt and non burnt but it is usually only the position of the boundary which causes difficulty. Scorch is readily identified and it is only likely to be the definition of scorch which will cause errors. In the final interpretation an area was classified as scorched if more than 50% of the crown cover was scorched.

There did not appear to be any marked advantage in using the larger scale photos and certainly not enough to outweigh the much increased cost. Because the photographs obtained were close to 40 chains per inch, mapping of the type boundaries was done by direct transfer to a 40 scale trace of the burn. This was satisfactory in most areas which were well roaded. Once accustomed to the work it is expected that the average burn could be interpreted and mapped in two days.

The greatest obstacle to full scale use of the method is accurate navigation. The small format of 70 mm photos allows for little error if complete coverage is to be achieved. Flying at 10,000 feet and using the present beacon set-up, deviations of a half to one mile are not uncommon. Because the jobs are long distances apart a system independent of beacons will be the most satisfactory.

Infra-red film was chosen for trial because it was expected to have a number of advantages over normal colour.

(a) Normal healthy foliage reflects a high percentage of the invisible near infra-red radiation. Ektachrome infra-red film can therefore take most advantage of the type of change caused by burning.

(b) Near-infra-red radiation has good haze penetration. This permitted relatively high altitude photos to be taken without haze problems. This was particularly important at this time of year when haze is often quite severe.

The colours of the various types varies slightly from job to job but in general they are:

1. Not burnt - red scrub, red crowns.
2. Scrub burnt - blue underneath red crowns.
3. Scorched - crowns straw to brown colour.
4. Defoliated - blue throughout.

Tracks, recent cut-over jarrah, some earlier burns usually appear white.

The trial indicated that the method could be used satisfactorily in the Karri zone up to 2½ months after a burn but would probably need to be done within about one month in the Jarrah zone.

The cost of film and processing is about 0.05 cents per acre but to carry out the entire operation including flying time, share of availability cost, interpretation, mapping and checking the cost would be of the order of 0.9 cents per acre for complete coverage with 70 m.m. Considering all cost factors it is unlikely that rough sketch mapping from an aircraft could be done for much less.