MURRUMBIDGEE IRRIGATION

GROUNDWATER CONDITIONS

IN THE

MIA AND DISTRICTS

ANNUAL REPORT 1996

GROUNDWATER CONDITIONS IN THE MIA & DISTRICTS 1996

Contents

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GROUNDWATER CONDITIONS IN THE MIA & DISTRICTS 1996

1. Introduction

A system of shallow and deeper piezometers is being maintained in the MIA and Districts and adjacent areas to allow regular assessment of groundwater trends and the associated salinity risk. The network consists of about 900 piezometers and is described by Tiwari (1996) for the 1995 annual report. There is also a much smaller network of piezometer nests to allow to assessment of seasonal trends in the various sub-districts which together make up the MIA. Results of this are reported for the first time in this report.

The weather conditions during the monitoring year may be described as about average. After a cool summer with above average rainfall during November 1995 and January 1996 a dry autumn occurred followed by winter with above average rainfall.

This report firstly describes groundwater conditions on basis of the main districts Yanco, Mirrool, Benerembah and Wah Wah, after which some statistics for the smaller sub-districts will be presented. At the end of the report some comments are made regarding the overall trends.

2. MIA as a Whole

Figure 1 shows contours of pressure levels in the most shallow aquifers to 12 metres depth, and Figure 2 shows the pressure levels in piezometers installed in aquifers between 12 and 35 meters. Several piezometers extend deeper than 35 meters but these were not used in the analysis.

Table 1a , corresponding with Figure 1, gives statistics for the most shallow aquifer systems for the areas with pressure levels within a given depth range. For practical purposes the term "shallow groundwater pressure depth" may be equated with the term "watertable depth", with which most people are more familiar, although it is necessary to remind oneself constantly that the two are not necessarily the same.

Table 1a : Areas (ha) of the MIA with groundwater pressure in the shallow (<12 m) aquifer within the depth indicated (*1)

Depth	1991	1993	1994	1995	1996
<1m	29060	41740	16320	29410	24140
<1.5m	n/a	n/a	n/a	n/a	66250
<2m	103340	110320	92730	112250	103860
<3m	143590	144660	136280	135790	137400
<4m	152590	152300	148150	144250	148900
Ave Depth	1.94	1.82	2.23	1.86	2.08
Winter Rainfall	139	122	45	117	141

*1. The area measured within the bounds of Figure 1 was 159,110 ha.

It is shown that despite the above average rainfall the groundwater depths had actually receded compared to 1995 or 1993, both of which were years with less winter rainfall.

The long term trend based on Table 1 does not show an increase in the area affected by high watertables. The 103,860 hectares with watertables within 2 metres represents 65% of the MIA excluding the Wah Wah District.

Table 1b, corresponding with Figure 2, shows the distribution of pressure levels in the 12-35 metres depth aquifer range. The difference with Table 1a is considerable.

Table 1b : Areas (ha) of the MIA with groundwater pressure in the shallow (12-35m) aquifer within the depth indicated (*1)

Depth	1996
<1m	13,160
<2m	66,300
<3m	95,200
<4m	110,500
<6m	128,400
<10m	150,000
Ave Depth	3.92
Winter Rainfall	141

*1. The area measured within the bounds of Figure 1 is 159,600 ha.

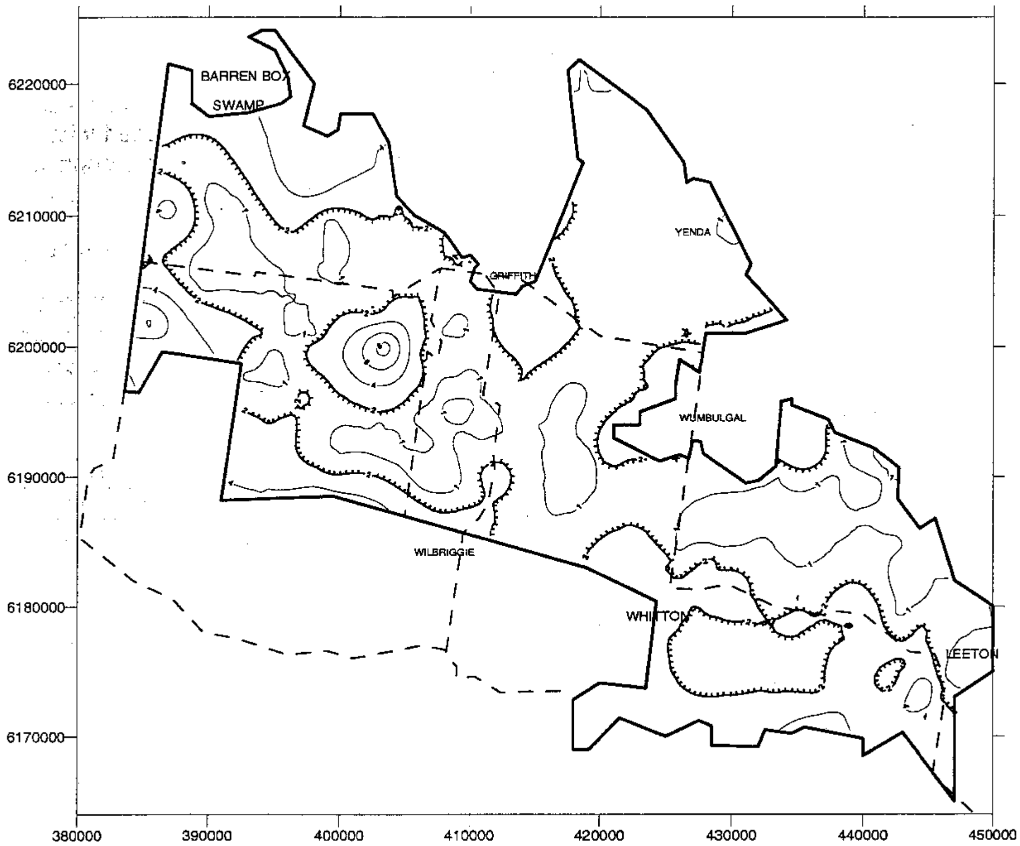


Figure 1 : Shallow groundwater pressure depths for the MIA, September 1996.

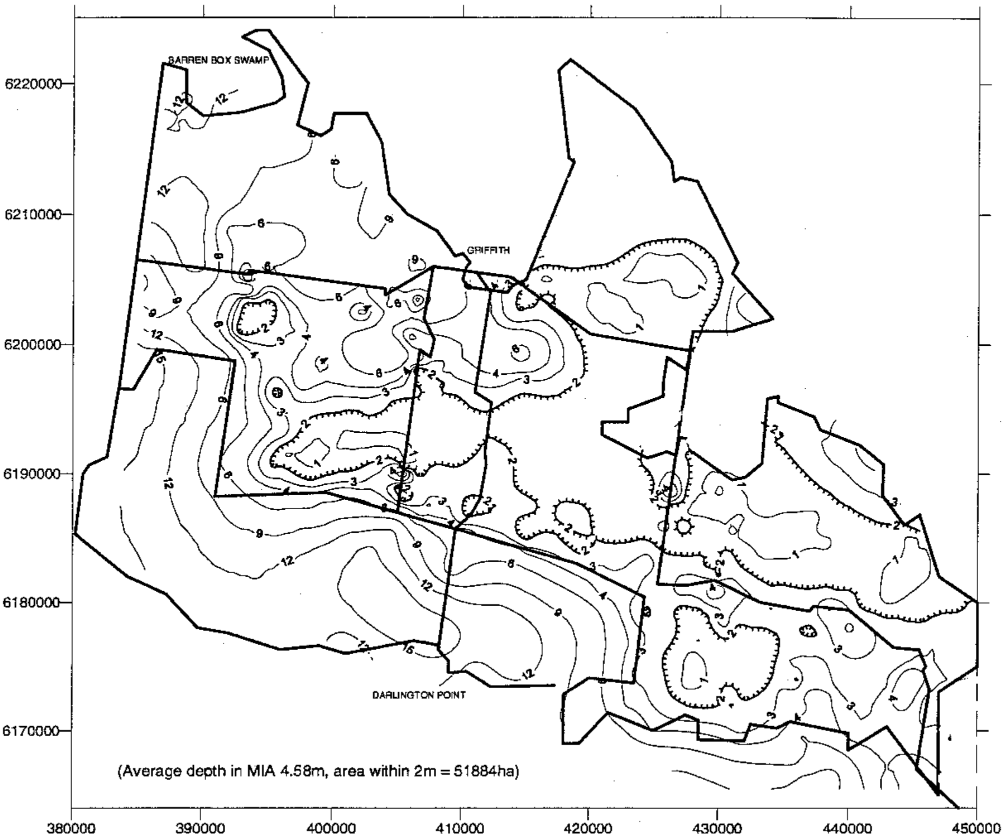


Figure 2 : MIA groundwater pressure depth contours in aquifers 12-35 deep, Sept 96

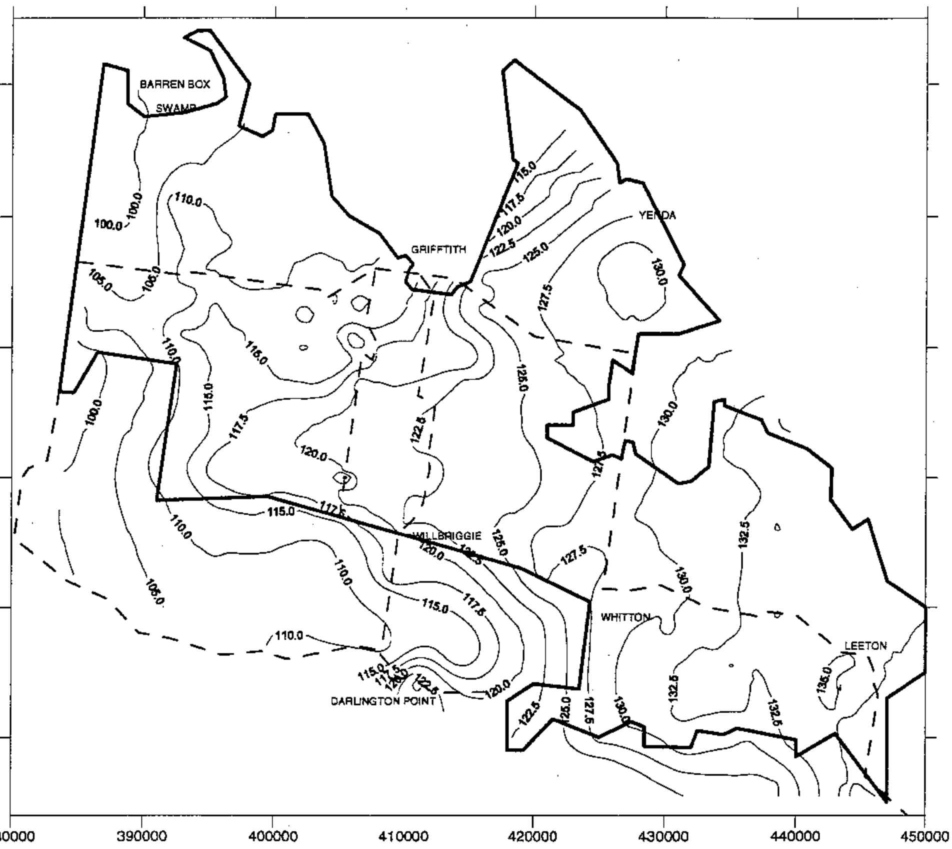


Figure 3 : AHD groundwater contours for aquifers at 12-35 metres depth, Sept 96.

The values of Table 1b are from the same data source as that used for following section on the Yanco, Mirrool and Benerembah areas. The totals of Tables 2, 3 and 4 of sections 2, 3 and 4 however are not exactly the same due to rounding errors in the SURFER software.

It is shown that about 52,000 ha are within 2 metres from the surface for this aquifer range. For the same total area being considered (159,000 ha) this is a considerable reduction since 1995 (est. 55,000 ha) and even compared to 1993, considered to be a good benchmark (est. 60,000 ha). Further discussion in provided at sections 2, 3 and 4.

Figure 3 shows the AHD groundwater contours for the 12-35 metres aquifer depth range. The AHD contours represent the height of the groundwater pressure level above sea level. As such it may be an indication of the directions in which the groundwater is moving. In the case of the MIA significant gradients occur from the Yanco area to the south underneath the Murrumbidgee River, into Kooba statio, and to the west of Benerembah. Figure 2 shows however that the depth to groundwater in the adjacent areas is still in the 6 to 15 metres below surface range.

A map showing Calivil pressure levels was produced for 1995 by Tiwari (1995). No such map has been prepared for 1996, as it would not show a large change. However the hydrographs of the five deep piezometers existing within the MIA has been prepared (by Mr Les Ellis) and this is included as Figure 4. It is shown there is no change or a small rise at the Bilbul site, whilst at Hanwood village and the Lockhart Road site in Benerembah there is a noticeable drop since about 1991. The highest levels occur towards the end of winter. At the Matthews Road site in eastern Kooba this drop is less obvious. At the Murrami site (5km south of village) there has been a significant drop since the end of 1994, for reasons which have not been explained.

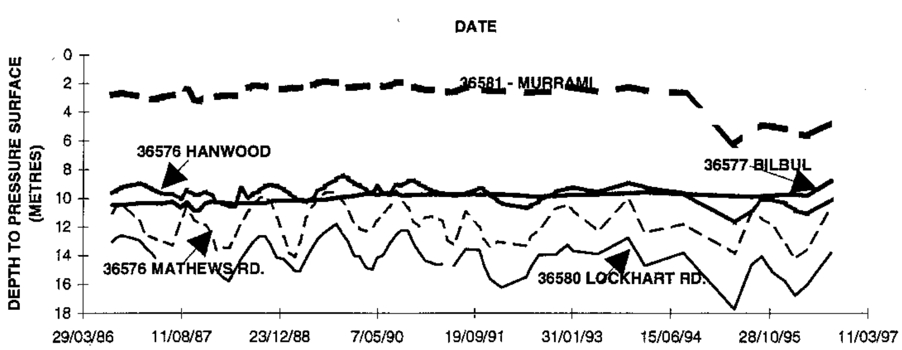


Figure 4. Hydrographs of Calivil Formation piezometers in MIA, 1987-1996.

3. Yanco Area

The median depth to the shallow and deeper pressure surface was calculated from the available piezometer set and is shown at Figure 5 on page 8. It is to be noted that whilst the median depth is a good indicator, it does not represent a weighted average depth for the area considered.

