Murrumbidgee Irrigation

ANNUAL COMPLIANCE REPORT 2016

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Murrumbidgee Irrigation Limited

Annual Compliance Report

2015/16

Introduction

The Annual Compliance Report 2015/16 has been prepared to meet the reporting requirements of the licences held by Murrumbidgee Irrigation Limited (MI) with the Department of Primary Industries, Water (DPI Water) and the NSW Environment Protection Authority (EPA). MI operates under a Combined Water Supply Work Approval and Water Use Approval 40CA403245 (Combined Approval) issued by DPI Water and an Environment Protection Licence (EPL) 4651 issued by the EPA.

MI is committed to achieving organisational excellence through operating safely, efficiently and effectively, all of which contribute towards the measure of MI's environmental and compliance performance. MI achieved full compliance with EPL 4651 and Combined Approval for the 2015/16 reporting year.

Brett Jones
Chief Executive Officer
Murrumbidgee Irrigation Limited

Frank Sergi
Chairman
Murrumbidgee Irrigation Limited

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Abbreviations

ANZECC	Australian and New Zealand Environment and Conservation Council
BBSW	Barren Box Storage and Wetland
CSIRO	Commonwealth Scientific Investigation and Research Organisation
DPI Water	Department of Primary Industries, Water
EC	Electrical Conductivity
EPA	Environment Protection Authority
EPL	Environment Protection Licence
ETo	Reference crop evapotranspiration
GIS	Geographic Information System
ha	Hectare(s)
LTA	Long-term average
MI	Murrumbidgee Irrigation Limited
MIA	Murrumbidgee Irrigation Area
µS/cm	MicroSiemens per centimetre
µg/L	Micrograms per litre
ML	Megalitre
OEH	Office of Environment and Heritage
SOP	Standard Operating Procedure
t	Tonnes
LAG	EPL Point 4 - Gogeldrie Main Drain at Gooragool Lagoon
GMSRR	EPL Point 5 - Gogeldrie Main Southern Drain River Road
YMS	EPL Point 6 - Yanco Main Southern Drain
ROCUDG	EPL Point 7 - Point Cudgel Creek Roaches Escape
MIRFLD	EPL Point 15 - Mirrool Creek Floodway Wyvern Station

Executive Summary

The first part of this report has been prepared to meet the conditions of Murrumbidgee Irrigation Limited's (MI) Combined Water Supply Work Approval and Water Use Approval 40CA403245 (Combined Approval). The data presented in these sections refer to the current reporting year, in comparison to data from the previous two reporting years and data from a year at least five years prior. The latter part of this report (from page 57) has been prepared to meet the conditions and requirements of Environmental Protection Licence (EPL) 4651. MI has fulfilled the compliance requirements as set out in the Combined Approval and EPL 4651 for 2015/16.

The climatic conditions across the Murrumbidgee Irrigation Area (MIA) influence all aspects of this report. The climatic conditions determine the volume of water required for irrigation, the amount of water discharged from the area and groundwater dynamics. In 2015/16 the MIA experienced high rainfall, with above average rainfall recorded in December of 2015, and January, May, June and July of 2016.

For 2015/16 the final water allocation for the Murrumbidgee Valley was 37% for general security and 95% for high security water entitlements. A total of 643,957 ML was diverted from the Murrumbidgee River into the MIA, a 37% reduction compared to 2014/15. This total does not include 1,857 ML water delivered on behalf of the NSW Office of Environment and Heritage (OEH) for environmental purposes.

Trigger based monitoring of EPL discharge points revealed an increase in detections when compared to 2014/15. Nineteen notification and/or action level EPL chemical detections were made in 2015/16, compared to seven in 2014/15. This increase in detections from last year can be attributed to increased discharge volumes at EPL sites caused by high rainfall events.

COMBINED WATER SUPPLY WORK APPROVAL AND WATER USE APPROVAL

1 Statement of Compliance

MI has met the conditions of the Combined Water Supply Work Approval and Water Use Approval 40CA403245 (Combined Approval) in 2015/16. A summary of the compliance requirements are cross referenced to this report and listed in Table 1.This Combined Approval authorises MI to construct and use water supply works to extract and convey water for any purpose within MI's Area of Operation.

