

**SOILS OF THE MERRI RIVER AND DRYSDALE
CREEK AREA, NEAR WARRNAMBOOL,
VICTORIA**

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Soils of the Merri River and Drysdale Creek area, near Warrnambol, Victoria.

(Research project series; no. 55)

1. Soils – Victoria – Merri River district. 2. Soils – Victoria – Drysdale Creek district. I. Victoria. Dept. of Agriculture. Division of Agricultural Chemistry. II. Title. (Series: Victoria. Dept. of Agriculture. Research project series; no. 55 ISSN 0313-4652).

NOTES FOR READERS

Soil, land use and land survey material, formerly published in either the Soil Survey Report series or in the Soils and Land Use Technical Bulletin series, is now published in the Research Project series of the department. This survey was carried out in late 1974 by Mr. Newell, who has since retired.

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Figure 1 – Locality Plan



SECTION A - Locality and Purpose

This reconnaissance soil survey of 11700 ha (45 sq. miles) bordering the Merri River and Drysdale Creek was made at the request of the Merri Valley Irrigation and Conservation Association, to provide background information for a submission to the Victorian Public Works Committee concerning the construction of a water storage on one or other of the named streams.

SECTION B - General Comments

In this area topographic and soil profile features are both very important for irrigation management , and also in the economic benefits to be expected from irrigation.

Following preliminary inspections, four main topographic units have been mapped. Although subdivisions of units 1 and 3 were noted it was possible to delineate boundaries between them in only a few areas on the map. Seven main groups of soil profiles have been identified, together with three others of minor extent.

Chloride and pH were measured throughout the profile at most of the 43 sites examined and reported in section F.

The distribution of the soils is controlled equally by topographic position, and the nature of the material from which the soil profiles have been formed.

Field observations and the comments both of Departmental officers and experienced farmers indicate that soil structure is of overwhelming importance in the irrigation of soils of this district, determining the entry of water into the soil, its distribution in the profile, and drainage characteristics. For this reason soil slope and field descriptions of the soil profile provide a sound framework for estimating the irrigation potential of any particular site.

Measurements, particularly of infiltration rates, by the Irrigation Research Branch would give a quantitative basis to the district experience of the Dairying Division, and would allow managerial and economic projections to be made.

SECTION C - General Assessment

(1) District need for irrigation, drainage and water harvesting.

In most years, productivity will be limited as often by waterlogging as by water stress. Consequently surface drainage must be considered almost as important as irrigation, which raises the question of water harvesting and farm dams as an alternative to the community project.

(2) Individual soils.

In general terms of groups A, B, and D (friable surface) of Unit 1, E of Unit 3, and I of Units 3 and 4 are good irrigation soils, which however differ widely in water usage and need for drainage; C of Unit 2, D (tough) of Unit 1, and G of Unit 4 are poor soils for irrigation; F of Units 2 and 3 is variable, while both F, and H of Unit 4 occur only in small patches.

(3) Chemical data.

Although there are significant differences between the soil groups, salinity (indicated by chloride) is everywhere low or very low, reaching a maximum of only 0.046% NaCl in any surface sample, in a group A soil, and 0.15% NaCl at 60 to 90 cm depth, in a group B soil, both occurring in unit 1. The range in pH values for single spot surface samples is from pH 5.3 to pH 8.0, most values being around pH 7 in units 1 and 2 and around pH in unit 4.

(4) The map.

A map of the topographic unit is appended. It shows also the 43 detailed observation sites on which this report is based.

SECTION D - The Topographic Units

TABLE 1 - Topographic Units of the Merri River and Drysdale Creek Area

Map unit	Topography and Area
1.	The river flats. Total area 1720 ha. 1a. The active flood plain 1b. Low terraces, i.e. the higher river flats, together with a few seepage areas and the “toes” of alluvial fans coming from small side gullies.
2.	Very steep slopes (Valley sides). Total area 1710 ha. The slope is though to be great enough to pose real limitations on effective irrigation.
3.	Gentle to moderate slopes. Total area 4930 ha. The slope as such poses no problems to spray irrigation, but stoniness or less permeable soils may do so in a few areas. 3a. The limestone hills near Warrnambol. 3b. Lower slopes, and long irregular slopes in places where there are no very steep slopes. 3c. Upper slopes, above unit 2 and below Unit 4.
4.	The high flats, i.e. the Basalt Plain. Total area 3350 ha.