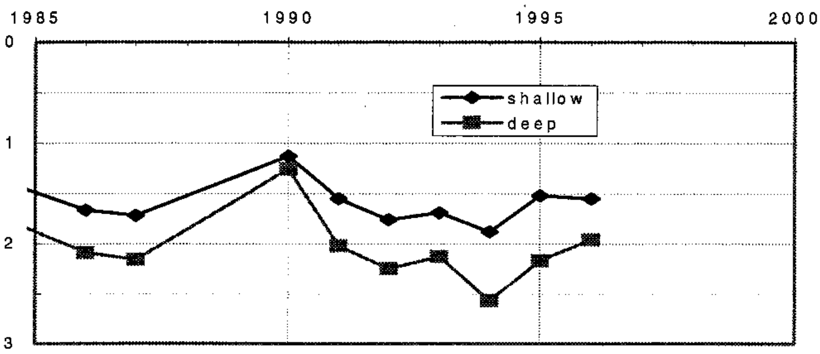


Figure 5 : Depth to median depth to shallow and deeper pressure level, Yanco area

Figures 6 and 7 show, for the Yanco area, the depth to the pressure level in the most shallow aquifer (<12m) and the deeper Shepparton aquifer (12-35 metres). Figure 8 shows the change in pressure depth since September 1995.

Table 2 shows the areas with pressure levels in aquifers 12-35 metres below the surface in the Yanco area for the period 1991 to 1996. There is a considerable decrease of the area within 2 metres since 1993 and 1995 (but not drought year 1994). It may be noted that the Calivil pressure level at Murrami had also decreased over this period (Figure 4).

Table 2. : Areas of the Yanco area (ha) with pressure levels within given depth range, for aquifers 12-35 metres below the surface (*1)

Depth	1991	1993	1994	1995	1996
<1m	2950	4770	300	7600	5450
<2m	24100	24850	16900	26200	20940
<3m	40520	39760	36870	39630	38010
<4m	45550	45720	45510	45250	46200
<6m	46730	46900	46900	47230	46200
Ave Depth	2.06	2.24	2.52	2.18	2.44

(*1). Yanco area as depicted measured 49,480ha

The shallower groundwater contour map areas (<12m) were also measured and it was found that 11,420ha was within 1 metres from the surface and 30,100ha within 2 metres. The average watertable was at 1.90 metres from the surface in the Yanco area, which is 0.54 metres more shallow than the level for the deeper system (which is at 2.44m). Most of the difference occurs in the southern parts of Yanco (Figures 6 and 7).

The rate of rise between 1995 and 1996 was negative. Table 2 suggests that a drop of 2.44-2.18=0.16 metres occurred. The actual drop however probably was less, at least Figure 7, which is based on the difference between Sep95 and Sep96 for an exactly identical piezometer set shows that the drop was only about 0.04 metres.

The configuration of Figure 8 is rather confusing, and at least partially reflects the fickle nature of piezometer behaviour in high groundwater level areas, some years being influenced by a close rice crop, other years being influenced by rice crops further away from the individual piezometers.

The long term trend based on Table 2 does not show an increase in the areas affected by high watertables.

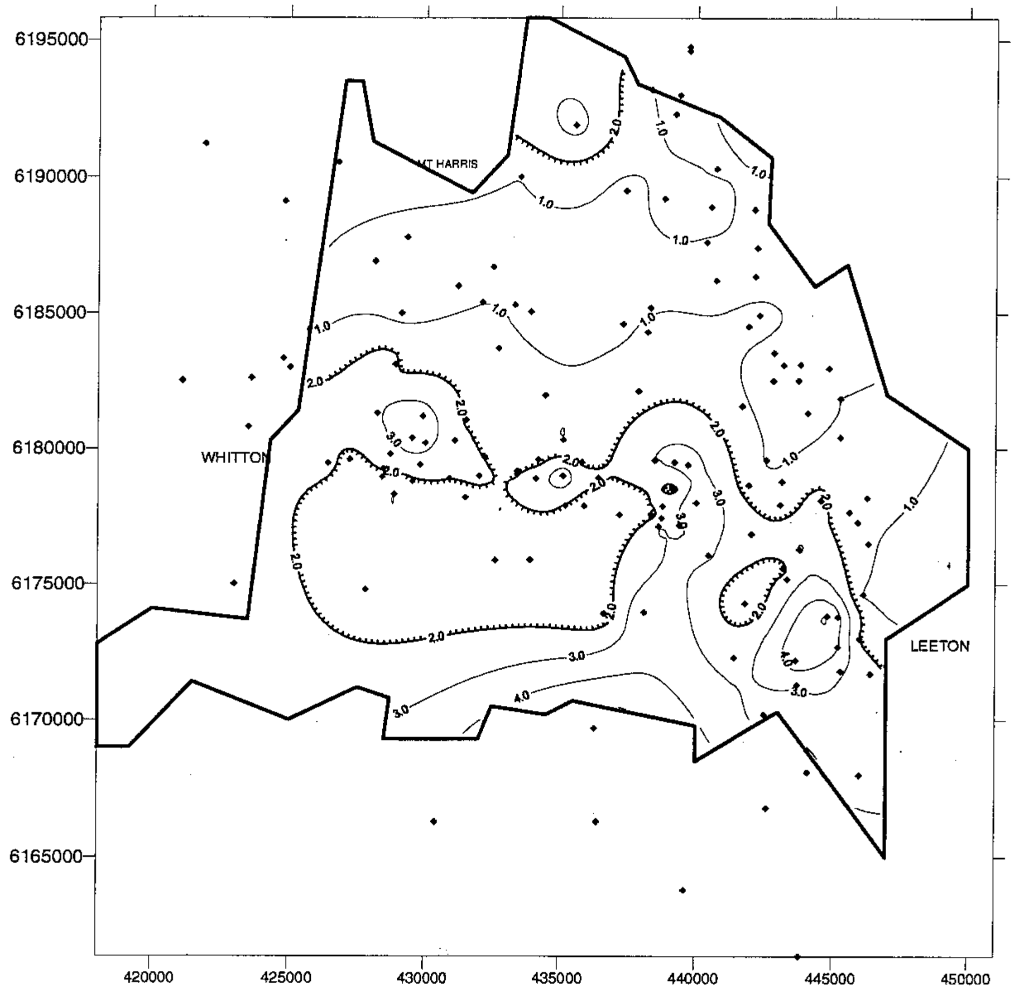


Figure 6 : Yanco area - Groundwater pressure depths in aquifers less than 12 metres deep, Sep 96.

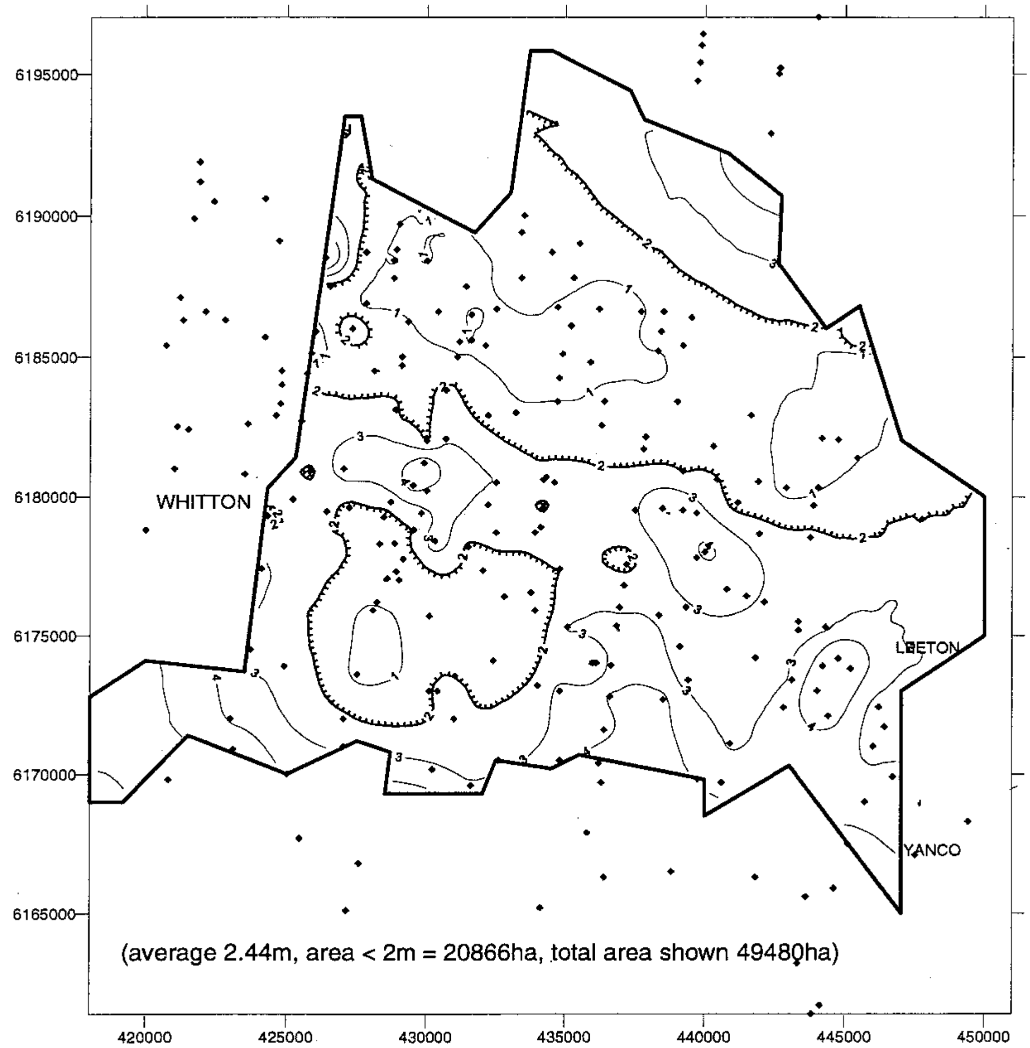


Figure 7 : Yanco area - Depth to groundwater pressure in aquifers 12-35 metres deep, September 1996.

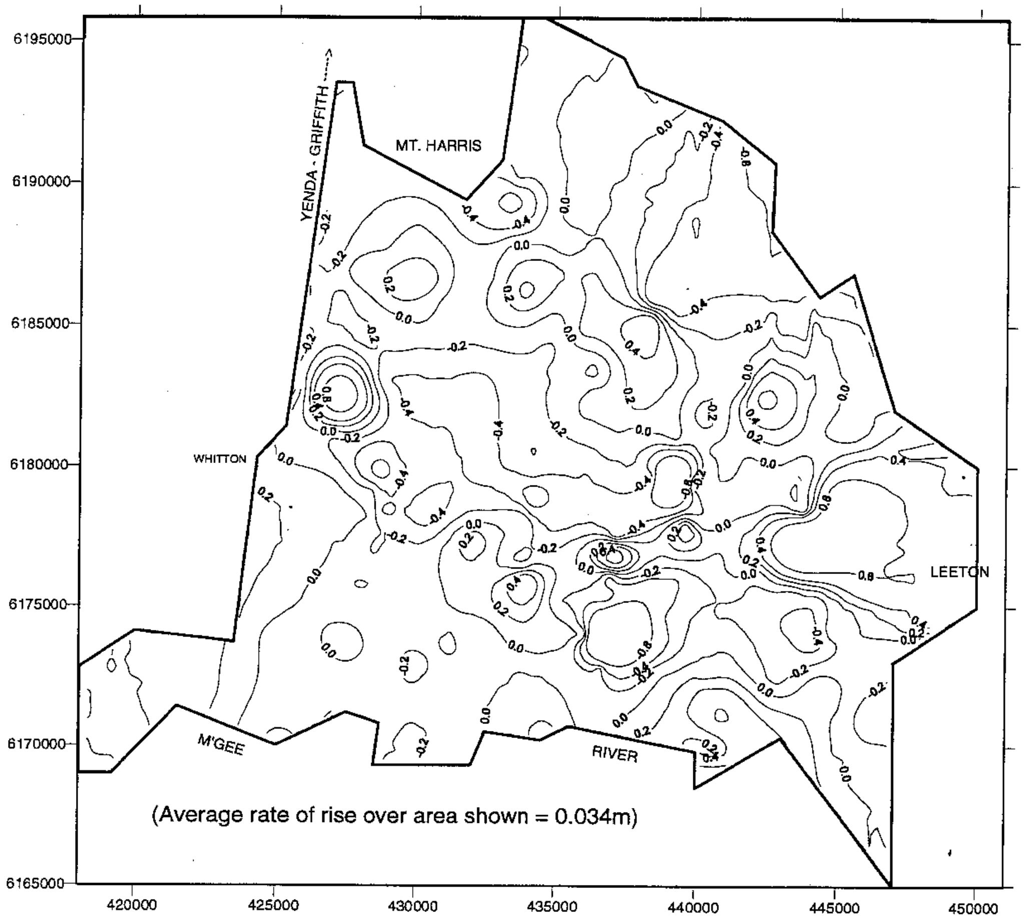


Figure 8 : Yanco area. Rise(+)/Drop(-) in pressure levels between Sep95 and Sep 96.

4. Mirrool Area

The median depth to pressure levels sice 1985 are shown at Figure 9. It is to be noted that whilst the median depth levels are a good indicator, they do not represent a weighted average for the district being considered.

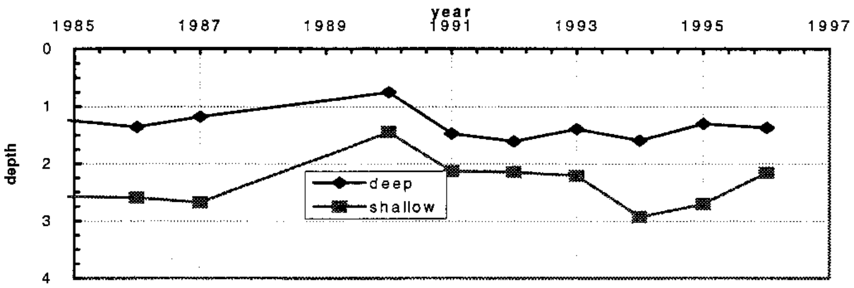


Figure 9 : Median levels to deep and shallow aquifers in the Mirrool Area.

Figures 10 and 11 show, for the Mirrool area, the depth to the pressure level in the most shallow aquifer (<12m) and the deeper Shepparton aquifer (12-35 metres). Figure 12 shows the change in pressure depth since September 1995. Based on Figure 11, Table 3 shows the areas with pressure levels in aquifers 12-35 metres below the surface in the Mirrool area for the period 1991 to 1996.

Table 3. : Areas of the Mirrool area (ha) with presure levels within given depth range, for aquifers 12-35 metres below the surface (*1)

Depth	1991	1993	1994	1995	1996
<1m	7610	6220	0	9610	3035
<1.5m	n/a	n/a	n/a	n/a	10730
<2m	34760	34800	26170	30000	27900
<3m	44030	44600	40860	38860	40080
<4m	48510	48160	45550	39860	43940
<6m	53625	53560	51160	42790	47500
<10m	54600	54600	54320	44230	48530
Ave Depth	2.27	2.33	2.64	2.21	2.33

(*1). Mirrool area measured 54600 ha, but the 1995 and 1996 areas do not include about 6,000 ha of the Yenda area where no aquifers occur (Figure 8).

The shallower groundwater contour areas (<12m) were also measured and it was found that 12,100 ha was within 1 metres from the surface and 30,180ha within 2 metres. The average watertable was at 1.49 metres from the surface in the Mirrool area, which is 0.84 metres more shallow than the level for the deeper system (2.33m, Table 3). Most of the difference occurs in the southern parts of Mirrool and the area from Hanwood to the north west (Figures 10 and 11).

