AERIAL PHOTO INTERPRETATION OF DIEBACK AREAS

by

F. Batini and J. Williamson

INTRODUCTION

With any forest disease situation, one of the first needs is to map the extent and the location of the diseased areas. Foresters have used various methods for mapping fungal and insect damage. These include ground reconnaissance, aerial photo interpretation and surveys from aeroplanes and helicopters.

Errors are inherent to any of these methods and it is therefore desirable to obtain a numerical expression of accuracy. The areas mapped in the Northern Jarrah Forest have been field checked and the results obtained will be discussed in this report.

METHOD

The interpretation was carried out using pocket and mirror stereoscopes and the Pinjarra 1 : 40,000 black and white photographs (approximate scale 48 chains = 1 inch). The minimum area delineated was 5 acres and the following classes were separated.

A.	unaffected	type 1
B.	affected	type 2 (affected but green)
		type 3 (dead)
C.	swamp	type 4
D.	water surfaces, rocks and cleared areas.	

The typing errors can be analysed in two ways.

1. Errors in total area (usually expressed as a percent over or under estimate) and
2. Reliability of the map produced (expressed as the probability of a point, randomly selected on the type map and falling in the correct type when it is located in the field).

Field checks were carried out with strip lines half to one and a half miles in length selected so as to cross type boundaries. Each chain along the line, the field type was noted. This was subsequently compared with the map types and an estimate of reliability and area errors was obtained.

RESULTS

Errors in Total Area

Example 1 Area mapped = 84, 850 acres
Area field checked = 1, 456 chains
= 291 acres

Class	Estimated areas from Aerial Photo Interpretation (Acres)	Corrected Areas Based on Field Check Lines (Acres)
Unaffected	69, 040	69, 367
Affected	11, 370	11, 353
Swamp	4, 440	4, 130
Total	84, 850	84, 850

Example 2 Area mapped =180, 300 acres
Area field checked = 2, 965 chains
= 593 acres

Class	Estimated areas from Aerial Photo Interpretation (Acres)	Corrected Areas Based on Field Check Lines (Acres)
Unaffected	147, 630	148, 260
Affected	19, 410	20, 560
Swamp	11, 200	9, 420
Water Surfaces	2, 060	2, 060
Total	180, 300	180, 300

These area statements indicate that the extent of the disease has been accurately mapped. The larger error (1, 150 acres, or 6%) is accurate enough for management and planning purposes.

Reliability

Probability of a Random Point falling into the correct type.

Class	Example 1	Example 2
Unaffected	95%	96%
Affected	69%	73%
Swamp	81%	72%
Total	83%	86%

The reliability figures indicate that unaffected areas have been accurately located. Diseased areas and swamps have not been typed quite so accurately. These types have a relatively large perimeter for a smaller area. The width of the interpretation line on the photograph was two chains and the minimum area delineated was five acres. All of these factors contributed to this inaccuracy.

DISCUSSION

From the interpreted photographs, 40 chains to the inch plans have been prepared. These have been used for various purposes, including:-

1. The planning of overall hygiene strategy and the sub-division of forest areas into zones which indicate the severity of infection.
2. The planning of logging operations and of access routes on an individual permit basis.
3. As progress plans to record cutting within dieback areas.
4. As a stratification for inventory sampling.

Volume figures for these types have been made available by the Working Plans Branch. These indicate a considerable volume reduction with respect to jarrah (a susceptible species) but no difference with respect to marri (a resistant species).

Volume per Acre by Photo Types

Class	Marketable Jarrah >60" GBHOB (Loads)	Total Jarrah >12" GBHOB (Loads)	Total Marri >12" GBHOB (Loads)
Unaffected	10.3	21.6	5.6
Affected	4.2	10.6	5.2
Swamp	0.8	2.0	2.4

Small areas of diseased forest are impossible to delineate from aerial photographs of this scale. For the purposes of selecting road access, control of new infections within high quality forest units and detailed research work, ground reconnaissan and field surveys will still be necessary. Aerial photo interpretation is generally used in the broad planning stage. The tests described are far more stringent than those which would be applied by foresters using these maps. It is considered therefore that this interpretation has fulfilled its primary function - to define accurately the extent and the location of diseased areas within the northern jarrah forest of this State.