Based on the soil description given in section E below, the following generalisations can be made:

The soils of Unit 1 are of groups A, B, D (friable) and D (tough).

The soils of Unit 2 are insufficiently examined to generalise, but groups I, F, A and C have been noted.

The soils of Unit 3 are of group E on Unit 3a and groups I, F, H elsewhere.

The soils of Unit 4 are mainly of group I with groups G and H in small areas.

Units 1, 2, 3a, and 4 form four distinct Soil Associations or patterns of soils, while Units 3b and 3c together form a fifth.

SECTION E - The soils – generalised descriptions of the profiles

Generalise descriptions of the soil profiles and comments on the assessment of those soils are given in Table II.

TABLE II - The Soils of the Merri River and Drysdale Creek Area

Group	Parent material	Generalised Profile	Occurrence	Assessment
A	Tuff	<p><u>Surface</u> Very dark grey or very dark grey-brown clay loam either with obvious fine crumbs structure or crumbling readily to fine crumbs. Passes gradually to the subsoil.</p> <p><u>Subsoil</u> Generally heavy clay with colour structure and crumbliness similar to surface.</p> <p><u>Depth</u> Often greater than 1 metre or if shallower, then resting on decomposing tuff.</p>	Common on units 1 and 3 of the Merri River with some occurrences on 2. A shallow layer of this soil sometimes overlies soil I e.g. Bushfield.	Very high water infiltration rate and fertility; excessive use of water.
B	Tuff	<p><u>Surface</u> Very dark grey-brown or black medium clay, fine crumb structure.</p> <p><u>Subsoil</u> From about 40 cm, dark medium to heavy clay, fine crumb structure.</p> <p><u>Depth</u> Often greater than 1 metre.</p>	Similar to A	Initial infiltration and fertility as for A; would use less water and drain less freely.
C	Tuff	<p><u>Surface</u> Dark brownish grey heavy clay, rather tough, poor structure.</p> <p><u>Sub-surface and Subsoil</u> Grey-brown heavy clay of good structure.</p> <p><u>Depth</u> 45 cm to tuff in the single occurrence noted.</p>	Upper western slopes of Unit 2.	Infiltration poor; Run-off excessive; Very difficult to irrigate effectively.
D Friable surface	Mixed Alluvium	<p><u>Surface</u> 10 to 25 cm of black heavy clay with obvious fine crumb structure of crumbling readily to fine crumbs.</p> <p><u>Subsoil</u> Black heavy clay, very dense and tough.</p> <p><u>Depth</u> Often greater than 1 metre.</p>	Common in small areas of Unit 1 of the Merri River and the Drysdale Creek.	Surface structure is good; subsoil impermeable and impossible to drain.
D Tough surface	Mixed Alluvium Dune limestone	<p><u>Surface</u> 10 to 20 cm of grey or black heavy clay, hard and tough.</p> <p><u>Subsoil</u> Black heavy clay, very dense and tough.</p>	As for D, friable surface.	Would take very little water when moist or wet; irrigation of little benefit.
E		<p><u>Surface</u> Almost black light clay, moderate crumb structure with some lime.</p>	Probably extensive on unit 3 near Warrambol and Dennington.	Good irrigation soils; water usage high.