The rate of rise between 1995 and 1996 was negative, Table 3 suggesting that the drop of 2.44-2.18=0.12m occurred. This is reasonably consistent with the mapping result of Figure 10 which on basis of an identical piezometer set between the two dates gives a drop of 0.14m. The configuration of Figure 12 shows rises and falls, which partially reflects the fickle nature of piezometer behaviour, which in some years is being influenced by a close rice crop, and in other years by drying because the rice crop is further away.

From Table 3 it cannot be concluded that there is evidence of a long term upward trend in the area affected by groundwater pressure levels within 2 metres from the surface.

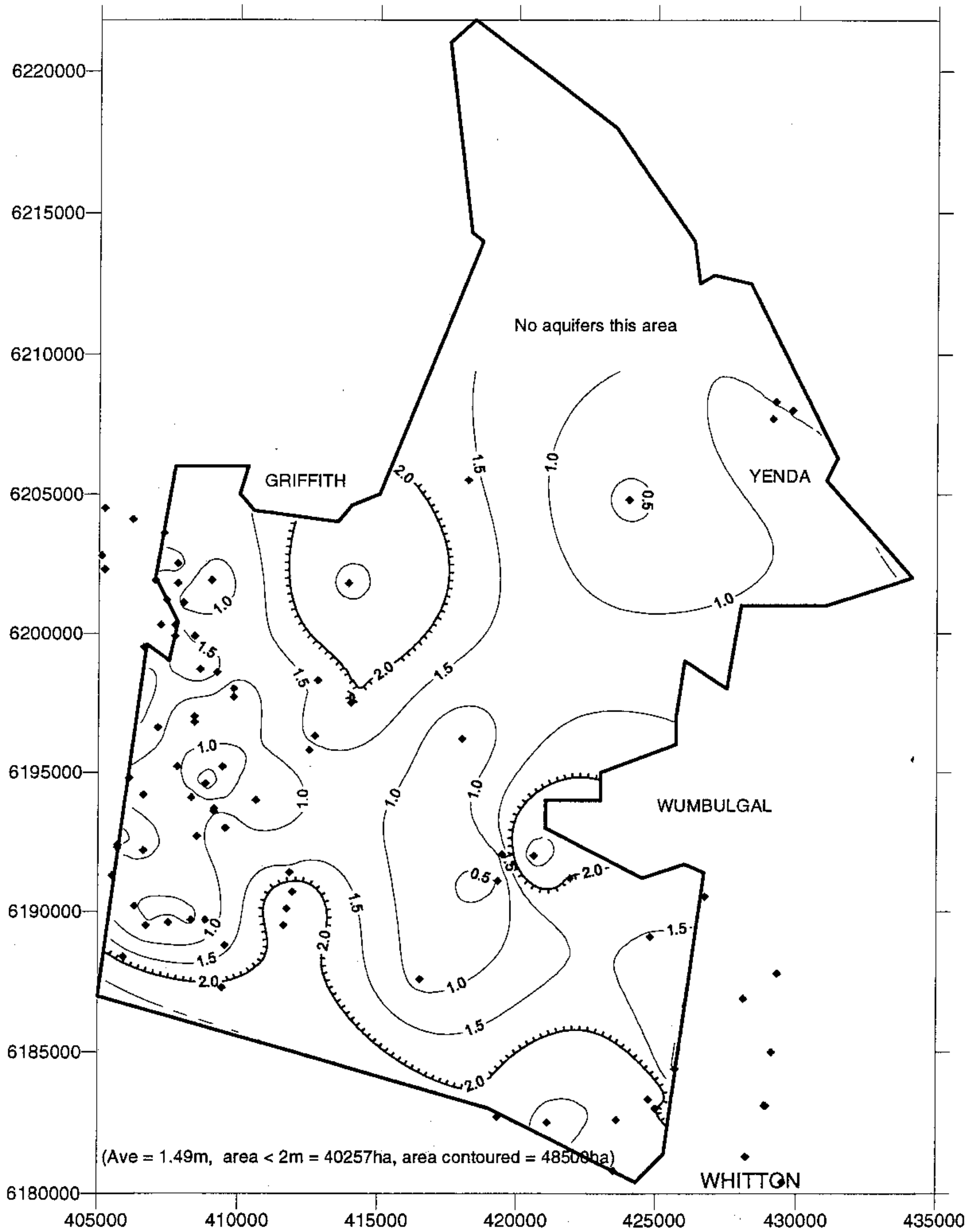


Figure 10 Mirrool area. Depth to groundwater pressure level in shallow aquifer (= watertable depth). September 1996.

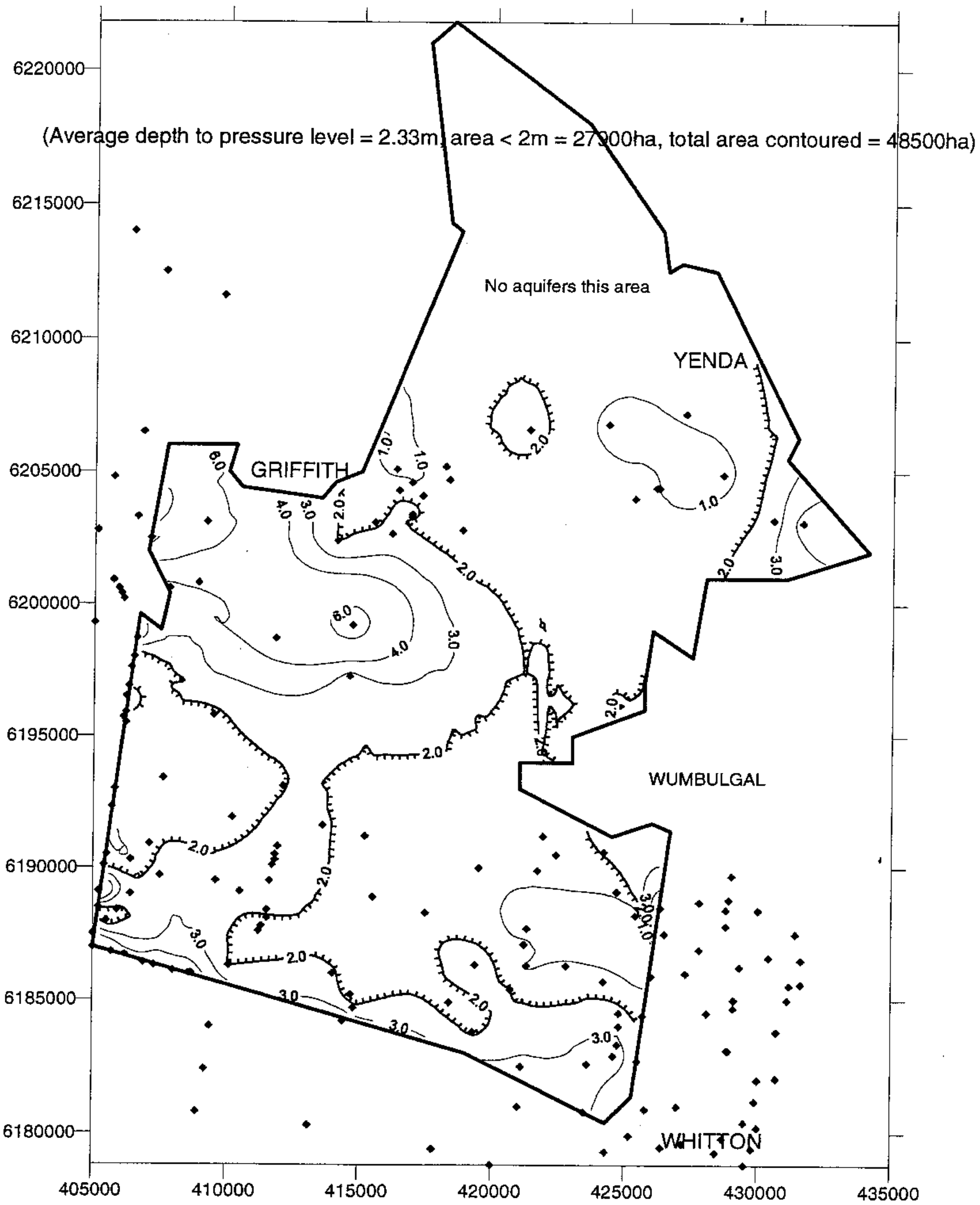
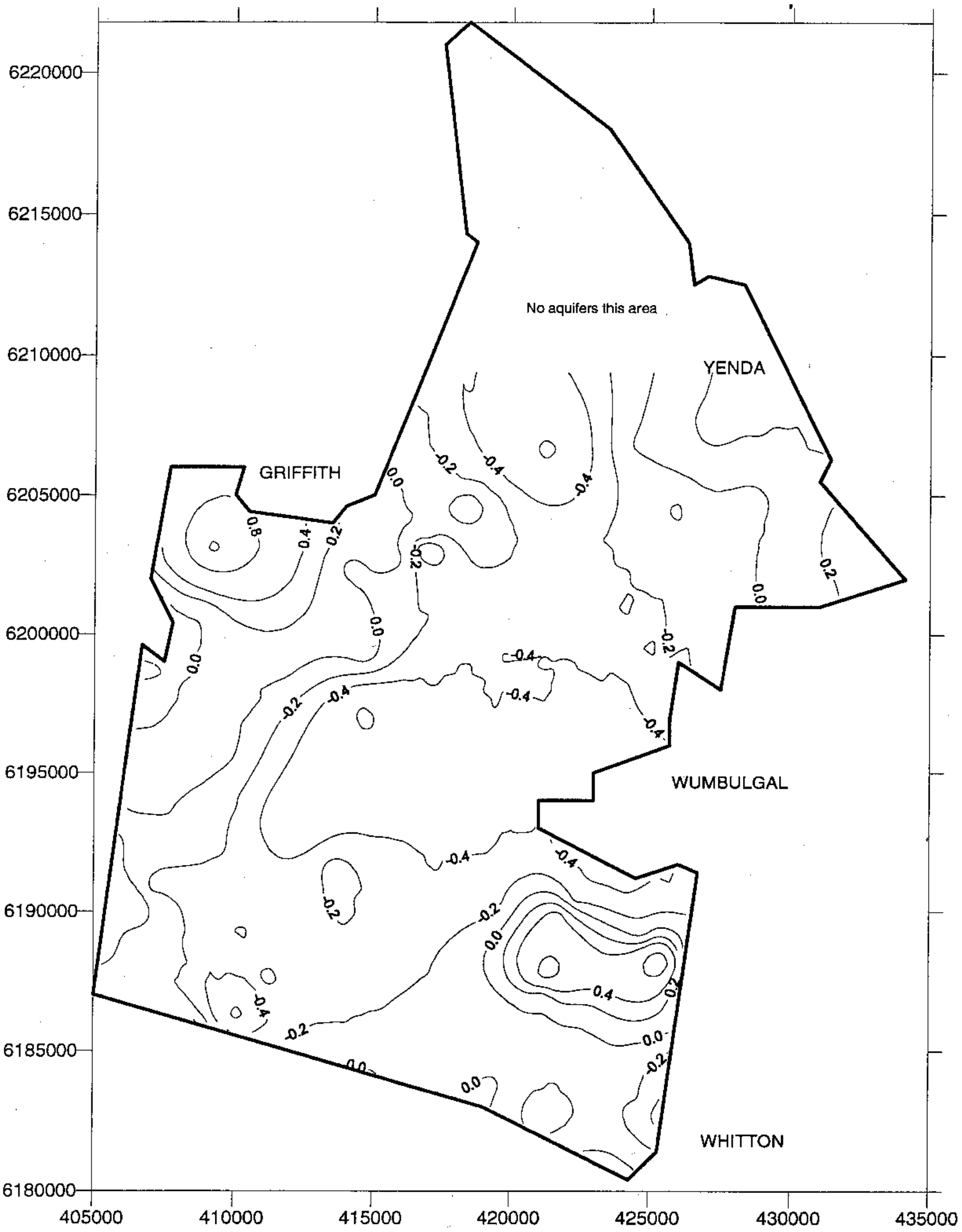


Figure 11 : Mirrrool area : Depth to groundwater pressure in deeper Shepparton aquifers (12-35 metres), for September 1996.



("+" = rise, "-" = drop. Average drop 1995/96 = 0.14m)

Figure 12 : Mirrool area. Rise and Falls in pressure levels of deeper Shepparton aquifer between Sep 95 and Sep 96.

5. Beneremabah Area

Figures 13 and 14 show, for the Benerembah area, the depth to the pressure level in the most shallow aquifer (<12m) and the deeper Shepparton aquifer (12-35 metres). Figure 15 shows the change in pressure depth since September 1995.

Table 4, which is based on Figure 14, shows the areas with pressure levels in aquifers 12-35 metres below the surface in the Benerembah area for the period 1991 to 1996.

Table 4. : Areas of the Benerembah area (ha) with presure levels within given depth range, for aquifers 12-35 metres below the surface (*1)

Depth	1991	1993	1994	1995	1996
<1m	640	1740	670	1000	450
<1.5m	n/a	n/a	n/a	n/a	2580
<2m	3390	6240	6390	5040	4640
<3m	9090	10570	10560	9410	9090
<4m	15620	16210	14525	13500	14190
<6m	25260	27150	24090	24730	26960
<10m	38940	42110	41150	41480	44950
Ave Depth	6.91	6.49	6.70	6.91	6.67

(*1). Benerembah area measured 54600 ha.

The shallower groundwater contour areas (<12m) were also measured and it was found that 4,900 ha was within 1 metres from the surface and 30,220 ha within 2 metres. The average watertable was at 2.39 metres from the surface in the Benerembah area, which is much more shallow than the level for the deeper system (6.67m). Most of the difference occurs in the western and northern parts of Benerembah (Figures 13 and 14), whilst in the Lockhart road area the pressure levels of the two systems are similar.

The map of Figure 13 is less accurate because of the lack of continuity in shallow aquifer conditions across the district, as discussed in previous reports (eg van der Lely, in Ref 3, 1995).

The rate of rise for the deeper aquifer (12-35m) between 1995 and 1996 was positive, Table 4 suggesting that it was 6.67-6.91=0.24m. Benerembah therefore behaved different from the Yanco and Mirrool areas, where an overall drop was recorded. Table 4 suggests that most of the increase would have occured where pressure levels are still deep rather than where they are already shallow. The areas within two metres did not increase compared to the 1991 to 1995 trend.

Figure 15 shows the rate of rise/drop in the deeper (12-35 m) aquifer. Whilst during 1994/95 a drop in pressure levels was observed (Tiwari, 1996), during 1995/96 the areas with a pressure increase is larger than the area with a pressure decline. Interestingly however, the area where a drop occurred coincides with the area for which Tiwari (1995) reported a drop in pressure level for 1994/95. This indicates the on-going effect of increased deep groundwater pumping to the south of Benerembah, whilst in the north the groundwater pressures continued to rise. Also compare the Calivil Formation hydrograph (Figure 4, page 8) for Lockhart Road. Whether or not the recently constructed surface drainage system is having an impact is uncertain. The effect would not be very large considering the lack of wet weather conditions during the last few years.

