DESCRIPTION OF SOIL TYPES

The following generalized field descriptions give the normal range of profiles for each soil type, including phases and variants, arranged in groups of increasing profile development as explained in the previous section.

Within each group the series are arranged from coarser to finer material in the B horizon, or in the second foot in the case of the youngest or 0 Group of soils.

In all cases the mapping symbol for the type, phase or variant is shown at the left of the page.

Since similar features distinguish the phases and variants of several series, these are not separately described in every case, but all the phases and variants of every type recorded in the survey are listed, either in the body of the text or in appropriate tables.

Soils on Contemporary Sediments

Series 0_1 0_2 0_3 0_4

The soils of this group show only minimal profile development from the sediment as laid down. Therefore the series are groups of sedimentary profiles, based on the average texture of each one foot depth of sediment as measured from the surface. Mining sludge and dredge tailings are treated in the same way as alluvium, but are indicated by an inscription on the map, e.g., the area inscribed "sludge", including Reference Site 35 on Map 1. "Tailings" refers only to coarse waste materials, e.g., on Map 13. Included in group 0 are some small areas of older sediment which have been exposed by erosion, and which are similar to contemporary sediments.

Degrees of profile development allowed in group 0 soils are the accumulation of fine organic matter, the elimination of fine stratification and the formation of a crumb structure in the top 6 inches. Owing to repeated burial, these features may recur at depth. Mottling and scattered dark brown soft concretions may occur below 36 inches.

Porepunkah Series
Types 0_1^{gr} 0_1^{s} 0_1^{sl}

Stones and large gravel completely dominate the profiles of the Porepunkah or 0, series. There may be a surface of finer material, and sand may occur in the crannies between the stones or in thin layers at depth, but silt and clay are virtually absent. By contrast, soils on gravel of the 1_1 and 2_1 series are marked by brown or red-brown clay partly clogging the interstices and coating the sand grains. Minor occurrences at Whorouly and Gapstead are on shoals in the river bed recently colonized by plants, or on point bars remaining after soil and sand have been removed. Major occurrences at Myrtleford, Four Creeks, and Porepunkah occur on coarse tailings from gold dredging, and form a complex with the 02_2 and 0_3 series.

0_1 Porepunkah gravel.

0-48 inches varied large rounded gravel and stones, 1 inch to greater than 6 inches median axis, with small amounts of sand and small gravel; continuing.

Up to 2 inches of sandy loam or 6 inches of coarse sand may occur at the surface.

0_1^{s} Porepunkah sand.

0-48 inches as for Porepunkah gravel but with 6 inches to 18 inches of coarse sand or loamy sand at the surface.

0_1^{sl} Porepunkah sandy loam.

0-48 inches as for Porepunkah gravel but with 2 inches to 12 inches of fine sandy loam or sandy loam surface.

UNNAMED SERIES.
Types 0^{2s} $0_2^{gr}1$ 0_2^{sl} 0_2^{fsl} 0_2^{fscl}

Sand and small gravel, up to ¼ inch median diameter dominate the second foot of profiles in this series, with sand, gravel and stones continuing to 48 inches. There are minor occurrences in all areas, on shoals, point bars, and levees of the present streams, but the major areas are on dredge tailings.

0_2 **0_2 sand**

0-18 inches grey-brown sand with small gravel.
18-24 inches grey-brown sand or sandy loam.
24-48 inches brown or greyish brown sand; continuing.

$0_2^{grl}{}_{gr}$ **0_2 gravelly loam, gravelly variant.**

There are only small areas of this soil, recorded as parts of a bouldery complex on sediments from granite at Nug Nug Creek.

0-12 inches dark grey gravelly sandy loam With occasional boulders.
12-30 inches grey passing to yellowish grey gravelly sandy loam, with large stones and weathered rock increasing with depth.

$0_2^{sl}{}_{+}$ **0_2 sandy loam, shallow phase.**

△ 33, △34 Map 1.

The only appreciable area mapped is on a levee of Yellow Creek at Wangaratta, where it occurs with shallow phases of Myrtleford sandy loam and fine sandy loam.

0-30 inches dull brown sandy loam, stratified with coarse sand and fine sandy loam. The depth of this horizon can vary from 12 to 44 inches.
30-40 inches dark grey and dark grey-brown mottled light clay.
40-48 inches light grey and brown mottled light clay.

0_2^{fsl} **0_2 fine sandy loam.**

Site 21 Map 15.

0-10 inches dark yellowish grey fine sandy loam where cultivated. Interstratified textures averaging fine sandy loam elsewhere.
10-30 inches dark yellowish grey and grey coarse sand, interstratified with fine sandy loam.
30-48 inches brownish grey coarse sand with fine sandy loam.

0_2^{fscl} **0_2 fine sandy clay loam.**

Differs from 0_2 fine sandy loam only in having fine sandy clay loam average texture in the first 12 inches.

MYRTLEFORD SERIES.
Types 0_3^{sl} 0_3^{fsl} 0_3^{scl} 0_3^{fscl}

Very fine or fine sandy loam forms the second foot in the profiles of this series, often with thin strata of sand. The average texture continues with little change to 4 feet, except in the case of the light deep subsoil phase and the shallow phase. The colour varies from dark brownish grey to brown, depending on the content of organic matter. Darker and lighter layers can occur at any depth.

0_3 **Myrtleford fine sandy loam.**

Site 10 Map 3, △52 Map 11.

0-18 inches greyish brown to dark brownish grey fine or very fine sandy loam; finely stratified; weak crumb structure to 8 inches if uncultivated or uniform and structureless to the depth of frequent cultivation.
18-48 inches greyish brown to dark brownish grey fine sandy loam, often passing to mottled sandy loam or sand after 30 inches.