Group	Parent material	Generalised Profile	Occurrence	Assessment
F	Older limestone	<p><u>Subsoil</u> Reddish grey-brown light to heavy clay, moderate structure, crumbly. Lime concretions before 50 cm.</p> <p><u>Depth</u> Often lies on limestone before 1 metre. Surface variable.</p> <p>This is a varied group of soils occurring in small patches mainly on units 2 and 3, overlying outcrops of older limestone.</p> <p><u>Surface</u> Grey-brown clay loam to medium clay, crumbly to tough usually about 10 cm deep.</p> <p><u>Subsoil</u> Grey-brown to brown light or heavy clay, usually dense and tough.</p> <p><u>Depth</u> Limestone occurs from 50 cm to 1 metre, occasionally on the surface</p>		The crumbly profiles are permeable and could be irrigated usefully if not too steep.
		<p><u>Surface</u> Dark brownish grey light or heavy clay, moderate blocky structure, about 10 to 15 cm deep.</p> <p>A duller coloured version of group I below</p> <p>A very extensive group of soils typical of the main basalt plain. They are all gravelly or buckshotty and vary mainly in depth of surface and amount of gravel.</p> <p><u>Surface</u> Grey-brown clay loam or loam, moderate structure.</p> <p><u>Sub-surface</u> Paler grey-brown to almost white clay loam, slight to much buckshot gravel.</p> <p><u>Subsoil</u> At 20 to 40 cm depth; a yellowish brown crumbly but dense heavy clay, becoming strongly mottled with red and light grey at depth.</p> <p><u>Depth</u> Basalt before 2 metres, sometimes before 50 cm.</p>	<p>On unit 4; not extensive.</p> <p>Occurs in small depression on Unit 4.</p> <p>Very extensive throughout Unit 4 sometime on 3C.</p>	<p>Would take little water doubtful benefit from irrigation of pastures.</p> <p>As for I.</p> <p>Good irrigation soils but surface drains would be necessary as safeguards in wet seasons.</p>

SECTION F - Localities Examined

Details of the chemical analyses of soil samples from profiles at the sites indicated on the map and details of the relevant soil "groups" are given in Table III. Since the "unit" notation in the Table refers to the particular topographic situation at, or in the immediate vicinity of the relevant site, this notation does not always correspond to the notation of the map unit containing the site.

The 43 sites in detail, on which this report is based, are listed in Table III

Table III - Sites Examined in the Merri River and Drysdale Creek Area, September 1974

Unit	Situation	Place and Nearest Stream		Soil group or variant	Chloride (as NaCl) % x 10 ⁻³				pH				Site
					a	b	c	d'	a	b	c	d'	
1a	high part	R. Jellie	Merri	A	46			45	7.1			7.2	1
1a	low part	R. Jellie	Merri	B (black surface)	25		39		7.0		7.0		2
1a	flat	R. Jellie	Yarpturk	D friable (black surf)	17			33	6.7			8.0	3
1a	higher part	McNamara	Drysdale	B (dark)	25	18	88	157	7.5	7.1	6.4	6.8	12
1a	flat	G.B. & P. Ryan Grasmere	Merri	D tough (dark)	12	22	49		7.1	7.3	6.5		17
1a	small flat	Near Grasmere Junction	Merri	D tough (grey)	13	18			7.0	7.0			19
1a	flat	Allan McLeod	Merri	D tough (black)	31		31	38	7.5		7.2	8.0	32
1a	flat	Injemira	Merri	D tough (dark0)	19	27	35	45	6.6	7.2	7.7	8.1	34
1a	flat	Kia Ora	Merri	A	21	13	17	21	7.2	7.5	7.8	7.9	24
1a	flat	Wollaston Bridge	Merri	D friable (black)	27	28	34		7.0	7.2	7.3		38
1a	flat	Robt. Roach	Merri	A	23	17	17	39	7.0	6.6	6.6	6.8	39
1b	extensive low terrace	G.B & P. Ryan (front paddock)	Merri	B	14	10	15	29	5.6	5.6	5.6	6.0	18
1b	flat	Harry Trigg	Merri	B	21	18	21	57	7.0	6.8	6.9	7.1	21
1b	flat	Injemira	Merri	D	17	15	18		6.0	6.4	6.3		36
Note Site on unit 2 do not represent the unit fairly, especially the steeper, barely irrigable slopes which were not fully examined.													
2	side valley moderately steep	R. Jellie	Merri	A	12	13	21	30	6.4	6.7	7.0	6.9	5A
2	upper slope	R. Jellie	Yarpturk	C	17			33	6.7			8.0	4
2	upper slope	Grasmere Junction	Merri	F (crumbly)	16	20	28	80 ²	7.3	7.1	7.1	7.9 ²	20
2	irregular slopes	Injemira	Merri	F (tough)	15	14	9	8	6.9	6.8	8.1	8.5	35
2	mid slope	McNamara	Drysdale	F (crumbly)	15	13	15 ³		6.4	6.7	6.9 ³		11
2	upper slope	Sloan (Purnim)	Drysdale	I (shallow & stony)	12	13	11 ⁴		6.2	6.6	6.9 ⁴		13
3a	undulating	Eccles (Dennington)	Merri	E	13		16		8.0		8.1		6