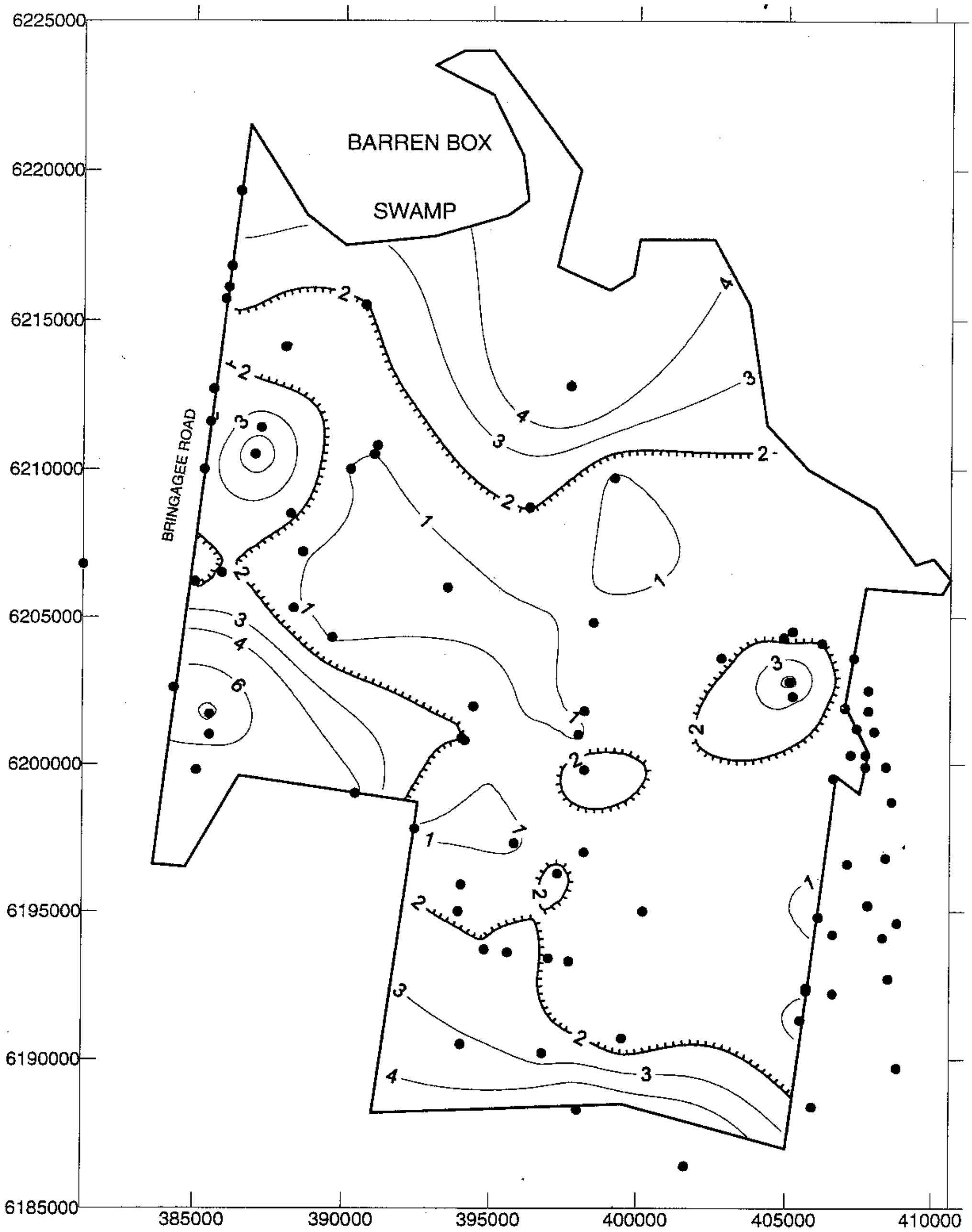


Figure 13 : Benerembah area : Depth to shallow groundwater pressure (= watertable depth) for September 1996.

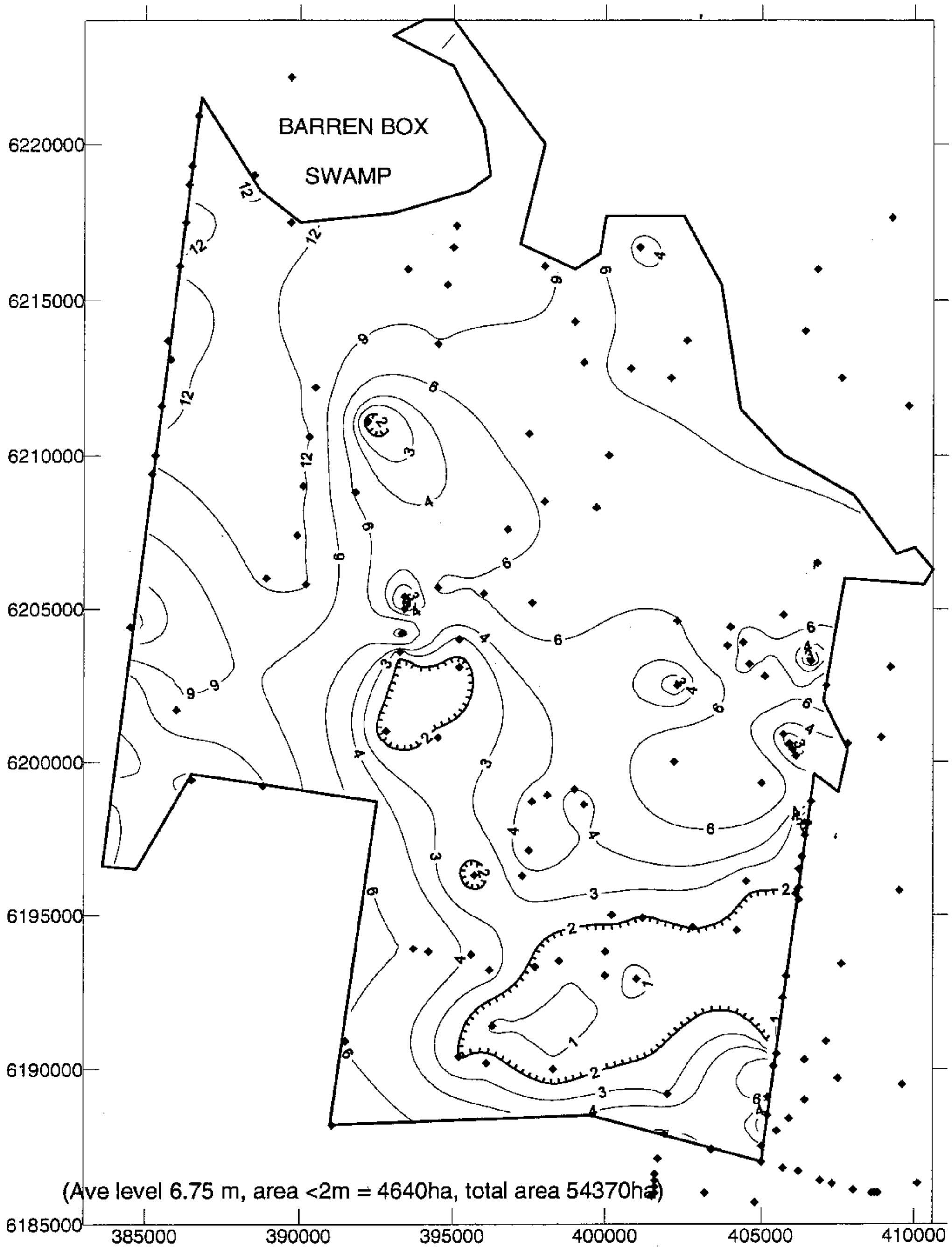


Figure 14 : Benerembah area. Depth to groundwater pressure in deeper (12-35m) Shepparton aquifer, September 1996.

BENEREMBAH DISTRICT - PRESSURE LEVEL RISE 1995/96.

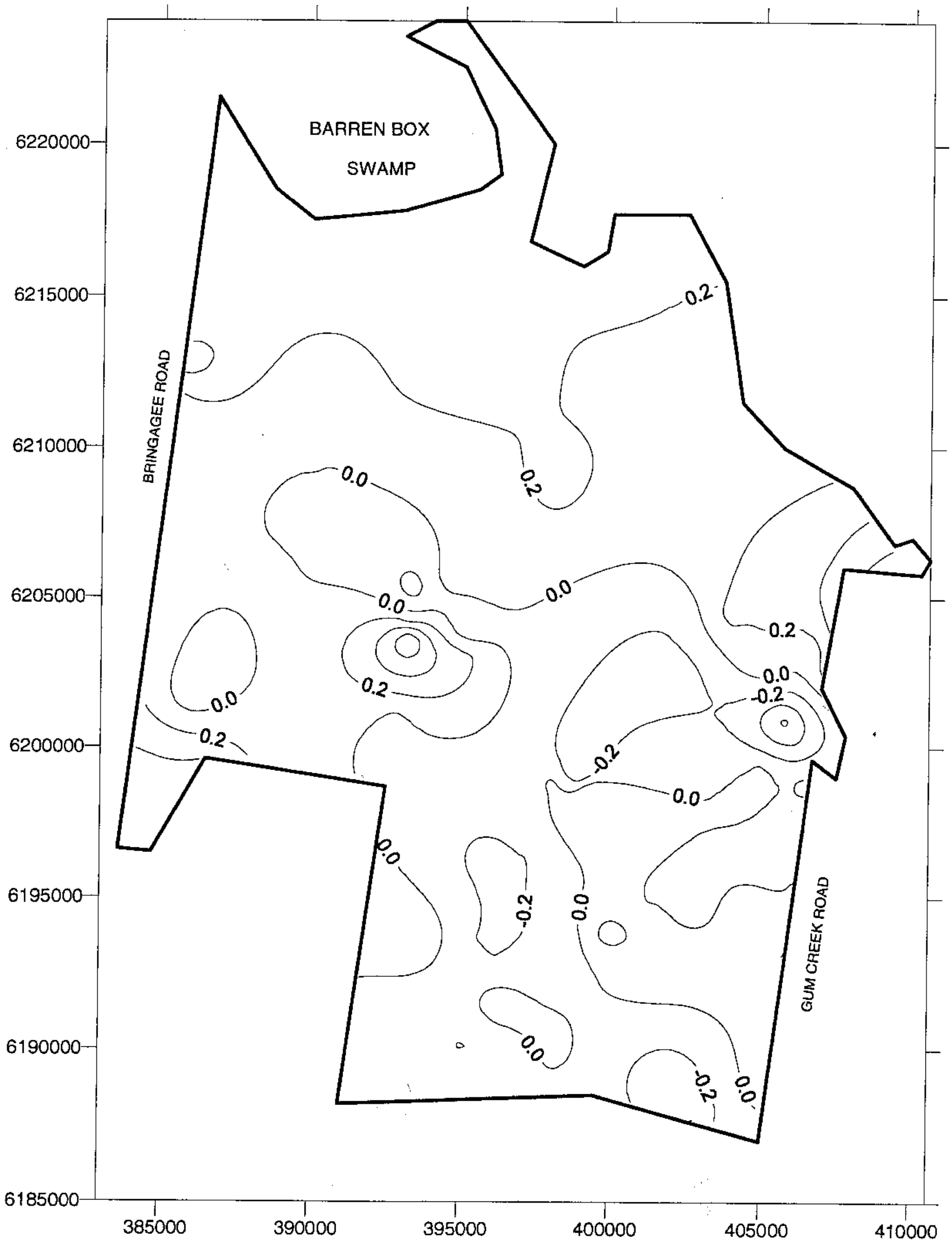


Figure 15 : Benerembah area. Rise (+) and Fall (-) in groundwater pressure depth between Sep 95 and Sep 96 for deeper aquifer.

The median depth to shallow and deeper pressure levels for the Benerembah area are shown at Figure 16. It is noted that whilst the median levels are a good indicator of trends they are not identical to the weighted average depth.

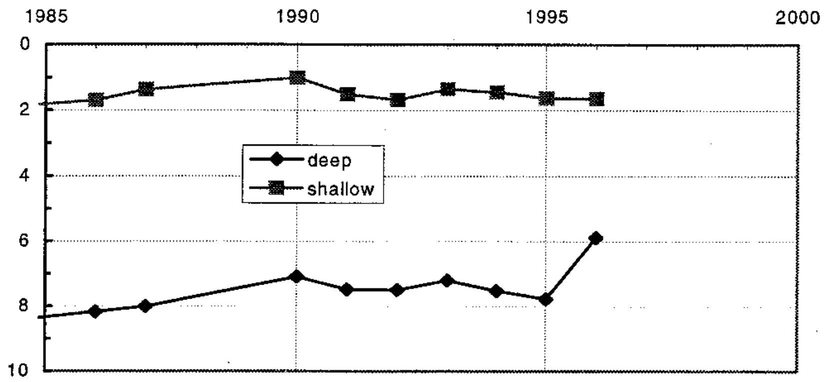


Figure 16 : Median levels of piezometers into shallow and deeper aquifers of the Benerembah area.

Note : The large apparent rise in the median level in the deeper piezometers from 7.8 metres in 1995 to 5.9 metres in 1996 is not explained. When comparing the Tiwari (1995) map with Figure 14 it is found that the piezometer set within the BID area depicted is almost the same. Yet the calculation of the median for 1991-1995 is likely to have been based on a somewhat different dataset. The 5.9m value for 1996 is believed to be realistic and compared with a 6.67m value for the weigthed mean (which did not rise as much, Table 4).

6. Wah Wah District

Figure 17 shows, for the Wah Wah Irrigation District, the depth to the pressure level in the deeper Shepparton aquifer (12-35 metres). Figure 18 shows the change in pressure depth since September 1995.

Table 5 shows the areas with pressure levels in aquifers 12-35 metres below the surface for the period 1987 to 1996.

Table 5. : Areas of the Wah Wah Irrigation District (ha) with presure levels within given depth range, for aquifers 12-35 metres below the surface (*1)

Depth	1987	1993	1994	1995	1996
<1m	0	n/a	0	0	0
<2m	0	n/a	0	0	38
<3m	0	n/a	0	0	399
<4m	0	n/a	0	0	1200
<6m	0	n/a	0	0	4052
<10m	0	n/a	0	100	17,418
Ave Depth	19.0	n/a	15.7	14.9	12.66

(*1). The WWID area of Figure 14 measured 66,500 ha,.

The comparison with 1995 (Tiwari) suggests that pressure levels in deeper aquifers apparantly rose by some 2.2 metres over 1995/96. However this is biased in that a number of piezometers deeper than 12 metres were not included for 1995, but they were for 1996. Using exactly the same piezometer set the rate of rise measured was only 0.35 metres. Figure 18 shows the rise in the eastern part of the area depicted to be about double the average for the whole district.

