

# SOILS AND LAND USE IN THE OVENS AND BUFFALO RIVER VALLEYS, VICTORIA

By J. W. Newell\*.

Soils Surveyed by J. W. Newell, J. C. Nieuwenhuis, P. G. Macumber, H. R. Thorne.

This is a very detailed soil survey of 35,000 acres of flood plain, alluvial terraces and colluvial cones, along 56 miles of the middle and lower reaches of the Ovens and Buffalo Rivers in North-Eastern Victoria, centred on Myrtleford (36 deg. 34 min. S. and 146 deg. 44 min. E., elevation 700 feet).

General information about the area includes some aspects of social history and their impact on the soils, trends in agricultural production, native vegetation and weeds. Geomorphology and climate are outlined in some detail, and conditions for plant growth examined, with particular reference to tobacco and pastures. Hops, maize, vegetables and pine trees are considered briefly. Special attention has been given to the significance of soil chloride in relation to tobacco growing.

Nineteen soil series covering a total of 156 soil types, phases and variants are mapped. The series are included within five age groups which form a sequence of development, ranging from soils on contemporary sediments, including mining debris, to quite old soils in which parent materials are weathered to a depth of many feet below the present surface.

The usual chemical and physical data are presented, and soil classification discussed.

Field mapping was at a scale of 1 : 5,000, reproduced here at approximately 1 : 16,000. All maps have been drawn on vertical aerial photomosaics, printed in five colours representing the five main soil groups.

## PURPOSE AND USE

This bulletin is intended primarily for the use of farmers, farm advisers, and research workers in agriculture, although much of the data will be of interest to teachers and regional geographers.

The bulletin is the report of the soil survey requested in June, 1962 by the Tobacco Branch of the Department of Agriculture, with the primary objective of delineating those areas which consistently produced tobacco leaf of poor quality.

Additional reasons for the survey included its use as a guide to the selection of new areas for growing good quality tobacco, as an aid to advisory work, and as a basis for research into tobacco-growing within the surveyed area. Because of the likelihood of substantially increased supplies of irrigation water in the near future, the soil survey was also regarded as being important for assisting in the assessment of the suitability of the soils for crops other than tobacco. The survey was commenced in late 1962 and was completed in 1964.

Maps and map legends enable soil types, and many individual features of the soils, to be identified at any point without reference to the text. The text gives fuller details of the soils, further explains the mapping symbols, and discusses soil features in relation to climate, farm management and plant growth. Detailed technical data are given in the appendices.

### *Use of the Maps*

The first of the coloured maps at the back of the bulletin relates the surveyed area to South-Eastern Australia, to sea level, to well known physical features, and to average annual rainfall. It also summarizes the distribution of chloride in the soils of the area.

*To Find a Particular Locality.*-Refer first to the above map which also shows the boundaries and serial numbers of the detailed maps. The serial numbers and locality names are listed in the Table of Contents.

*Individual Farms and Points within Farms.* - These can be picked out on the numbered soil maps by relating them to roads and tracks, buildings and gravel banks, all relatively pale coloured; or to streams, lagoons and trees, usually dark coloured.

The scale of 1 inch equals 20 chains (1 to 16,000 approx.) enables points to be placed within paddocks with an error of less than 1 chain in most cases. This is rather better than the accuracy claimed for the positions of soil type boundaries.

Crown allotment boundaries are not shown, since they disagree in so many cases with occupation boundaries and fence lines. However, parish names are printed in large capitals in the body of each map and part of each parish boundary is shown, as well as a selection of crown allotment numbers, just sufficient to relate the map to a parish plan. For example on Map No. 2, OXLEY

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FLATS, the parish names are WANGARATTA NORTH, WANGARATTA SOUTH, OXLEY and TARRAWINGEE. Allotment number 25 of section F in TARRAWINGEE occurs in the top right hand corner; number 92 of OXLEY to the bottom right of the coloured portion; and number 16 of WANGARATTA NORTH in the top left corner. Adjoining maps overlap but may be skewed relative to one another and to the north to south line.

*Map Details and the Use of Colour and Symbols.*-The very complex pattern of soil types in the district requires a very detailed map to describe it. This is further demanded by the many different forms of land use, from grazing beef cattle on pastures, to growing tobacco, hops, maize, walnuts and vegetables under spray irrigation; by the high value of the principal crops, with a premium on quality; and the high labour-intensity which ensures that areas as small as half an acre can be treated differently from their surrounding soils, if soil differences demand it.

The complexity and detail of the maps is made simpler to use by three devices:

1. The aerial photomosaic background to the maps makes it easy to locate spots within a farm, and to place soil type boundaries in relation to landscape features, tracks, trees, etc. The photomosaic also fills in some of the extra details within the soil units as outlined. For instance in the complex area growing tobacco at the lower left hand side of Map No. 2, the three tones of the photograph show areas from which top soil has been removed (pale tone), normal soil, and a winding, filled-in watercourse now appearing as a slight depression (darkest tone).
2. Each colour on the detailed soil maps, with its characteristic large numeral, 0, 1, 2 or 3 in the soil symbol brings together all soils of the one age, which therefore have several important features in common. These are summarized in the "Key to the Detailed Soil Maps", and are explained fully in the sections "Explanation of Mapping Symbols" and "Description of Soil Types".
3. Symbols for other soil features are used systematically. For instance, each of the small numerals 1 to 5 in the soil symbol indicates a subsoil of a definite texture class, with only minor exceptions explained in the Key; the small zero subscript, 0, in a soil symbol means light deep subsoil irrespective of the age group or soil type, while the small delta subscript,  $\Delta$ , refers to a gleyed horizon in the deep subsoil indicating present or past waterlogging.

*Reference Sites.*-Places, where soil profiles have been sampled and analysed are marked with a numbered black triangle on the detailed maps; other sites referred to in the text are marked with an open triangle.

### ***Significance of Soil Types***

The features chosen to define soil types and phases are of general significance both in agriculture and in other soil studies, but the finer subdivisions have particular relevance to tobacco growing and to spray irrigation. For instance, small differences in assessed through profile drainage to 4 feet, and in real water availability have determined soil phases. Differences in surface texture, smaller than are usually considered decisive, have also differentiated some soil types. This arises from observed differences in speed of water intake, and differing liability to soil dispersion, and surface sealing or crusting.

### ***Advisory Services***

The full usefulness of the maps is explained in the section "Relationship of Soil Types to Agriculture", but farmers are strongly advised to compare their land very critically with the detailed map of their area, using the "Key to the Detailed Soil Maps", and to discuss all questions of management with Departmental advisers, contacted through the Tobacco Research Station, Myrtleford.