0_{3o} **Myrtleford fine sandy loam, light deep subsoil phase.**

Site 11 Map 4, Site 22 Map 15.

0-10 inches dark brownish grey fine or very fine sandy loam.

10-24 inches yellowish grey-brown very fine to fine sandy loam.
24-48 inches grey-brown to yellowish brown sandy loam or fine sand, grading to coarse sand and gravel.

0_{3+} Myrtleford fine sandy loam, shallow phase.

Site 14 Map 11, △ 40 Map 4.

0-3 to 10 inches dark grey-brown fine sandy loam; weak crumb structure.
3 to 10-30 inches grey-brown passing to dull brown with dark brown mottle, finely stratified sand and fine sandy loam; structureless.
30-48 inches dull brown to yellow-grey clay loam to light clay.

0_{3o}^{gt} Myrtleford fine sandy loam, light deep subsoil phase, gritty profile variant.

0-12 inches grey-brown or dark grey-brown gritty fine sandy loam to sandy loam.
12-30 inches dark grey-brown gritty fine sandy loam to sandy clay loam.
30-48 inches as above, often passing quickly to grey-brown or brown sand or gravel.

This soil, together with gritty profile variants of other types, and of the 0, or Wangaratta series (see below) occur on a very complex pattern of sediments from the Buffalo Creek near its junction with the Ovens River. They have some similarity to Myrtleford sandy clay loam.

0_3^{sl} Myrtleford sandy loam.

0_3^{fscl} Myrtleford fine sandy clay loam.

These minor types are similar to Myrtleford fine sandy loam, but have the named textures as the average for the first foot of the profile.

0_3^{scl} Myrtleford sandy clay loam.

This is a very minor type near the junction of the Buffalo and Ovens Rivers.

0-15 inches very dark brownish grey light sandy clay loam.
15-36 inches yellowish grey-brown heavy sandy to fine sandy loam.
36-48 inches yellowish brown sand.

WANGARATTA SERIES.
Types 0_4^{sl} 0_4^{fsl} 0_4^{scl} 0_4^{fscl}

This series is closely related to the Myrtleford series, but with slightly finer sediments, averaging silty to fine sandy clay loam in the second foot, and continuing throughout the profile. Variation In colour, stratification of sediments, and influence of pastures and of cultivation are similar to those in the Myrtleford series. Corresponding light deep subsoil and shallow phases occur.

0_4 Wangaratta fine sandy clay loam.

Site 12, Map 4.

0-8 inches dark yellowish grey-brown silty or very fine sandy clay loam; weak crumb structure.
8-48 inches dark yellowish grey-brown to brownish grey very fine sandy clay loam, often with thin layers of brown sand; structureless.
48-72 inches as above, with increasing coarse textures, and increasing dark brown mottle or soft ferruginous concretions.

0_{4o} Wangaratta fine sandy clay loam, light deep subsoil phase.

Site 9, Map 2, △ 42 Map 6.

0-14 inches dark yellowish grey-brown silty or very fine sandy clay loam; weak crumb structure; becoming lighter in colour.
14-36 inches grey and brown layers of fine sandy clay loam and sand.
36-48 inches grey and brown sand or gravel, sometimes with fine sandy loam; continuing.

The sand and gravel may occur at any depth from 24 inches to 44 inches.

0_{4+} Wangaratta fine sandy clay loam, shallow profile phase.

△ 35 Map 1.

Fine-grained waste (sludge) from mines and dredges has filled billabongs and covered older soils on parts of the flood plain at Wangaratta and Everton. In these moist situations biological activity has blended the layers to a depth of about 1 foot, contrasting with dry grassland at Murmungee where paper-thin layering is visible as shallow as 3 inches below the present surface.

0-10 inches yellowish grey-brown clay loam to fine sandy clay loam; weak crumb to very weak subangular blocky structure.
10-30 inches brown and grey finely layered light clay and fine sandy clay loam; structureless.
30-38 inches dark grey clay loam.
38-48 inches light grey clay loam with slight ferruginous gravel passing to yellowish grey light clay; continuing.

Either the dark grey or the light grey clay loam of the buried soil may be absent. The fine sandy clay loam layer may be as shallow as 18 inches.

$c0_4$ Wangaratta fine sandy clay loam, colluvial variant.

The isolated occurrence of this variant on Map 11 differs from the type in the presence of angular gravel in the profile.

0_4^{sl} Wangaratta sandy loam.

0_4^{fsl} Wangaratta fine sandy loam.

0_4^{scl} Wangaratta sandy clay loam.

These are minor types similar to Wangaratta fine sandy clay loam, but with textures in the first foot averaging sandy loam, fine sandy loam or sandy clay loam, respectively.

$0_4^{sl}{}_{gt}$ Wangaratta sandy loam, gritty profile variant.

0_{4gt} Wangaratta fine sandy clay loam, gritty profile variant.

0-18 inches dark grey-brown sandy loam (or gritty fine sandy clay loam).
18-48 inches dark grey and dark grey-brown gritty fine sandy clay loam; sometimes passing to brown sandy loam or gravel below 36 inches

For a general note on these variants and other associated gritty soils see 0_{3ogt} above.