The area within 10 metres from the surface is now assessed to be over 17,000 ha, indicating the extent of the district just passing this milestone. The area with pressure levels within 2 metres is still small.

The rate rise map for Wah Wah (Figure 18) this year shows two areas with high increase, one near Tabita Lane and one at the eastern boundary of Corynnia. The location of the rise in the Corynnia subdivision is due groundwater changes in the same piezometer location as the location of the local groundwater mound nearby, see Figure 17.

Figure 19 applies for the wider Wah Wah District and includes areas outside the irrigation district boundary. The Lower Mirrool Creek floodway runs through the southern part of the western extension. The location and levels in the shallow piezometers (where existing) are superimposed on the deeper groundwater contours. This may be used to get an impression of the extent by which accessions from the floodway have affected the local system. A floodway release of about 25GL occurred between Nov1995 and Feb 1996. The map is for Sept 96. Through Corynnia the levels in the shallow piezometers near the floodway are shown to be in the range of 5.0-6.1 metres depth, whilst near the Mid-western Highway and Berangerine they are more shallow. The deeper pressure levels are still at 10-15 metres. The deeper groundwater contours at this stage do not appear to be significantly affected by the flooding events. In the Corynnnia subdivision rice growing accessions tends to show up as a more significant contributor.

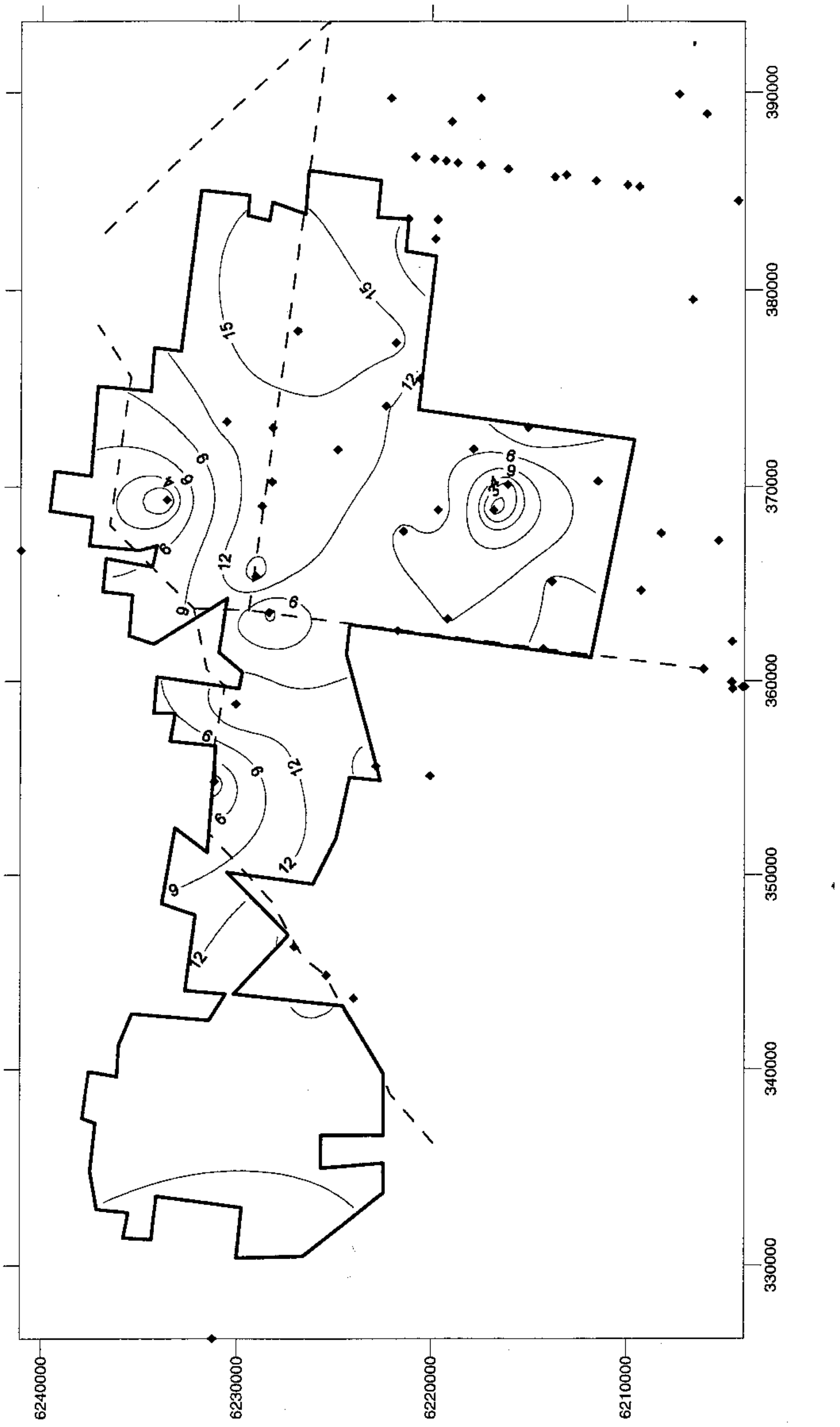


Figure 17 : Wah Wah area. Depth to deep (12-35m aquifers) pressure levels September 1996.

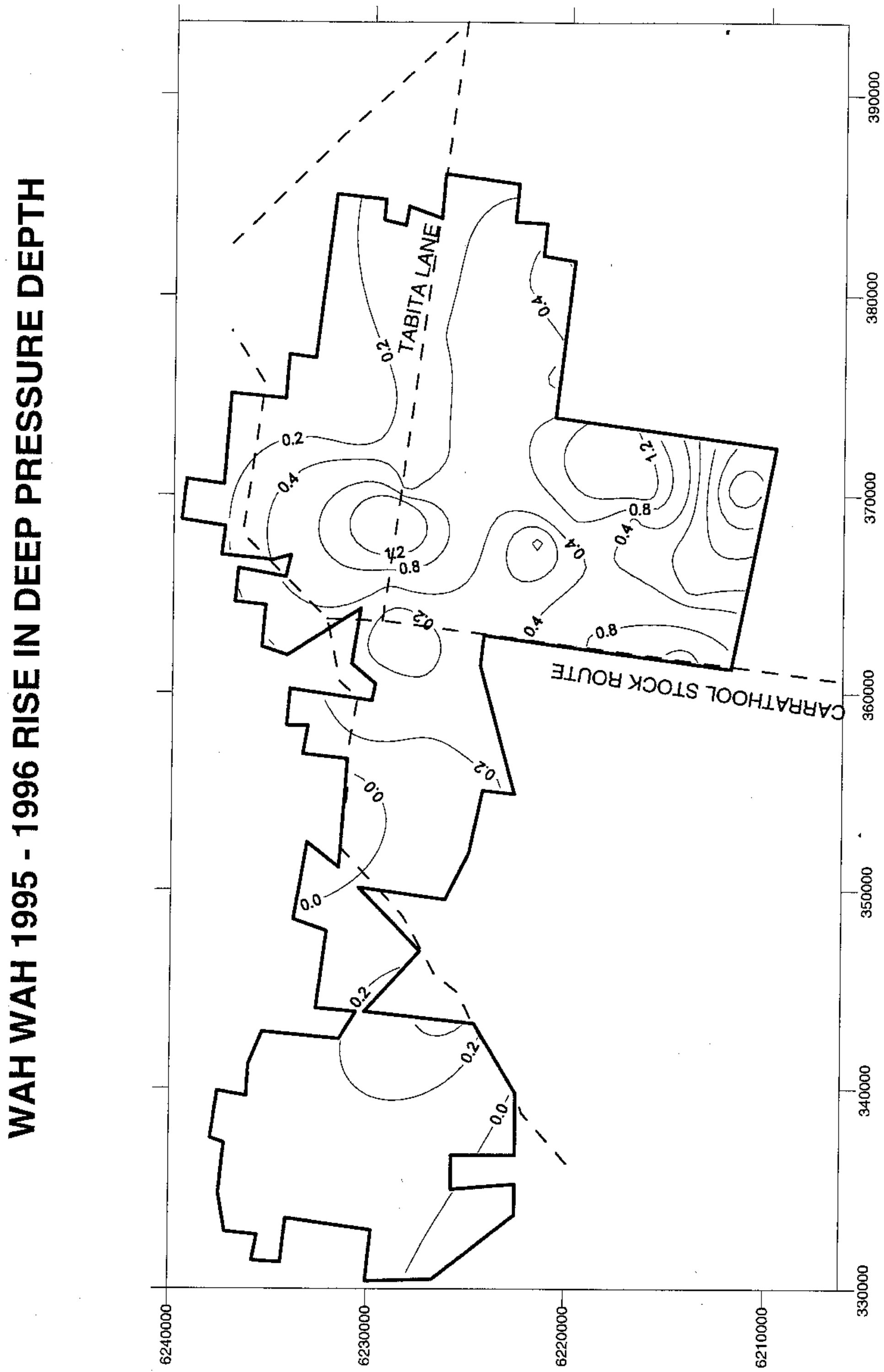


Figure 18 : Wah Wah area. Rise and Fall (-) in deep pressure level from Sep 1995 to Sep 1996.

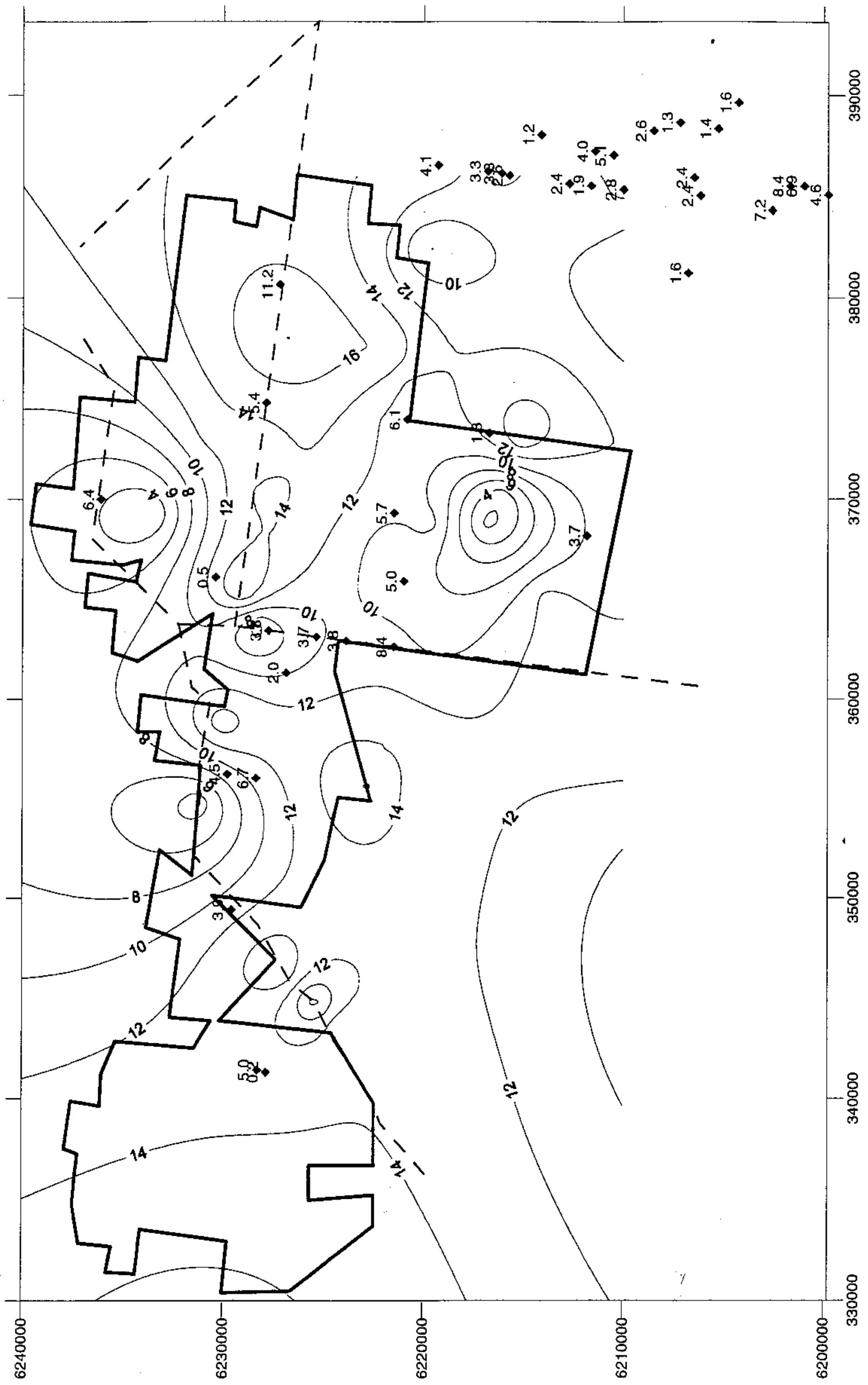


Figure 19 Wah Wah Region. Deep pressure level contours with location of shallow piezometers, showing depth to pressure in each.

7. Sub-District Monitoring

The MIA was divided into nine sub-districts for the purpose of analysing groundwater conditions for the Land and Water Management Plan (van der Lely, 1995). Three of these areas are in Yanco (Koonadan, Gogeldrie/Yanco, Murrami/Calorofield), three in Mirrool (Yenda/Widgelli, Kooba and West Hanwood), two in Benerembah (South and North, whilst Wah Wah is taken as one unit (later on it may be divided into smaller parts). For each of these areas the analysis of groundwater trends consisted of two parts, assessment of the percentage of area within 2 metres, and seasonal trends based on piezometer nests.

Percentage of land with watertables within 2 metres.
Figure 20 shows the location of the subdistricts and the location of the piezometer nests. Table 6 gives the statistics of groundwater depth for these areas.

Table 6 : Percentage (%) of land within subdistricts having a watertable within the identified depth range (*1)

	Benerembah		Mirrool			Yanco		
Depth	sBen	nBen	wHan	YenWid	Kooba	MurCal	Koon	GogYan
<1m	8.1	11.0	44.2	37.4	17.7	27.9	49.2	0.0
<2m	61.5	45.7	100.0	98.8	58.8	80.6	92.8	32.3
<3m	79.7	67.1	100.0	100.0	96.8	98.9	99.5	79.0
<4m	88.5	81.1	100.0	100.0	100.0	100.0	100.0	97.2
Ave	2.29	2.64	1.18	1.2	1.93	1.59	1.21	2.59

(*1) Shallowest piezometers.

The highest proportions with watertables within 2 metres from the surface are in the northern parts of Yanco and most of Mirrool excepting the Kooba subdivision.

Seasonal Behaviour
The data from the piezometer nests were averaged for each date of two monthly readings and hydrographs drawn. Because of the small number of piezometers involved (usually 3-9) these averages are not the same as the averages for the subdistricts as shown at Table 6 (which are based on groundwater maps).