Unit	Situation	Place and Nearest Stream		Soil group or variant	Chloride (as NaCl) % x 10 ⁻³				pH				Site
					a	b	c	d'	a	b	c	d'	
3b	lower gently undulating	Roach	Merri	I	10	5	6	21	7.0	6.6	6.7	6.8	40
3b	hilltop undulating	Roach	Merri	I	10	7	19		7.0	6.8	6.8		41
3b	lower, gentle slope	Vinc, Mugavin	Merri	A	25	31	31	126	7.4	7.5	7.6	7.5	22
3b	mid-slope		Russell's	I (shallow surface)	11	7	13	13	5.8	6.1	6.2	6.3	37
3 or 4	high flat	Near Brierly Wangoom turn-off	Merri	I	10	7	7	8	5.8	5.8	6.3	6.6	26
3b	mid-slope		Merri	A	10	9	11	12	6.2	6.4	6.6	6.7	30
3b	mid-slope	Allan McLeod	Merri	F (tough)	9				6.1				31
3c	upper, steeply undulating	Allan McLeod Cahnady, Bushfield	Merri	I ('A' surface)	21	15	25	43	6.3	6.2	6.4	6.2	28
3c	upper, gentle slope	Sloan (Purnim)	Drysdale	I (shallow surface)	14	11	9		5.9	6.2	6.5		14
3c	do		Drysdale	I (deep surface)	10 ³	9 ³			6.0 ³	6.1 ³			15
3c	upper, moderate slope	Sloan (Purnim) Latta (Kia Ora)	Merri	D	12	9	11		6.1	6.4	6.7		23
3c	lower, moderate slope	Latta (Kia Ora)	Merri	F (tough)	15	11	13		6.5	7.1	7.5		25
4	flat	above Roach's	Merri	G (light clay)	10	11	16		6.0	6.6	7.2		42
4	flat, above site 26	Wangoom turn-off	Merri	I	7	13	11	21	6.6	6.5	6.6	6.5	27
4	flat	Wangoom turn-off	Merri	I (crumbly surface)	17	7	9		6.2	6.3	6.6		29
4	very gentle slope	R. Jellie	Merri	G	12	12			6.1	6.3			5
4	flat	Cathcart's Ford Road	Merri	Unclassified*	9 ⁶	13 ₆	16		5.7 ⁶	5.8 ⁶	5.9		16
4	flat	McDonald (Cooranook)	Drysdale	I deep, gravelly	7		19		5.3		6.6		33
4	flat	McNamara	Drysdale	I shallow surface	9	12	58		5.8	5.8	5.8		10
4	depression	Framlingham Rd. turn-off	Drysdale	H	11	11	11		6.4	6.5	6.6		7
4	flat	Framlingham Rd. tun-off	Drysdale	I	14 ⁷	10 ⁷	14 ⁷		6.3 ⁷	6.6 ⁷	6.5 ⁷		8
4	flat	Near Deptl. Plot site	Drysdale	I (deep surface)	12	8	8	13	6.0	6.5	6.9	7.0	9

*20 cm of rather dense clay loam lying on a brown heavy clay.

1. Except where indicated, standard depths of samples are:
- a. 0 – 15 cm
 - b. 15 – 30 cm
 - c. 30 – 60 cm
 - d. 60 – 90 cm

depth 0 – 30 cm indicated by figure between a and b columns.

2. 60 – 80 cm chloride 61 pH 7.1
80 – 90 cm chloride 80 pH 7.9
3. 30 – 42 13 6.8
42 – 60 17 7.0
4. 33 – 45 cm
5. 0 – 20 and 20 – 42 cm
6. 0 – 20 20 – 30
7. 0 – 20 27 – 35 35 - 60