Soils on very recent sediments – Minimal Clay Illuviation

Series 1_1 1_2 1_3 1_4 1_5 1_6

These soils show very little evidence of sedimentation in recent years. There is slight but distinct profile development in the obliteration of fine stratification to a depth of about 2 feet; slight coherence with change to a brown colour and weak structure to form a colour B horizon; slight visible accumulation of clay on the walls of worm holes, root channels, and cracks; a clay content in the B horizon commonly about 20 per cent greater than in the A horizon, but barely detectable by feel. Exceptions are soils of the 1_1 and 1_2 series with little clay accumulation, and some soils in low-lying areas, where grey profile variants show little change from surface to subsoil. Other exceptions are soils of the Oxley Flats or 1_6 series which may have a weakly bleached subsurface horizon, with or without slight buckshot gravel.

Unnamed Series
Types 1_1^{gr} 1_1^{sl} 1_1^{fsl} 1_1^{fscl}

1_1 1_1 gravel

A very minor soil type on gravel banks of stepped terraces at Eurobin, Upper Buffalo River and Everton.

0-1 inch grey-brown sand to fine sandy loam partly covering the next horizon.

1-24 inches large rounded stones and gravel from 1 to greater than 6 inches median diameter, with some sand and very slight reddish or yellowish brown clay accumulation.

1_1^{sl} 1_1 sandy loam

1_1^{fsl} 1_1 fine sandy loam

1_1^{fscl} 1_1 fine sandy clay loam

These are very minor unnamed soil types related to 1_1 gravel, but having thin surfaces, usually from 3 inches to 9 inches deep, of the named textures.

$c1_1^{fscl}$ 1_1 fine sandy clay loam, colluvial variant.

0-4 inches dark grey-brown gritty fine sandy clay loam
4-48 inches greyish brown angular gravel with brown fine sandy clay loam

Unnamed Series
Types 1_2^{grs} $1_2^{sl}1_2^{fsl}$

This is a very minor series formed on the sands of point bars and sand splays.

1_{2gr} 1_2 gravelly sand, gravelly profile variant

Site 23, Map 17

This type was recorded at only one site, on sediments roughly sorted from granite colluvium.

0-40 inches dark brownish grey passing to brownish grey and then to yellowish brown gravelly sand. The gravel is angular, equant, and up to about ¼ inch in size; gravel decreasing at depth.
40-48 inches diffusely mottled grey fine sandy loam

1_2^{sl} 1_2 sandy loam

Site 6, Map 8

This minor soil was recorded only in an area of Ovens sandy loam, light profile.

0-6 inches grey-brown sandy loam passing to
6-18 inches yellowish brown sandy loam passing to
18-48 inches yellowish brown or grey coarse sandy loam passing to gravel and large stones.

1_2^{fsl} 1_2 fine sandy loam

A minor soil on point bars at Wangaratta.

0-10 inches yellowish grey-brown fine sandy loam
10-48 inches brown sand

OVENS SERIES.
Types 1_3^{sl} 1_3^{fsl} 1_3^{grl} 1_3^{fscl} 1_3^{cl}

This is by far the most extensive series of he survey, occupying most of the occasionally to rarely flooded country from Wangaratta to the Hop Gardens on the Ovens River, and in the Buffalo River Valley from Myrtleford to Nug Nug. Reddish variants occur further up the valleys, and in locally high spots everywhere. Grey profile variants are widespread in places where surface water accumulates, notably at Ovens and Everton. The characteristic material of the series is fine sandy clay loam, with fine sandy loam to sandy clay loam in the light profile phase. This light profile phase is the most important soil of the upper Buffalo River Valley, and at Myrtleford and Gapstead. There are also considerable areas at Whorouly and Markwood.

1_3 Ovens fine sandy clay loam.

Site 7, Map 1.

This is the most extensive and wide-spread soil type in the surveyed area, occurring on every map.

0-8 inches grey-brown very fine sandy clay loam, sometimes loam or silty clay loam.
8-20 inches yellowish brown, or brown to yellowish grey-brown, very fine sandy clay loam; weakly structured; evident clay surfaces on peds.
20-48 inches weakly mottled brown or yellowish brown fine sandy clay loam or fine sandy loam; sometimes sandy loam below 36 inches.

1_3^{fsl} Ovens fine sandy loam.

This soil type is less extensive than Ovens fine sandy clay loam, but occurs throughout the surveyed area. The only constant feature distinguishing the type from Ovens fine sandy clay loam is the surface texture. However, there is a tendency to greater variation in surface depth (from 6 to 11 inches), and for the brown colour to extend to deeper than 36 inches.

0-8 inches grey-brown fine sandy loam.
8-20 inches brown fine sandy clay loam.
20-36 inches brown or yellowish brown fine sandy clay loam or fine' sandy loam.
36-48 inches brown or yellowish brown fine sandy clay loam or sandy loam, occasionally sand.

1_3^{cl} Ovens clay loam.

Site 13, Map 5.

This is a very minor type, not mapped separately but occurring intimately mixed, as
a minor component, with Ovens fine sandy clay loam, on Maps 1 to 5. It is greyer and fractionally heavier in the profile than the commoner type.

Phases and variants.
Table 4 includes all the phases and variants of the Ovens series that have been recorded in the present survey. Only a few of these are described in detail below, since constant features define each phase or variant, irrespective of other associated features of the profile. For example, the reddish profile variants have the same range of B horizon colours throughout all the types, phases and variants of the Ovens series. Again, the grey profile, deep surface variant of Ovens fine sandy clay loam, shallow phase, has the distinguishing characteristics of all deep surface soils, all grey profile variants and all shallow phases of the whole series.

Table 4. - Phases and Variants of the 1_3 or Ovens Series.