Quality assurance and control procedures are in place to guarantee data integrity and to ensure that all compliance obligations are fulfilled. This includes using a NATA accredited laboratory for water sample analysis and contracting an external hydrological service provider to manage and maintain automated monitoring stations. Internal Standard Operating Procedures (SOPs) are reviewed regularly.

MI did not change or modify the condition of the existing authorised water supply works or authorised discharge works listed in the Combined Approval during 2015/16. MI did not change or modify existing authorised discharge works listed in the Combined Approval or construct new works that would allow further discharge from the area of operations during 2015/16.

Table 1 Combined Water Supply Work Approval and Water Use Approval (40CA403245) reporting summary

Licence section	Requirement	Report Section
Plans of the Area of Operations, Authorised Works, Monitoring Sites and Water Management Infrastructure	12.1 12.2	2. Plan of Operations and Works
Statement of Compliance	12.3	1. Statement of Compliance
Presentation of Data and Analyses	12.4 12.5 12.6 12.7	Section 1 - 6 Provided on USB
	12.8	1. Statement of Compliance
New Measures to Limit Groundwater Recharge and Discharge of Salt	12.9	7. New Measures to Limit Groundwater Recharge and Discharge of Salt
Reporting on Water Management	12.10	3.3 Diversions and Water Allocation
	12.11	3.5 Water discharged from Area of Operation
	12.12	3.9 Water Balance
	12.13 (a) (b) (c) – (j)	3.1 Climate Conditions 4. Water Use
Reporting on Salinity and Salt load	12.14 12.15 12.16	5. Salinity and Salt load
Reporting on Groundwater Conditions	12.17	6. Groundwater Conditions

2 Plan of operations and works

MI's area of operations, storages and major supply and drainage channels are presented in Figure 1. The MIA is irrigated from water diverted from the Murrumbidgee River in accordance with the conditions of the Combined Approval via authorised supply works shown in Figure 2.

In 2015/16, the boundary of MI's Area of Operations did not change.

2.1 Operational background

The MIA is supplied by water stored in Burrinjuck and Blowering dams in the upper Murrumbidgee catchment via two authorised supply works:

- NARREG - Narrandera Regulator (after diversion from Berembed Weir via Bundidgerry Creek and regulator)
- STUR - Sturt Canal (after diversion from Gogeldrie Weir)

The water released from Burrinjuck and Blowering dams flows down the Murrumbidgee River to Berembed Weir where majority of the water for the MIA is diverted via NARREG which feeds the supply channels that deliver irrigation water to customers. The balance of the MIA's water requirements are diverted at Gogeldrie Weir and directed to the Sturt Canal to supply customers in the southern and western regions of the MIA.

A complementary drainage system captures drainage water, which includes catchment flows, escape flows and off-farm drainage. Majority of this water flows via Mirrool Creek towards Barren Box Storage and Wetland, and is then combined with water flows from supply channels and reused in the Wah Wah, Benerembah and Tabbita Irrigation Districts.

MI's supply and drainage system is a virtually closed system in that it does not discharge to any other rivers or creeks outside the area of operations except during high rainfall events or increased flow of farm drainage during the irrigation season. There are five drainage sites which can potentially discharge outside the area of operations following these flow events (Figure 3). These sites are listed as discharge sites in the Combined Approval under Schedule 1 - Attachment 2 and are monitored in accordance with EPL 4651.

- LAG – Gogeldrie Main Drain at Gooragool Lagoon
- ROCUDG – Cudgel Creek Roaches Escape
- YMS – Yanco Main Southern Drain
- GMSRR – Gogeldrie Main Southern Drain River Road
- MIRFLD – Mirrool Creek Floodway Wyvern Station