For the Benerembah area (Figures 21, 22, and 23) the fluctuation in the deeper aquifer is small, levels still being at 5.5-12 metres from the surface. Figure 22 for south Benerembah shows the behaviour of the shallow piezometers, with levels increasing from September 1995 to reach a maximum in January (rainfall) and March (end of rice season).

For the Mirrool area (Figures 24, 25, and 26) hydrograph behaviour is variable. The Kooba area (Figure 24) shows the same level for both shallow and deeper piezometers, with highest levels towards March 1996, then dropping sharply. In the Hanwood area this pattern exists also but not quite as distinct, and the deeper piezometer levels are at 4-5 metres with an apparent two month time lag in the peaks. In the Yenda Widgelli arae the piezometer levels were highest during July 1995, then dropping near continuously for the 12 month period (Figure 26). This unexplained feature occurred in all the (five) piezometers used and therefore may not be written off as an anomaly. Interestingly, the levels in the shallow piezometers rose again from 1.26 metres to 0.73 metres during the winter of 1996 (not shown). Hence it is possible that these piezometers are influenced more by rainfall events than irrigation. The location in relation to irrigation paddocks will be examined during 1997.

In the Yanco area (Figures 27, 28, and 29) the behaviour in all three sub-districts is similar to that in the Kooba area, with highest levels being observed during March. The difference between shallow and deeper piezometers is most marked in the Gogeldrie area and least in the Koonadan area. In all three areas the lowest pressure levels were observed during June 1996.

For the Wah Wah district (Figure 30) the two monthly data produced a hydrograph similar to those of the deeper piezometers in Benerembah and west Hanwood. The peak is towards the end of the irrigation season, but is delayed compared to the date for rice drainage. The June 1996 levels were higher than those for July 1995, consistent with long term trends.

8. Discussion/Conclusions

From the groundwater mapping and the prepared statistics no upward trend in groundwater conditions could be concluded for the 1995/96 period, except for Wah Wah. This also applies when compared to the data compiled since 1991. The average levels tend to be below those of 1991, however it needs to be considered that the groundwater conditions of 1991 may still have been influenced by the wet winters of 1988, 1989 and 1990.

In terms of correlating the September groundwater levels with the rainfall during the previous winter months, it is found that 1993, with about average 120 mm rainfall is a good benchmark (van der Lely, 1995). The rainfall of 1996, at 141mm, was higher so it would be expected that groundwater levels during 1996 would be higher than during 1993. The actual levels in this report are found to be about the same as during 1993, meaning one of two things :

- The correlation does not apply for the 1996 year
- Irrigation and drainage practices have improved.

Whilst it would be proper to give credit to the irrigators where it is due it also needs to be observed that April and May 1996 were very dry and much of the winter rainfall of 1996 was absorbed in the dry soil, without contributing much to groundwater rise.

Whilst the overall trends presently appear favourable, three issues have been identified in the report :.

1. Deeper pressure levels in Benerembah have risen compared to 1995
2. Groundwater levels in the Corynnia subdivision of Wah Wah are higher than reported previously and rising at significant rates (up to 1m/year).
3. Shallow groundwater underneath lands of the Floodway and Lower Mirrool Creek.

Actions related to rice growing proposed for the Wah Wah LWMP could overcome the latter problem if there is sufficient resolve to implement these type of institutional measures by all parties concerned.

9. References

1. Tiwari, A. (1996) Groundwater Conditions in the MIA and Districts - 1995 Annual report.
2. van der Lely, A. (1995) Groundwater Conditions in the MIA - 1994/95 Annual report.
3. van der Lely, A. (1995) Groundwater Conditions in the Murrumbidgee Irrigation Areas. MIA LWMP Document. In "Evaluation of Watertable Control Options, MIA LWMP. 1995 (based on 1993 benchmarks).

MIA PIEZOMETERS WHICH ARE READ EVERY TWO MONTHS

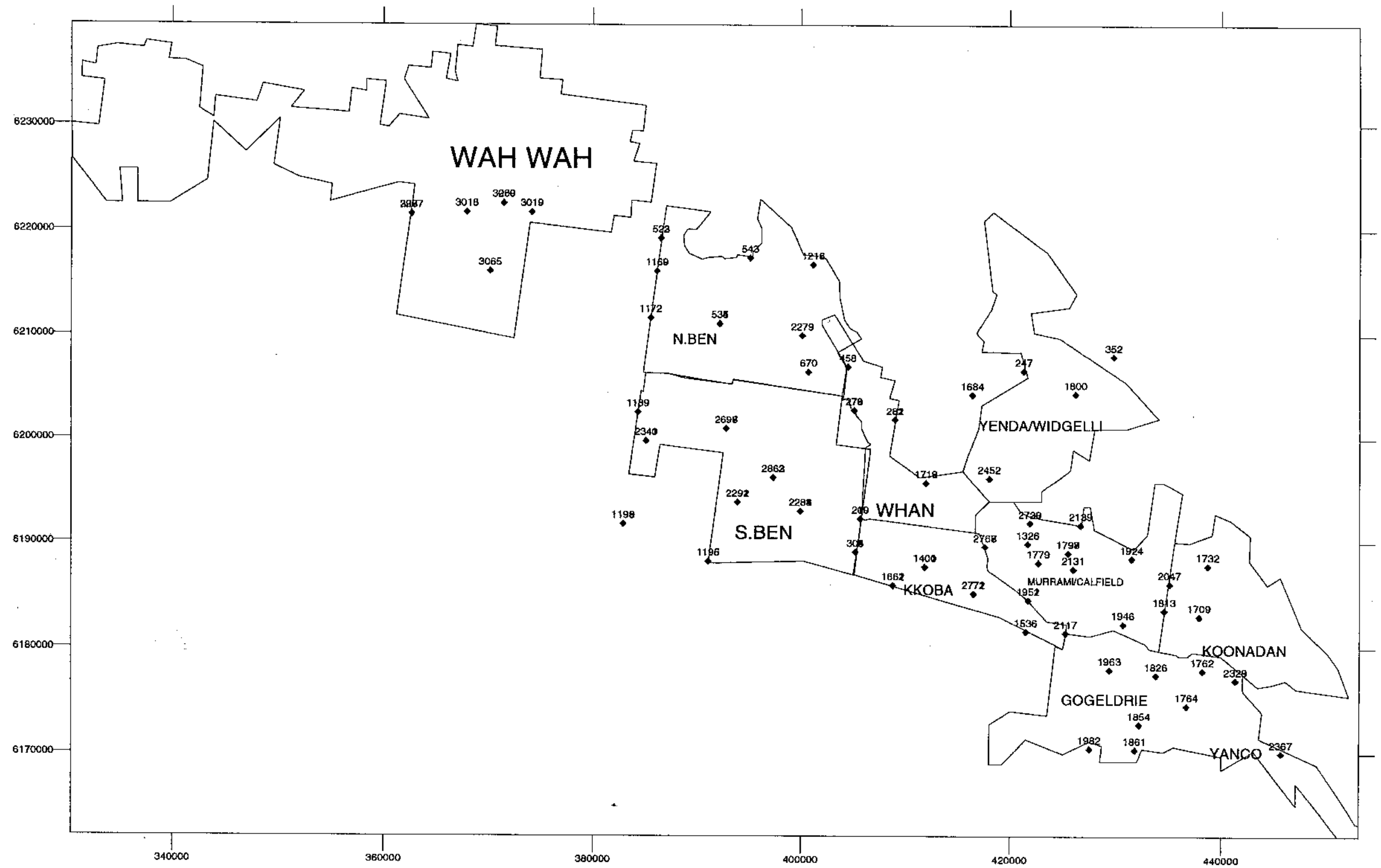


FIGURE 20

Average deep pressure level behaviour in North Benerembah, 1995/96

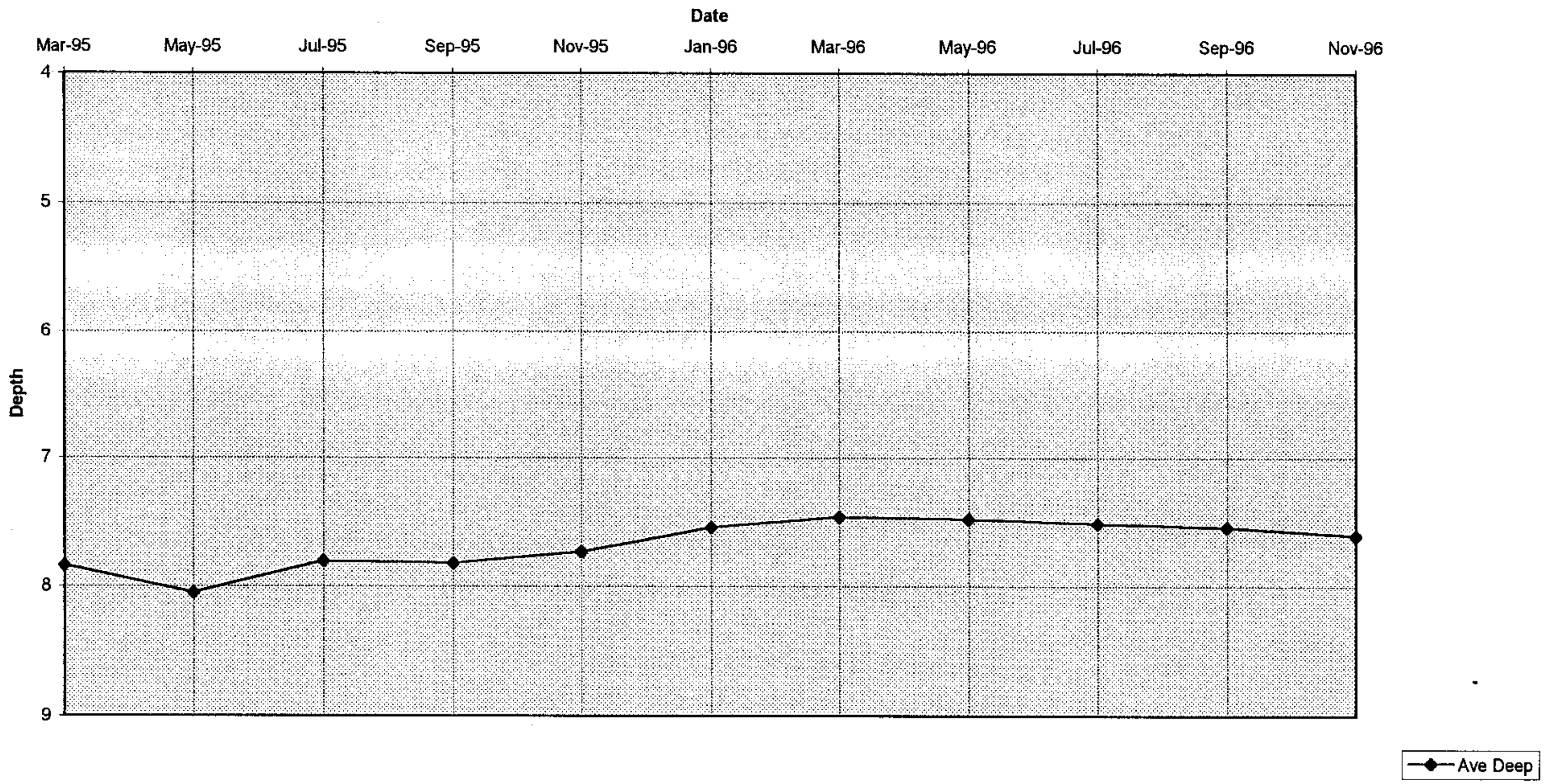


FIGURE 21

Average shallow and deep pressure level behaviour in South Benerembah 1995/96

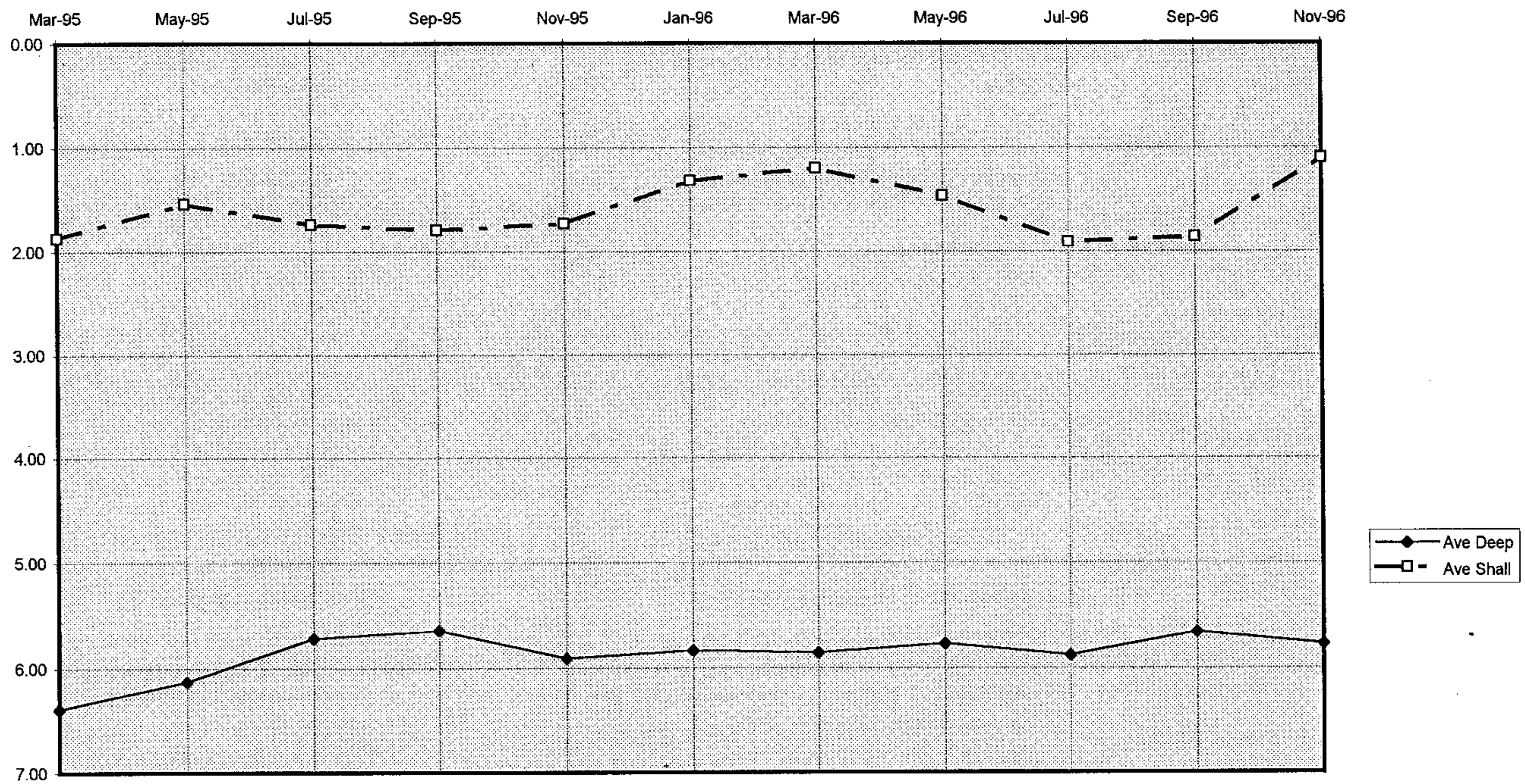


FIGURE 22

2 monthly Chart 12

Average shallow and deep pressure level behaviour in the Warrawidgee area of BID, 1995/96