Phase or Variant	Surface Texture				
	Gravelly loam	**Sandy loam**	**Fine sandy loam**	**Fine sandy clay loam**	**Clay loam**
Phases					
Light profile		1_3^{sl}..(24/16, 43/6)	1_3^{fsl}.. (5/8)	1_3.. (1/8)	
Light deep subsoil		1_{3o}^{sl}	1_{3o}^{fsl}	1_{3o}	
Gleyed deep subsoil		$1_{3\triangle}^{sl}$		$1_{3\triangle}$ (49/9)	$1_{3\triangle}^{c}$
Shallow profile			1_{3+}^{fsl}	1_{3+}	
Variants					
Reddish profile		$1_3^{sl}r$	$1_3^{fsl}r$ (17/12)	1_3r (45/7)	
Grey profile				1_3g (41/5)	
Deep surface		$1_3^{sl}ds$	$1_3^{fsl}ds$ (25/15)	1_3ds	
Colluvial				Cl_3	Cl_3^{cl}
Combinations					
Gleyed deep subsoil, light profile			$1_{3\triangle}^{fsl}$..	$1_{3\triangle}$.. (2/8)	
Gleyed, light deep subsoil				$1_{3o\triangle}$	
Reddish light profile		$1_{3\triangle}^{sl}r$.. (30/17, 44/6)	$1_3^{fsl}r$..	1_3r..	
Deep surface, reddish profile			$1_3^{fsl}r\ ds$	$1_3r\ ds$	
Reddish profile, gleyed deep subsoil				$1_{3\triangle}r$	
Light deep subsoil, shallow profile				1_{3o+}	
Light deep subsoil, reddish profile		$1_{3o}^{sl}r$	$1_{3o}^{fsl}r$	$1_{3o}r$	
Light deep subsoil, deep surface			$13_o^{fsl}ds$	13_ods	
Gleyed deep subsoil, deep surface		$1_{3\triangle}^{sl}ds$	$1_{3\triangle}^{fsl}ds$	$1_{3\triangle}ds$	
Gleyed deep subsoil, shallow phase				$1_{3\triangle+}$	
Gleyed deep subsoil, gravelly variant				$1_{3\triangle}gr$ (50/9)	
Gleyed light deep subsoil, gravelly variant	$1_{3o\triangle}^{grl}gr$				
Grey profile, shallow phase				$1_{3+}g$	
Grey profile, deep surface			$1_3^{fsl}gds$	1_3gds	
Grey profile, deep surface, shallow phase				$1_{3+}gds$	
Colluvial, gravelly profile			$Cl_3^{fsl}gr$		
Grey profile, colluvial variant					$Cl_3^{cl}g$

Examples:

1_{3o} Ovens fine sandy clay loam, light deep subsoil phase.

Site 15, Map 12.

0-7 inches grey-brown fine sandy clay loam; weak crumb structure.
7-20 inches brown passing to yellowish brown fine sandy clay loam, heavier than above; very weak structure.
20-30 inches dull yellowish brown fine sandy loam.
30-48 inches yellow-brown mottled coarse sandy loam passing to gravel.

Fine sandy loam may occur shallower than 20 inches.

$1_{3\triangle}$ Ovens fine sandy clay loam, gleyed deep subsoil phase.

△49, Map 9.

0-10 inches dark grey-brown or brownish grey very fine sandy clay loam.
10-24 inches brown or grey-brown very fine sandy clay loam passing gradually to
24-48 inches brown and yellow-grey, or grey-brown and light grey moderately mottled fine sandy clay loam or fine sandy loam, with soft ferruginous concretions.

1_{3+} Ovens fine sandy clay loam, shallow phase.

There are a few minor areas of this phase at East Wangaratta, Oxley Flats, Everton and Ovens, but it is mostly in complex with 1_{3g} 1_4g or 1_6 soils.

0-8 inches dark yellowish grey-brown or grey-brown fine sandy clay loam.
8-36 inches brown or sometimes brownish grey passing to yellowish brown fine sandy clay loam.
36-48 inches grey or dark grey clay loam or medium clay; moderate structure.

$1_{3\triangle}$ Ovens fine sandy clay loam, light profile, gleyed deep subsoil phase.

Site 2, Map 8.

0-7 inches greyish brown to yellowish grey-brown very fine to fine sandy clay loam.
7-16 inches yellowish grey-brown heavy fine sandy loam, becoming lighter.
16-48 inches yellowish grey-brown loamy sand, becoming greyer and mottled with dark brown and light grey below 30 inches.

1_{3r} Ovens fine sandy clay loam, reddish variant.

△45, Map 7.

This variant is wide-spread, but is less extensive than the type or the reddish light profile variant. It can be regarded as intermediate between these more extensive soils. It differs from Ovens fine sandy clay loam in the reddish brown colour of the B horizon and in a significant number of cases the surface has a slightly reddish tinge. There is a greater likelihood of gravel occurring from 36 inches than in the type.

0-8 inches grey-brown fine sandy clay loam.
8-24 inches reddish brown fine sandy clay loam changing at about 16 inches to brown and passing gradually at about 24 inches to
24-48 inches yellowish brown becoming mottled at depth, fine sandy clay loam to light sandy clay loam; sometimes with gravel from 36 inches.

1_{3+} Ovens fine sandy clay loam, grey variant.

△ 41, Map 5.

0-7 inches dark brownish grey fine sandy clay loam to loam.
7-30 inches yellowish grey to grey and dark grey-brown fine sandy clay loam.
30-48 inches yellow-brown to grey and yellowish brown mottled fine sandy clay loam.

1_{3ds} Ovens fine sandy clay loam, deep surf ace variant.