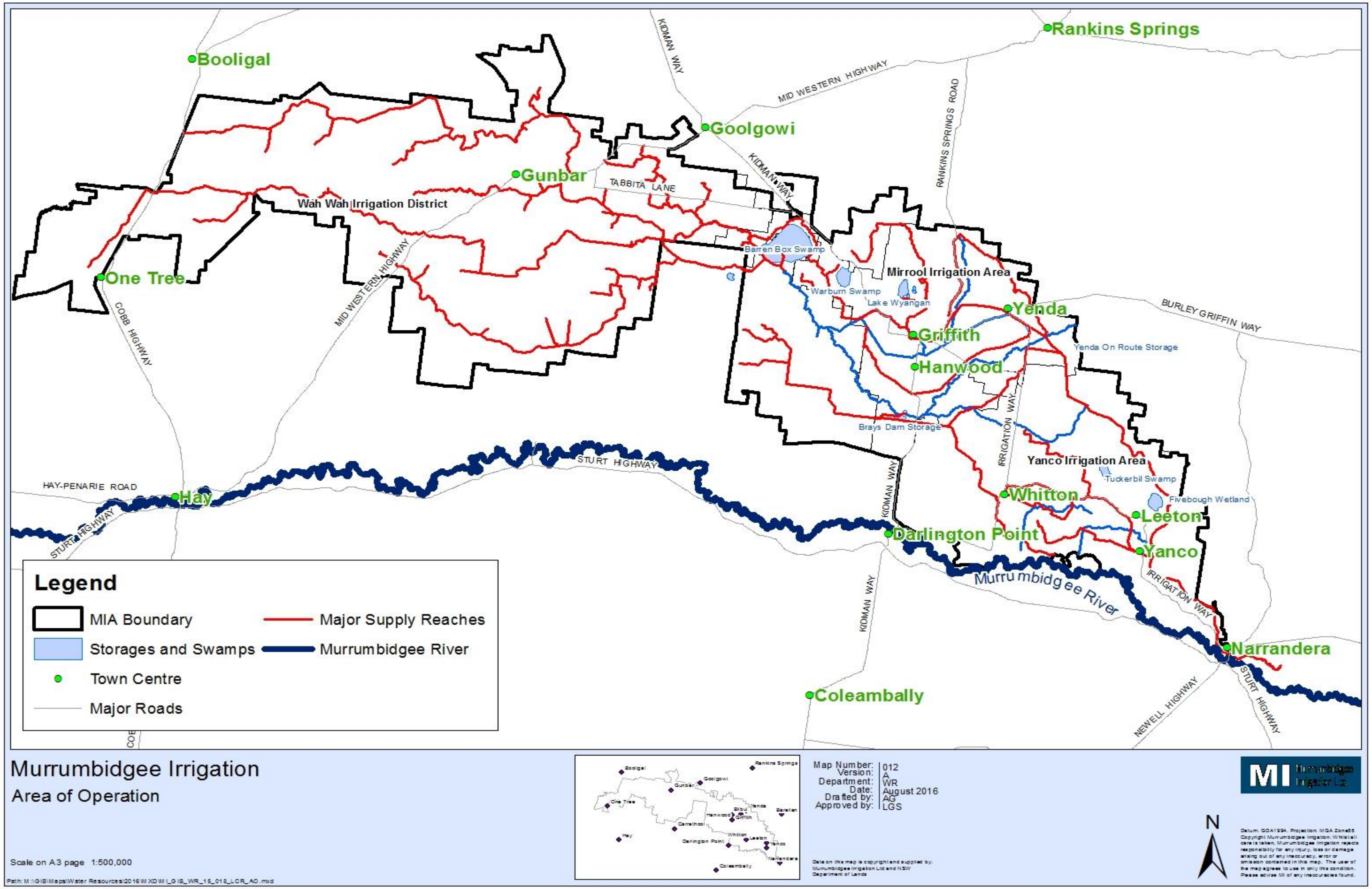


Figure 1 Murrumbidgee Irrigation's Area of Operation

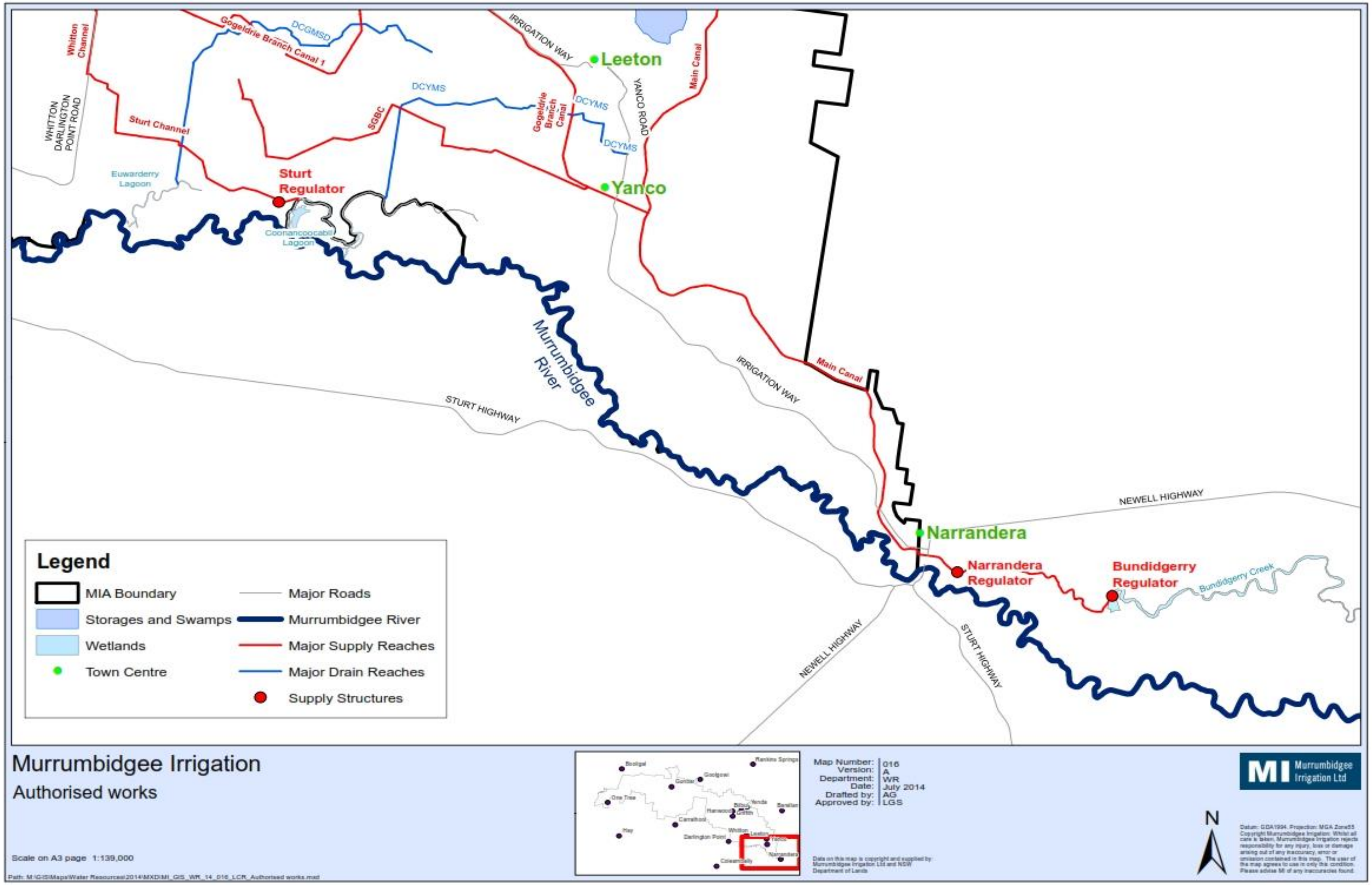


Figure 2 Location of authorised supply works