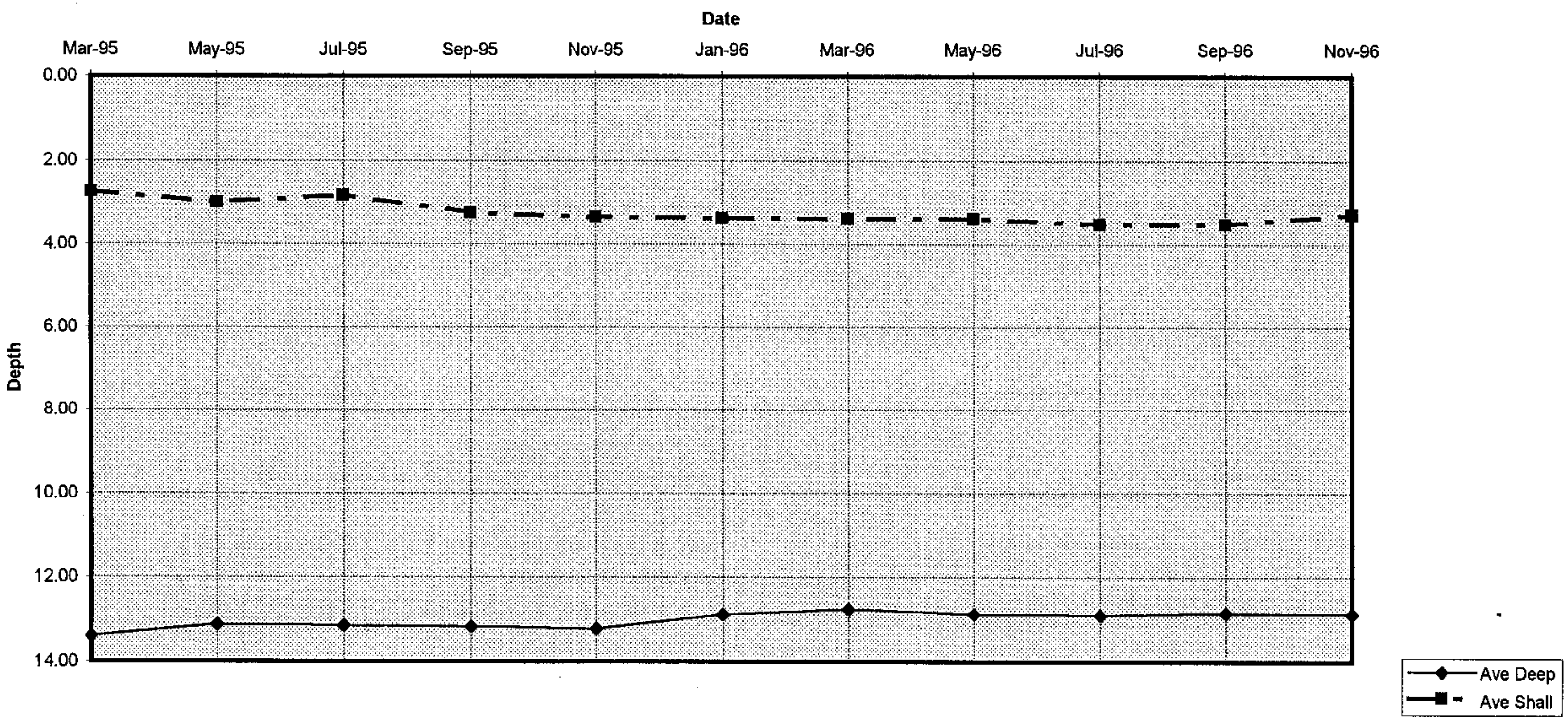


FIGURE 23

Average pressure level behaviour in shallow and deep aquifers of the Kooba area

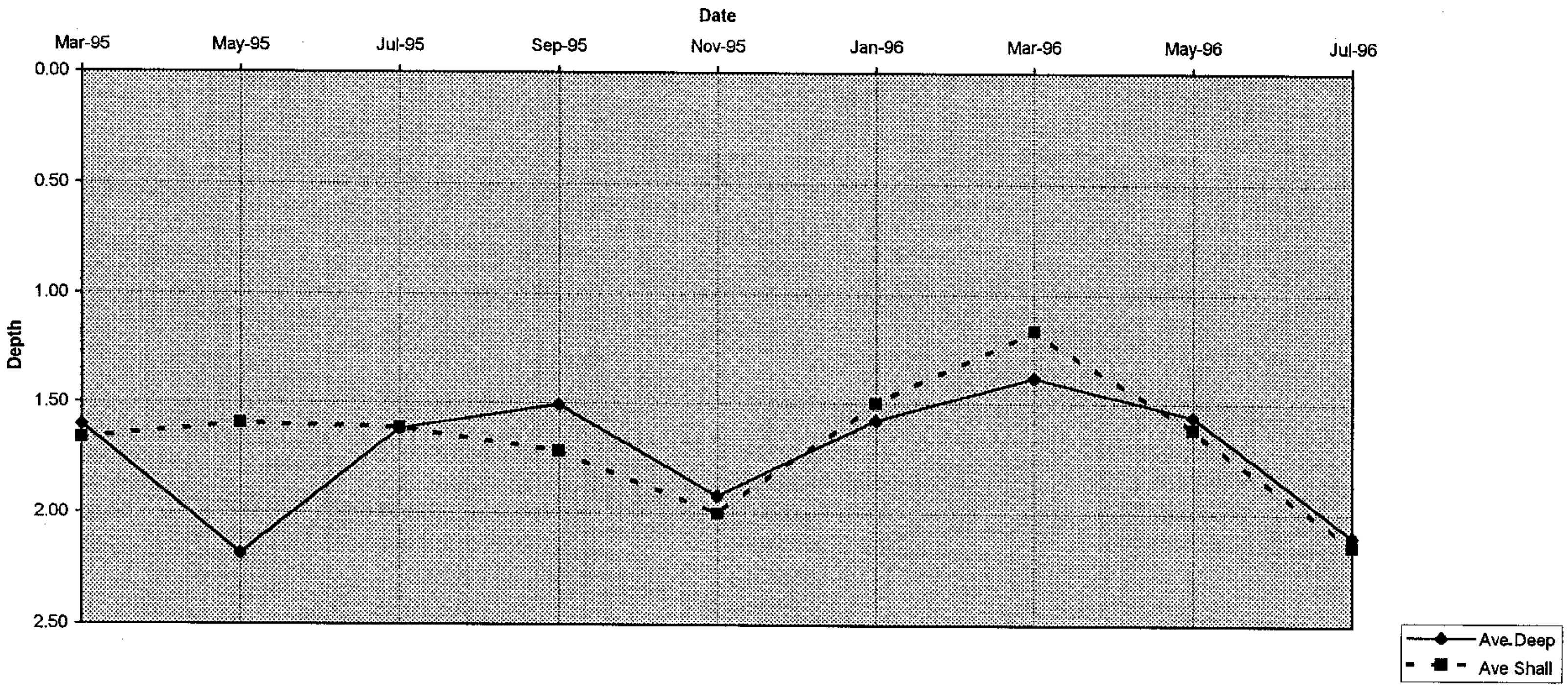


FIGURE 24

Average shallow and deep pressure level behaviour in the West of Hanwood area, 1995/96.

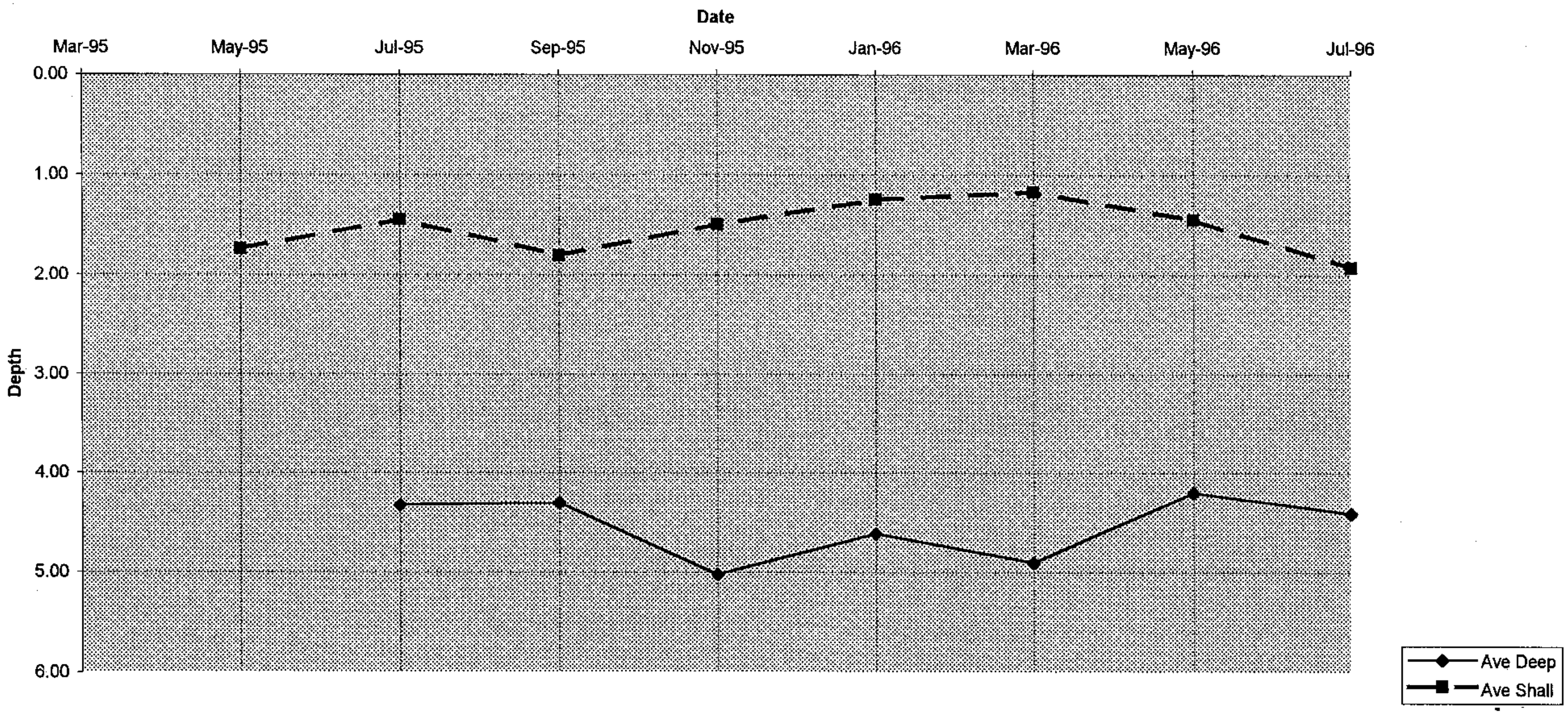


FIGURE 25

Average Shallow and deep pressure level behaviour 1995/96 in Widgelli - Yenda area