This soil is designated "variant" rather than “phase" since its distinctive feature is an overlay of contemporary sediments, which if .deeper than 18 inches would be considered to be a shallow phase of an 0 group soil.

0-15 inches dark brownish grey or greyish brown fine sandy clay loam passing to grey-brown with increase in structure.
15-48 inches normal horizons of Ovens fine sandy clay loam.

1_3^{fsl}. Ovens fine sandy loam, light profile phase.

Site 5, Map 8.

0-10 inches grey-brown gritty fine sandy loam.
10-18 inches brown or bright brown gritty fine sandy loam or light sandy clay loam.
18-30 inches brown or yellowish brown light sandy loam.
30-48 inches yellowish brown or brownish grey sandy loam or coarse sand.

$1_3{}^{fsl}{}_r$ Ovens fine sandy loam, reddish variant.

Site 17, Map 12.

This soil is important at Buffalo River and Eurobin.

0-7 inches grey-brown fine sandy loam.
7-24 inches reddish brown fine sandy clay loam; weak structure.
24-48 inches brown fine sandy loam becoming yellowish brown or yellowish grey, sometimes with sand or clay loam below 40 inches.

1_3^{sl}.. Ovens sandy loam, light profile phase.

Site 24, Map 16, 43, Map 6.

This is an important minor soil at Whorouly and on the Buffalo River. Some areas contain other surface textures, gravelly profiles, and sometimes sandy depressions.

0-10 inches grey-brown sandy loam.
10-24 inches brown sandy loam, heavier than above.
24-48 inches dull brown to yellowish or greyish brown sandy loam, passing to sand or gravelly sand.

$1_3^{sl}{}_r$.. Ovens sandy loam, light profile phase, reddish variant.

Site 30, Map 17, A 44, Map 6.

0-12 inches grey-brown sandy loam or gritty fine sandy loam.
12-24 inches reddish brown light sandy . clay loam.
24-48 inches brown sandy loam.

$1_{3o}^{grl}\triangle_{gr}$ Ovens gravelly loam, gravelly profile variant, gleyed light deep subsoil phase.

Near △ 50, Map 9.

This is a minor type occurring on the levee of a small break-away prior stream near the junction of Buffalo Creek and the Ovens River.

0-10 inches brownish grey gravelly loam with angular gravel to ¼ inch size.
10-27 inches greyish brown becoming brown gravelly clay loam.
27-48 inches rounded gravel, large and small.

The horizon of rounded gravel may begin at depths from 20 to 36 inches.

UNNAMED SERIES.
Types 1_4^{grl} 1_4^{fsl} 1_4^{sil} 1_4^{fscl} 1_4^{cl}

The 1, series resembles the Ovens series except that the determinant B horizon is a grey-brown to brown clay loam or silty light clay, instead of a fine sandy clay loam. In the field the soils of the two series often adjoin each other, with the 14 series at a fractionally higher level in the landscape, or nearer to the valley sides. Areas of 14 soils are usually more nearly level than areas of the Ovens series, and are also less dissected by stream channels.

1_4 1_4 fine sandy clay loam.

0-8 inches grey-brown very fine sandy clay loam to clay loam.
8-20 inches yellowish brown clay loam to silty light clay.
20-48 inches dominantly yellowish brown, diffusely mottled with greyer colours, fine sandy clay loam or light clay.

The surface ranges from 6 to 10 inches in depth. Although fine sandy clay loam is normal in the type, clay loam textures do occur. In areas mapped as 1, clay loam, however, clay loam is the only surface texture present.

1_4^{fsl} 1_4 fine sandy loam.

1_4^{cl} 1_4 clay loam.

These types differ from 1, fine sandy clay loam only in the texture of the surface.

1_4^{sil} 1_4 silty loam.

This minor type is recorded near Robert's Creek in complex with 1, fine sandy loam, shallow phase.

0-8 inches dark brownish grey silty loam.
8-20 inches greyish brown light clay passing gradually to
20-48 inches yellowish brown clay loam or light clay, with or without gravel below 36 inches.

Table 5. - Phases and Variants of the 1_4 Series.

Phase or Variant	Surface Texture			
	Gravelly loam	Fine sandy loam	Fine sandy clay loam	Clay loam
Phases				
Light deep subsoil		1_{4o}^{fsl}	1_{4o}	1_{4o}^{cl} (3/8)
Gleyed deep subsoil		$1_{4\triangle}^{fsl}$	$1_{4\triangle}$	$1_{4\triangle}^{cl}$ (20/14)
Shallow profile		$1_4^{fsl}r$	1_4^{r}	$1_4^{cl}r$
Variants				
Reddish profile		$1_4^{fsl}r$	1_4r	$1_4^{cl}r$
Grey profile			1_4g	1_4^{cl}g
Heavy profile				
Gravelly profile	$1_4^{grl}gr$			
Deep surface			1_4ds	
Colluvial		cl_4^{fsl}	cl_4	cl_4^{cl}
Combinations				
Gleyed, light deep subsoil			$1_{4o\triangle}$	
Reddish profile, gleyed deep subsoil		$1_{4\triangle}^{fsl}r$		
Grey profile, deep surface			1_4gds	
Grey profile, shallow phase			$1_{4+}g$	
Grey, heavy profile			1_4ghp	
Grey profile, colluvial variant			cl_4g (53/12)	

Figures in parentheses refer to reference sites; thus (12/17) refers to Reference Site 12 on Map 17.