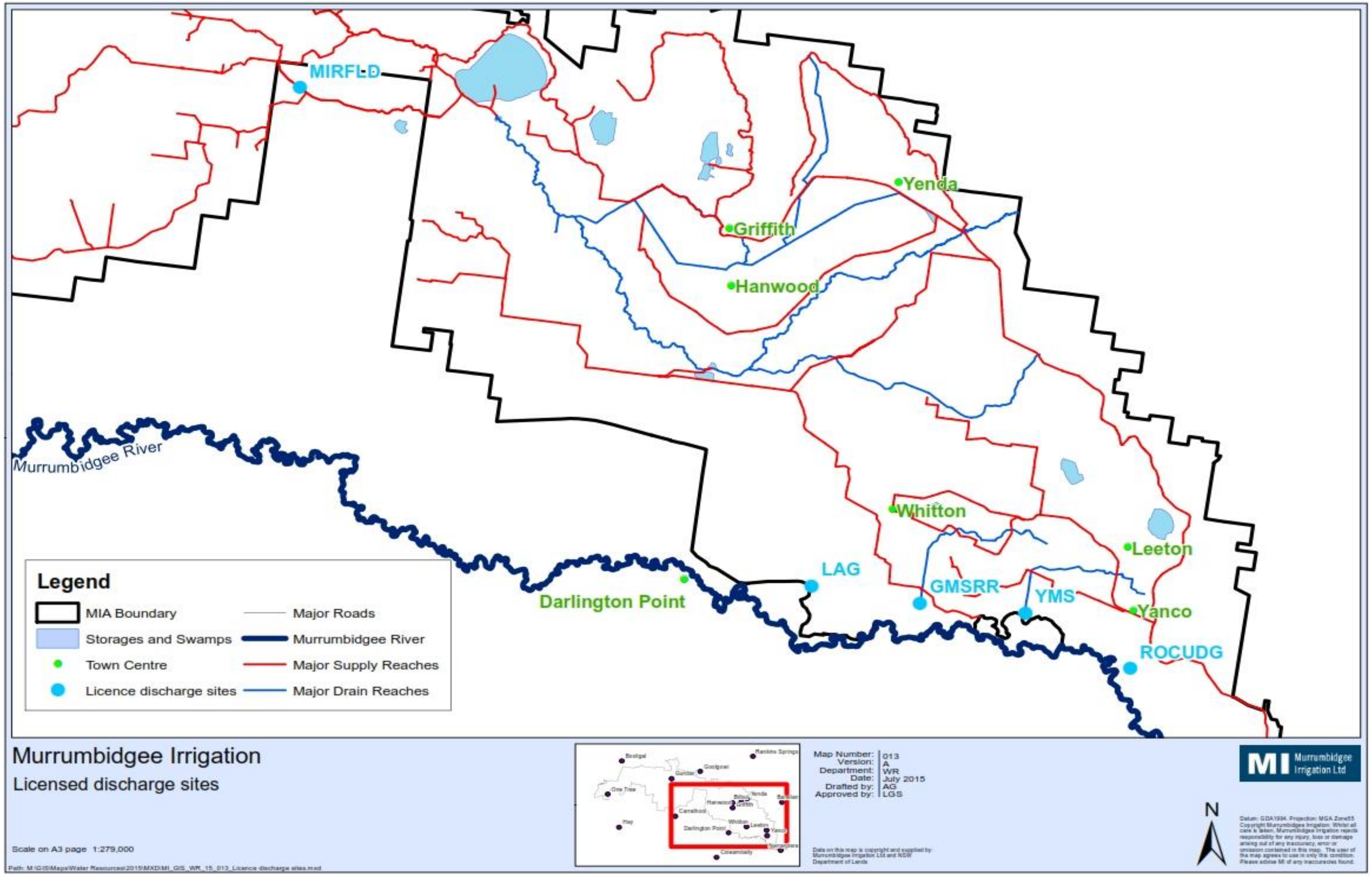


Figure 3 Licence monitoring and discharge points in the MIA

3 Reporting on Water Management

3.1 Climate conditions

The climatic data for the MIA is monitored at eight weather stations across the MIA (Figure 4). These weather stations measure rainfall and evapotranspiration (ETo) on a daily basis and are operated by MI and CSIRO.