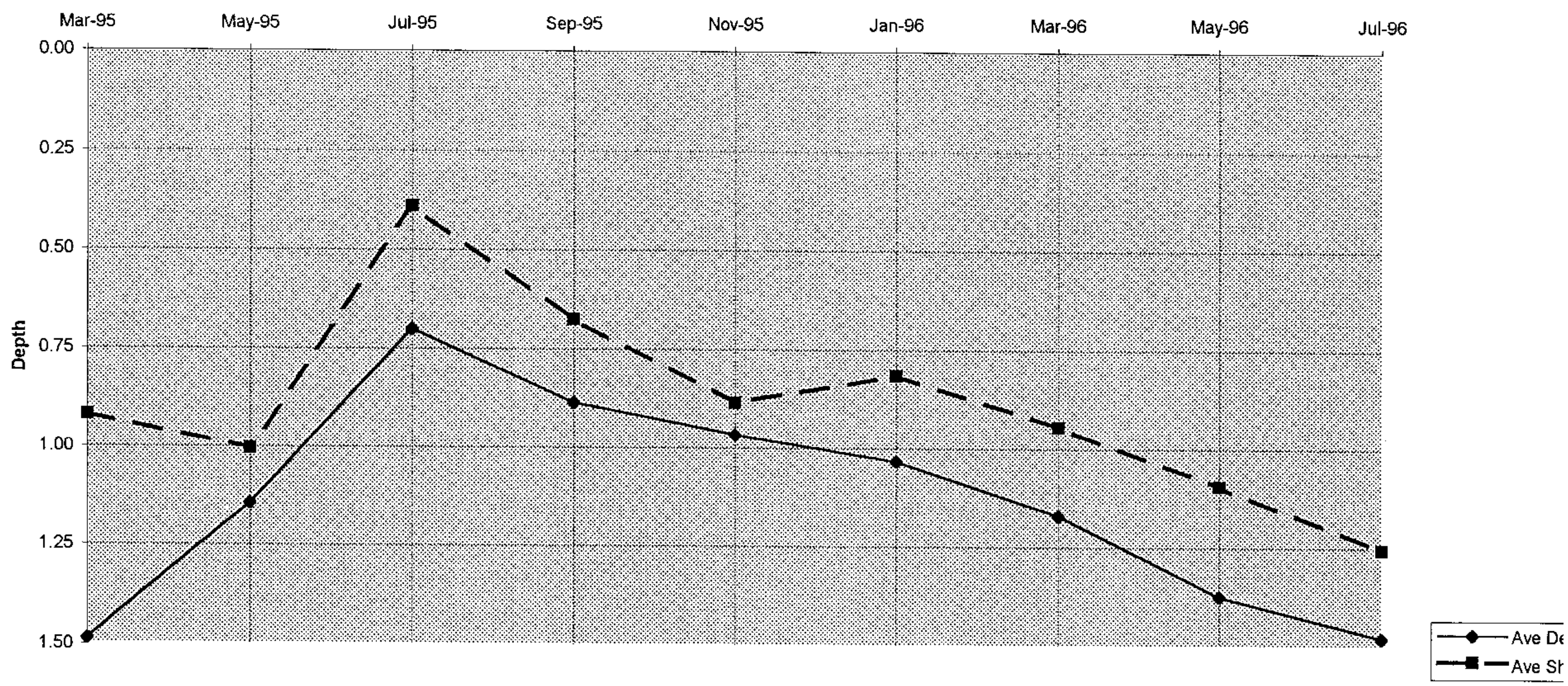


FIGURE 26

2 monthly Chart 8

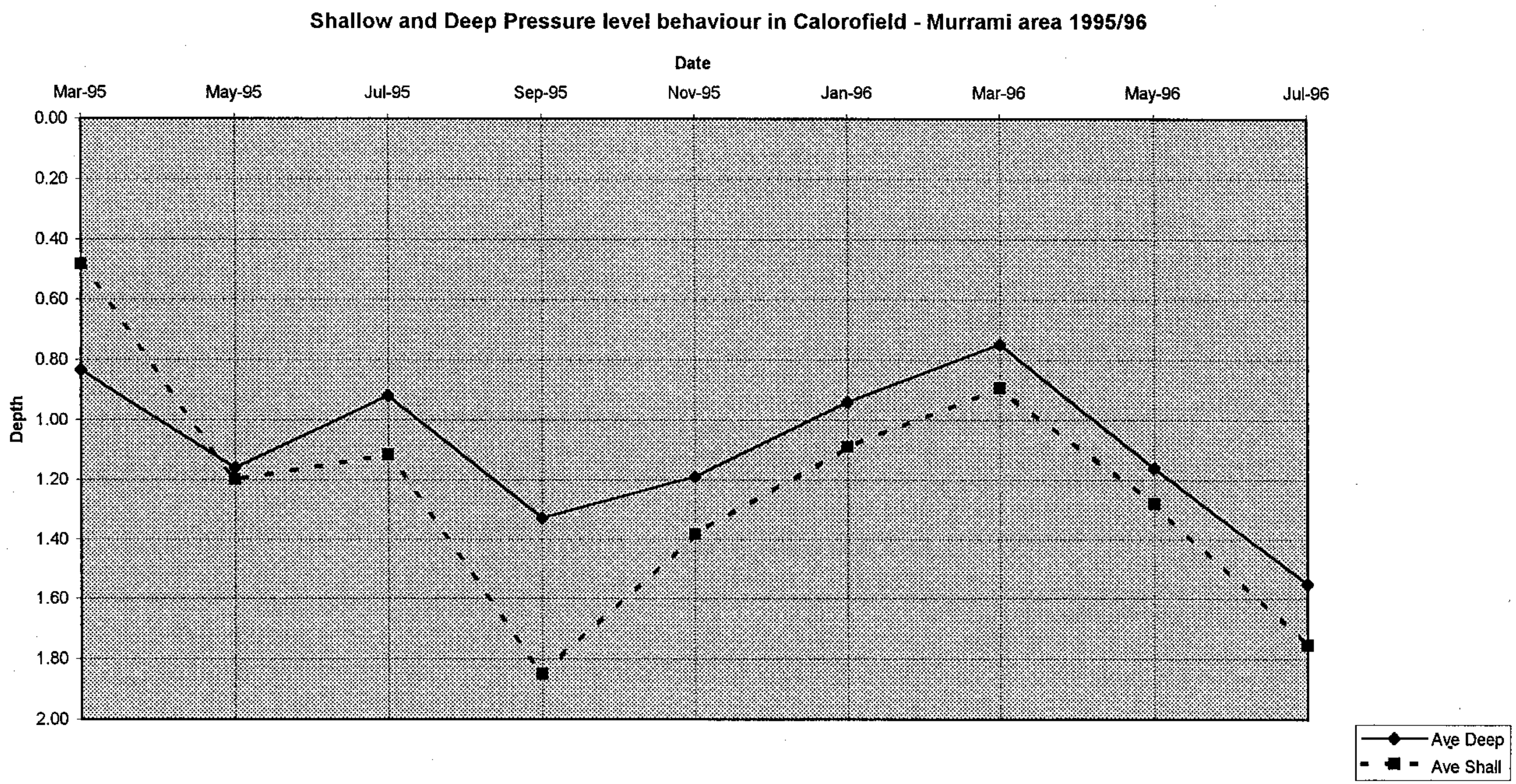


FIGURE 27

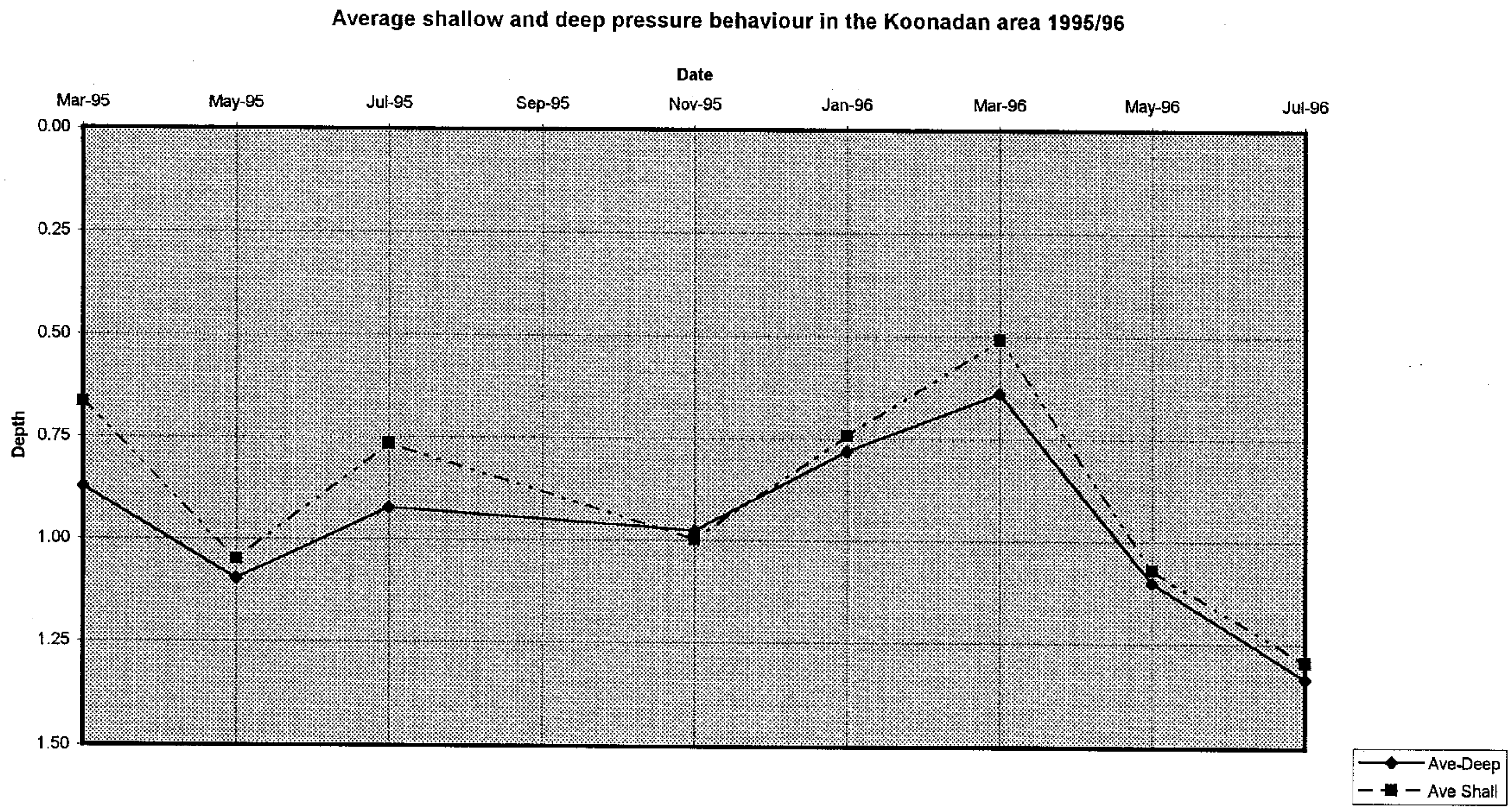

Average shallow and deep pressure behaviour in the Koonadan area 1995/96
Date
Mar-95
May-95
Jul-95
Sep-95
Nov-95
Jan-96
Mar-96
May-96
Jul-96
Depth
0.00
0.25
0.50
0.75
1.00
1.25
1.50
Ave-Deep
Ave Shall

FIGURE 28

Average Shallow and Deep pressure level behaviour in the Gogeldrie - Yanco area 1995/96

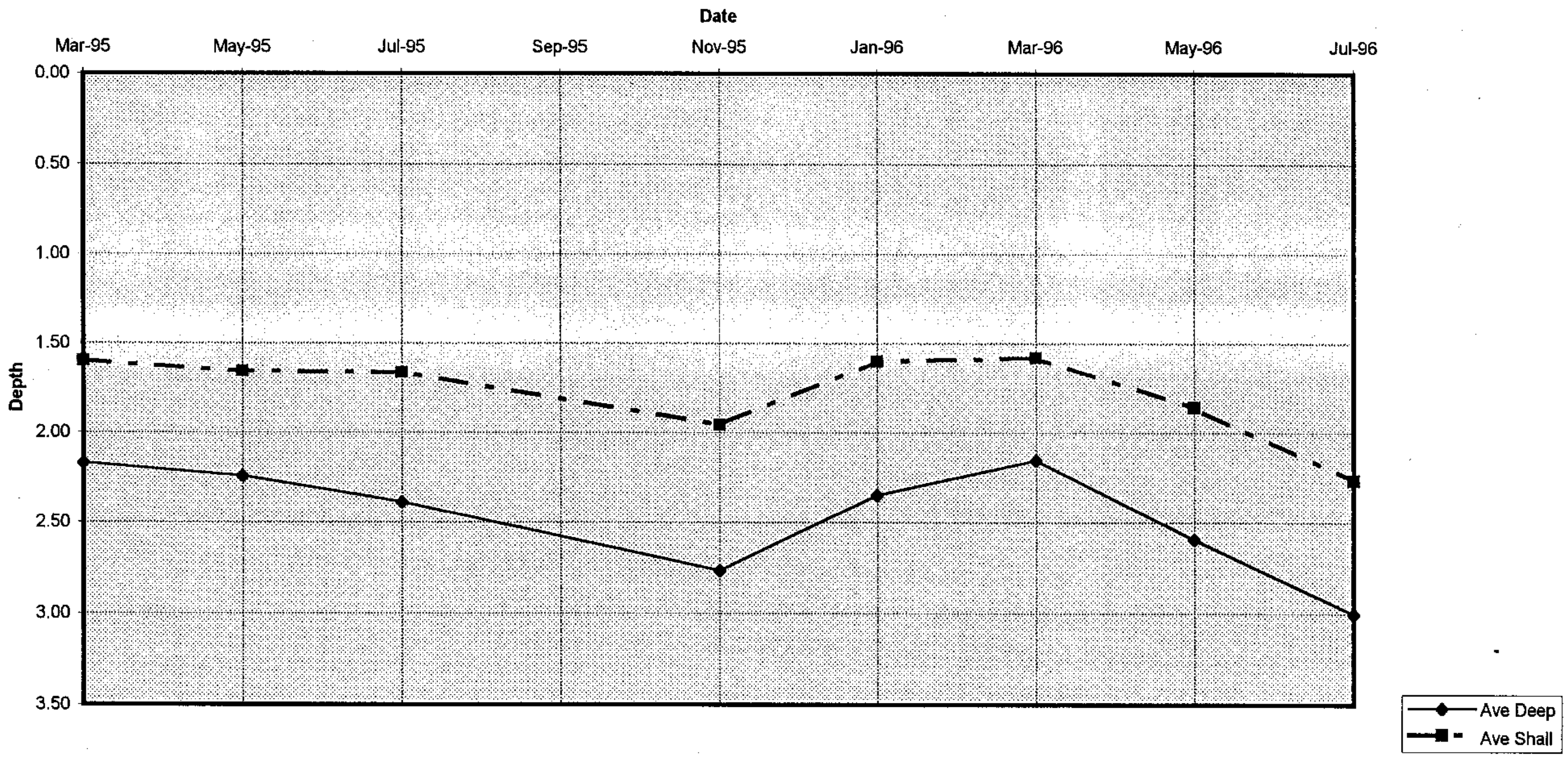


FIGURE 29

Average deep pressure level behaviour in the Wah Wah Irrigation District, 1995/96

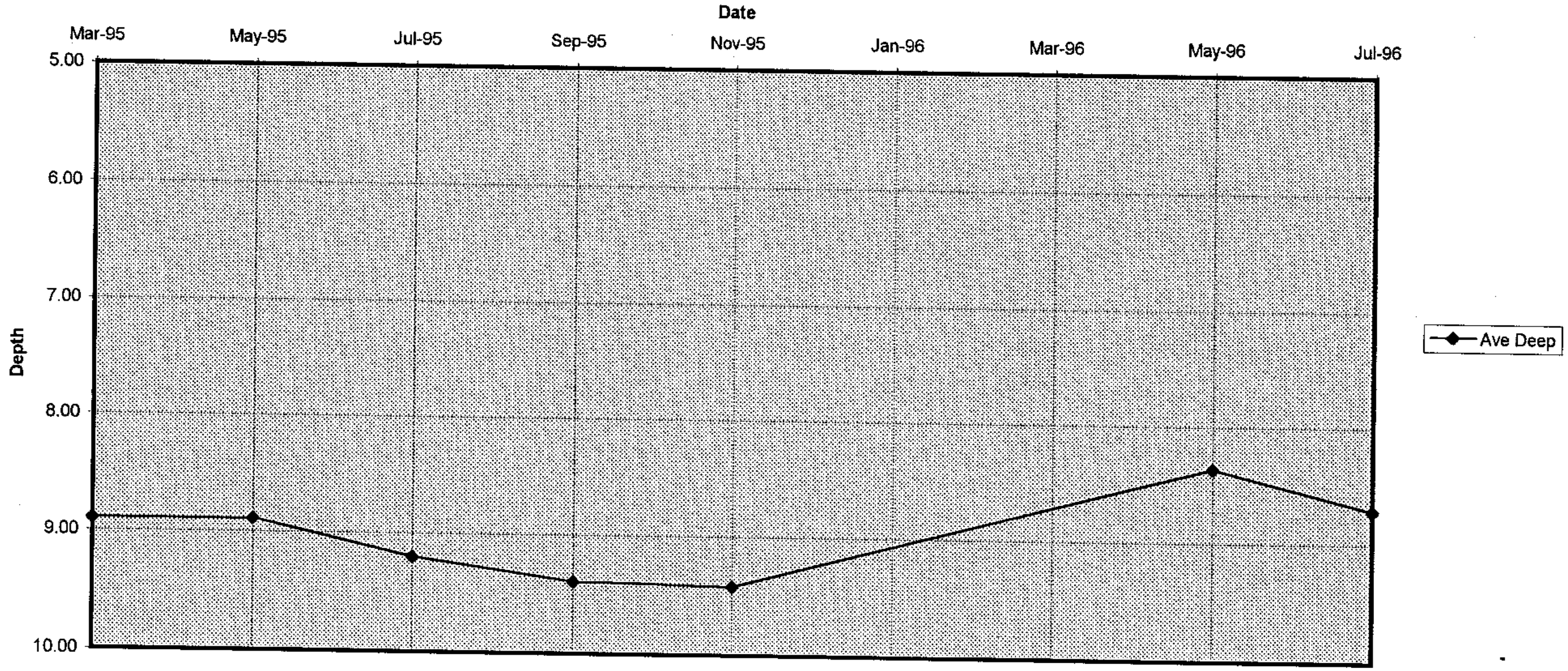


FIGURE 30