Phases and variants.
These are listed in Table 5 and are as defined for the Ovens series except that the light deep subsoil phase of the 1, series allows the presence of fine sandy loam in the deep subsoil, whereas in the Ovens series this horizon must be no finer than coarse sandy loam. The heavy profile variant, which does not occur in the Ovens series, has light to medium clay in the deep subsoil, at some depth greater than 24 inches.

$1_4^{grl}{}_{gr}$ 1_4 gravelly loam, gravelly profile.

This variant and type is recorded only in the complex of soils on granitic sediments at Nug Nug.

0-8 inches grey to grey-brown sandy loam with small gravel.
8-18 inches dull yellowish brown gravelly clay loam.
18-48 inches brown gravelly clay.

Boulders may occur anywhere in the profile.

UNNAMED SERIES.
Type and variant $1_5{}^{c}{}_{g}$

Soils of this series occur in small areas where water and fine-grained sediments accumulate, usually between a levee and the toe of a colluvial cone or the scarp of an older terrace.

$1_5{}^{C}{}_{g}$ 1_5 clay, grey profile variant.

△56, △ 57, Map 14.

0-12 inches grey light or medium clay; large or medium blocky structure; tough.
12-48 inches grey and yellowish grey mottled medium or heavy clay.

The area inscribed "dark profile" has the following characteristics:

0-16 inches black heavy clay; fine blocky structure; deeply cracking; passing gradually to
16-48 inches dark grey and dark brownish grey diffusely mottled heavy clay.

OXLEY FLATS SERIES.
Types 1_6^{Sl} 1_6^{fsl} 1_6^{fscl} 1_6^{cl} 1_6^{grcl}

This is an extensive series on the flood plain recently abandoned by the river. The characteristic sediment is clay loam to light clay, and the distinguishing features are grey colours and weak iron segregation near the surface, appearing as a weakly bleached subsurface in about half of all profiles.

1_6 Oxley Flats fine sandy clay loam.

Site 8, Map 1.

0-10 inches dark yellowish grey-brown to brownish grey fine sandy clay loam.
10-20 inches brownish grey or light grey with brown clay loam or fine sandy clay loam, occasionally with ferruginous gravel.
20-48 inches dominantly grey mottled light clay.

The surface depth may vary from 5 to 12 inches, deeper examples having a thin surface layer of contemporary sediments.

1_6^{fsl} Oxley Flats fine sandy loam.

A very minor type differing from the above in having a surface of fine sandy loam.

1_6^{Cl} Oxley Flats clay loam.

0-8 inches dark yellowish grey-brown to brownish grey clay loam, with or without slight ferruginous gravel.
8-18 inches grey or light grey with brown clay loam or light clay.
18-48 inches mottled grey or yellow-brown light clay.

Table 6. - Phases and Variants of the 1_6 or Oxley Flats Series.

Phase or Variant	Surface Texture				
	Sandy loam	Fine sandy loam	Fine sandy clay loam	Clay loam	Gravelly lay loam
Phases					
Shallow profile			l_{6+}	$l_6^{cl}{}_+$	
Variants					
Deep surface	$l_6^{sl}ds$	$l_6^{fs}lds$	l_6ds	$l_6^{cl}ds$	
Heavy profile			1_6hp (37/2)	$1_6^{cl}hp$	
Colluvial			$c1_6$	$c1_6^{cl}$	
Gravelly profile					$1_6^{grcl}gr$

Figures in parentheses refer to reference sites ; thus *(37/2)* refers to Reference Site 37 on Map 2.

Phases and variants.
These are listed in Table 6. The shallow phase, and the deep surface and colluvial variants are defined as for the Ovens series. The heavy profile variant has medium clay before 36 inches, without clear evidence of a buried soil. The gravelly variant has the following profile characteristics:

$1_6^{grcl}{}_{gr}$ Oxley Flats gravelly clay loam gravelly variant.

△51, Maps 9 and 15.

0-12 inches grey clay loam with moderate small rounded gravel.
12-32 inches light grey and yellowish brown mottled clay loam with moderate rounded gravel.
32-48 inches grey with yellowish brown clay loam with small and large gravel.

Gradational Soils on Older Sediments.

Series 2_1 2_3 2_4 2_5 2_6

Soils of this group occur on a terrace distinctly above the level of Group 1 soils, above all normal flooding, or on an older colluvial cone. Some remnants of a yet higher terrace or of even older cones have been included in the group, on the basis of similar profiles. Profiles characteristic of the group have distinct clayey B horizons, red-brown in locally well drained positions, with a clay content 1-11 to 2 times that in the A horizon, the increase taking place over more than 4 inches. Structure is weak,

though more distinct than in Group 1 soils and the peds are porous and earthy. In gravelly profiles of series 2, the accumulation Of clay in the B horizon is slight but clearly visible, as distinct from 1, soils which virtually have a colour B horizon only.

Unnamed Series
Type 2_1^{gr}

This is a very minor series of one type recorded at Eurobin on Map 12.

2_1 2_1, gravel.

0-1 inch grey-brown fine sandy loam.
1-12 inches large rounded gravel with some reddish brown clay in the interstices.
12-48 inches as above, with decreasing clay.

MERRIANG SERIES.
Types 2_3^{sl} 2_3^{fsl} 2_3^{scl} 2_3^{fscl}

The Merriang series with fine sandy clay in the B horizon, and the Eurobin series with light to medium clay, are the characteristic series of Group 2. They and their colluvial variants occur extensively along the edges of the valley floor upstream from Whorouly, and as remnants elsewhere. Merriang soils are more characteristic of the Buffalo River and lower Ovens River terraces, and the Eurobin series of the upper Ovens River. The Merriang series is close in texture range to the unnamed series 1_4, but with a B horizon usually more sandy, and the A and B horizons slightly more contrasted in texture or structure. Reddish variants of the Ovens series are also close to the Merriang series.

2_3 Merriang fine sandy clay loam.

Site 31, Map 17, Site 32, Map 15.

0-6 inches grey-brown light fine sandy clay loam.
6-10 inches reddish brown heavy fine sandy clay loam; porous peds.
10-24 inches red-brown fine sandy clay; weak structure.
24-40 inches brown, light fine sandy clay loam.
40-48 inches yellow-brown or grey sandy loam, with or without slight gravel.

2_3^{fsl} Merriang fine sandy loam.

A minor type differing from Merriang fine sandy clay loam only in the texture of the surface horizon.

2_{3o} Merriang fine sandy loam, light deep subsoil phase.

These phases differ from the types in having fine sandy loam before 30 inches, passing to sand or gravel to 48 inches.

2_{3o}^{fsl} Merriang fine sandy clay loam, gleyed deep subsoil phase.

This soil differs from the type in that the colours deeper than 36 inches are moderately mottled with light grey to yellow grey, with or without soft ferruginous gravel.

$2_{3\triangle}$ Merriang fine sandy clay loam, gleyed deep subsoil phase

2_3^{sl}.. Merriang sandy loam, light profile phase.

2_3^{scl} Merriang sandy clay loam, light profile phase.

Very minor areas of these soils occur on gravelly sediments.

0-5 inches brown sandy loam (or sandy clay loam).
5-15 inches red-brown sandy clay loam with small gravel.
15-48 inches large gravel with reddish brown light clay or clay loam.

c2_3 Merriang fine sandy clay loam, colluvial variant.

This variant differs from the type in having angular gravel in the B horizon and lower in the profile.

EUROBIN SERIES.
Types 2_4^{grsl} 2_4^{fsl} 2_4^{l} 2_4^{fscl} 2_4^{cl}

The Eurobin series occurs closely associated with the Merriang series but is more characteristic of the Ovens River terraces upstream from Myrtleford. The colluvial variant of Eurobin fine sandy clay loam is the most common soil on colluvium in all localities. It is especially important at Porepunkah.

2_4 Eurobin fine sandy clay loam.

This characteristic soil of the Eurobin series occurs in all areas upstream from Milawa, but is not extensive.

0-6 inches grey-brown fine sandy clay loam.
6-10 inches reddish or light reddish brown clay loam or light clay.
10-20 inches red-brown light or medium clay.
20-48 inches reddish brown passing to yellowish brown or mottled brown clay loam or light clay.

2_4^{fsl} Eurobin fine sandy loam.

2_4^{cl} Eurobin clay loam.

Site 19, Map 14.

These are very minor soil types occurring in most areas of the survey. They are distinguished from Eurobin fine sandy clay loam by their coarser or finer surface textures respectively, and in the case of the clay loam, by increased siltiness and duller colours in the A and B horizons.

2_{4o} Eurobin fine sandy clay loam, light deep subsoil phase.

Site 16, Map 12.

The profile differs from that of the type, in that below 30 inches textures are fine sandy clay loam or lighter.

2_4^{grsl} Eurobin gravelly sandy loam.

2_4^{l} Eurobin loam.

These types have been recorded only as the following variants:

$CT2_4^{grsl}{}_{gr}$ Eurobin gravelly sandy loam, gravelly profile, colluvial terrace variant.

Site 27, Map 17.

This soil occurs on a dissected terrace et into granitic colluvium at Nug Nug.

0-7 inches yellowish grey sandy loam with light amounts of small sharp quartz gravel.
7-20 inches yellowish grey-brown sandy loam, very light in colour when dry, with light amounts of gravel.
20-40 inches yellowish grey passing to reddish brown light clay with moderate gravel and weather rock.
40-48 inches brown light clay with gravel.

$c2_4^{l}$ Eurobin loam, colluvial variant.

Site 18, Map 14.

This soil occurs on colluvium from fine grained sedimentary and metamorphic rock Site 18 is on one of a sequence of colluvium cones at Bright, and this variant is record also on an eroded cone at Buffalo River D Site east of Site 29.

0-6 inches grey-brown gravelly lo or fine sandy clay loam m variable small ferruginized fragments.
6-14 inches reddish to yellowish brown gravelly clay loam with small fragments.
14-36 inches reddish brown light with small and large stones rock increasing with depth.

UNNAMED SERIES.
Type and variant $c2_5^{cl}{}_g$

This series has been recorded at only site, a small seepage area on a colluvial cone.

$c2_{5g}$ 2_5 clay loam, grey colluvial variant.

Near △55, Map 12.

0-8 inches dark yellowish grey loam; very weakly structured; passing gradually to
8-14 inches grey medium clay; occasional rock fragments.
14-24 inches yellowish grey and yellowish brown mottled medium clay, becoming lighter with depth; light amounts of rock.
24-48 inches as above or light yellow-brown light clay with rock increasing.

UNNAMED SERIES.
Types 2_6^{fscl} 2_6^{cl}

This series is of minor extent in areas of water accumulation. A wide range of textures and colours is allowed in the deep subsoil.

2_6 2_6 fine sandy clay loam.

0-3 inches dark brownish grey, or grey with brown fine sandy clay loam.
3-6 to 12 inches light grey or yellowish grey fine sandy clay loam or clay loam with slight ferruginous concretions.
6 to 12-48 inches yellowish grey to yellow-brown, usually mottled, light clay to fine sandy clay loam.

2_6^{cl} 2^6 clay loam

This type differs from the fine sandy clay loam in having a silty loam to clay loam surface.

Duplex Soils on Older Sediments.

Series 3_4 3_5 3_6

Group 3, duplex profile soils, occur at terrace levels above adjoining Group 2 soils. However, there are distinct steps in the terraces at some points, without a change from one group to another. On colluvium, earth movements such as minor slumping or continued slow accretion of sediment have prevented the formation of duplex profiles in some cases.

TARA SERIES.
Type 3_4^{fsl}

This is a very extensive series on the highest terrace from Wangaratta to Everton. Tara fine sandy loam occurs mainly in complex with 3_6 soils. Minor components of the complex are the light deep subsoil phase of Tara fine sandy loam on old levees, and grey soils of the 2_6 series in some lower areas and depressions.

3_4 Tara fine sandy loam.

Near △ 36, Map 2.

0-8 inches grey-brown or reddish grey-brown heavy fine sandy loam.
8-15 inches reddish brown becoming red-brown light clay, sometimes with a trace of hard lime.
15-36 inches red-brown light or medium clay.
36-48 inches brown light clay sometimes passing to fine sandy clay loam.

3_{4+} Tara fine sandy loam, shallow phase.

△ 39, Map 4.

0-6 inches greyish brown loam or fine sandy loam, gritty; weak coarse structure.
6-18 inches red-brown light clay; weak to moderate structure; trace of hard lime.
18-32 inches red-brown light clay; moderate structure; ¼ inch earthy peds.

32-42 inches red-brown medium clay; strong structure; ½ inch breaking to 1/10th inch peds with shiny black f aces.
42-48 inches yellow-brown with red-brown faces light clay; continuing.

3_{4o} Tara fine sandy loam, light deep subsoil phase.

Near △ 36, Map 2.

The profile is as for Tara fine sandy loam, but has fine sandy clay loam or lighter before 36 inches and continuing deeper than 48 inches.

RANDELONG SERIES.
Types 3_5^{sl} 3_5^{fscl} 3_5^{cl}

This series exists on terrace remnants at Myrtleford and Nug Nug, and as the colluvial variant and the grey colluvial variant at Wabonga Bridge.

3_5 Randelong fine sandy clay loam.

0-8 inches brownish grey fine sandy clay loam.
8-26 inches red-brown medium clay; moderate structure with ¼ inch peds; passing gradually to
26-48 inches brown light clay becoming mottled with yellow-brown at depth.

3_5^{Cl} Randelong clay loam.

This type differs from Randelong fine sandy clay loam only in the surface texture.

$CT3_5^{sl}$ Randelong sandy loam, colluvial terrace variant.

Site 28, Map 17.

This soil occurs on a terrace cut into granitic colluvium at Nug Nug.

0-8 inches grey to grey-brown sandy loam or fine sandy loam.
8-36 inches red-brown sandy medium or light clay; weak structure with j inch peds.
36-48 inches reddish brown and brown light clay with inclusions of yellow-grey gravelly clay (decomposing rock).

$C3_5$ Randelong fine sandy clay loam, colluvial variant.

This soil is of minor extent and differs from the type mainly because of its occurrence on a colluvial cone, but also because of the presence of occasional stones or large gravel in the profile.

$C3_5^{cl}{}_g$ Randelong clay loam, grey colluvial variant

△ 54, Map 12.

This very minor occurrence on the lower slope of a colluvial cone is a hydromorphic variant of Randelong clay loam.

0-8 inches dark yellowish grey clay loam; friable.
8-22 inches yellowish grey and yellowish brown diffusely mottled medium clay, passing to
22-48 inches grey and yellow-brown mottled medium clay with slight and increasing rock fragments; blocky structure.

3_6 UNNAMED SERIES.

This series has not been separated into types. It has been recorded only in complex with the 3_4 or Tara series at Tarrawingee, and as a colluvial terrace variant with Randelong sandy loam at Nug Nug. It occupies very shallow depressions and broad flat areas of the highest terrace at both places. The following generalized description covers the range of profiles recorded in the series:

0-7 to 14 inches grey to grey-brown fine sandy clay loam to light clay; weakly structured; usually passing to light grey with slight ferruginous gravel, with some increase in texture.
7 to 14-30 inches grey to greyish yellow-brown slightly mottle medium clay, with or without slight ferruginous gravel.

30-48 inches as above, becoming more strongly mottled at depth; with o without moderate hard carbonate in the upper part.

Friable Soils on the Oldest Sediments

Series 3_{5f}

BUFFALO SERIES.
Type $3^{l}_{5\,f}$

This series of very minor extent is found only on remnants of the highest terraces and oldest cones preserved in the upper reaches of the rivers. The series 'is distinguished from the Randelong series by its very friable subsoil, and by the fact that gravels have weathered to depths below 6 feet.

3_5^f Buffalo loam.

Site 26, Map 16.

0-6 inches grey-brown loam, or very fine sandy loam to clay loam.
6-15 inches red-brown medium or light clay; moderate fine structure; earthy peds; passing gradually to
15-48 inches red-brown medium or heavy clay; strong fine structure.
48-84 inches red-brown becoming mottled with yellowish brown light clay; sometimes with slight weathered gravel at depth.

$CT3_5^f$ Buffalo loam, colluvial terrace variant

Site 29, Map 18.

0-7 inches grey-brown loam to fine sandy clay loam; scattered small rock fragments.
7-24 inches red-brown medium clay;
- moderate fine structure.
24-48 inches reddish brown variously mottled light clay; weak structure; some small ferruginized rock fragments increasing with depth.