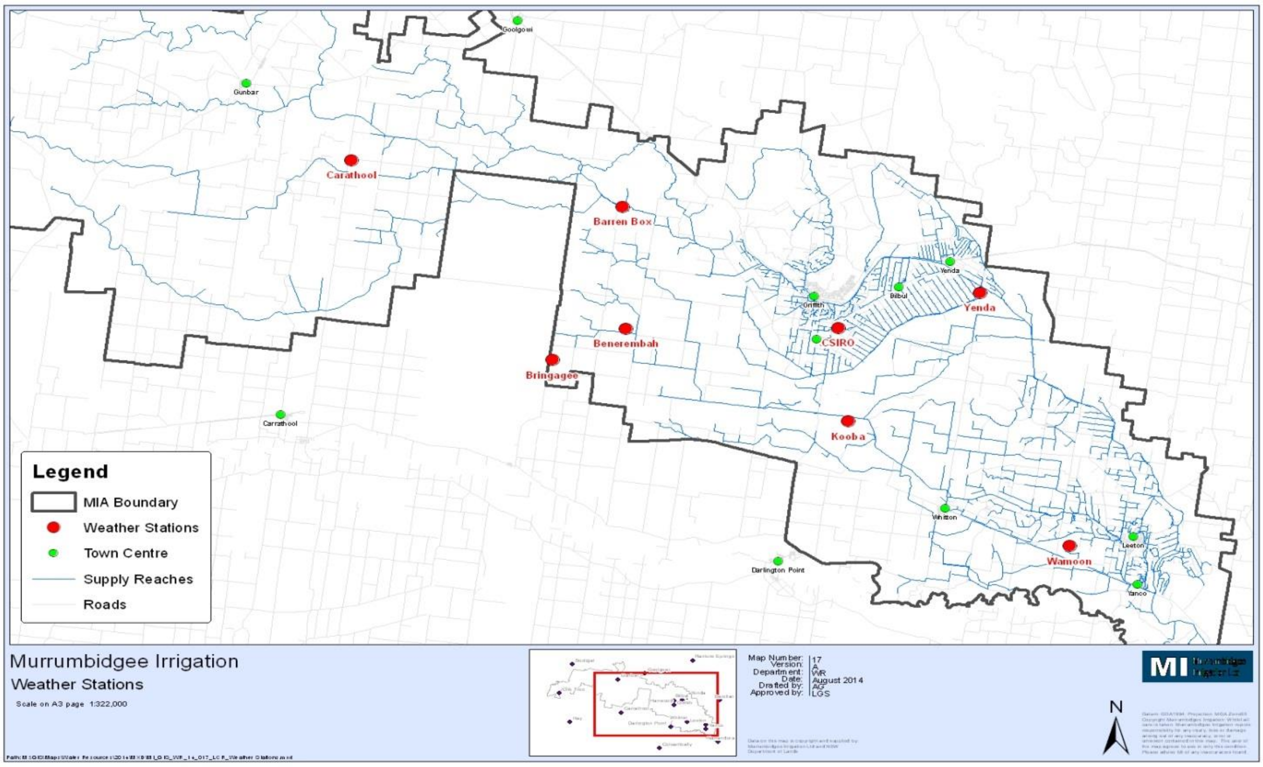


Figure 4 Location of weather monitoring stations in the MIA

Total Rainfall and ETo recorded at each weather station during 2015/16 is displayed in Table 2. Griffith recorded the highest rainfall (529 mm) and lowest ETo (1712 mm), whereas lowest rainfall (419 mm) and highest ETo (2085 mm) was recorded at Carathool.

Table 2 Annual rainfall (mm) and ETo (mm) total for MIA weather station districts for 2015/16

Weather Station	Total rainfall (mm)	Total ETo (mm)
Barren Box	445	1975
Benerembah	468	1860
Bringagee	451	2061
Carathool	419	2085
Kooba	443	1987
Wamoon	435	1986
Yenda	429	1778
Griffith (CSIRO)	529	1712

Weather data recorded at the Griffith weather station is displayed with Long Term Average (LTA 1962-2015) data in Figure 5. Above average rainfall was recorded in December and January, coinciding with peak ETo. May, June and July also experienced above average rainfall for 2015/16, and also the lowest ETo, as expected for this time of year. This would have resulted in higher water retention in the area. ETo for 2015/16 peaked in December, slightly earlier in the irrigation season when compared to historical LTA records.

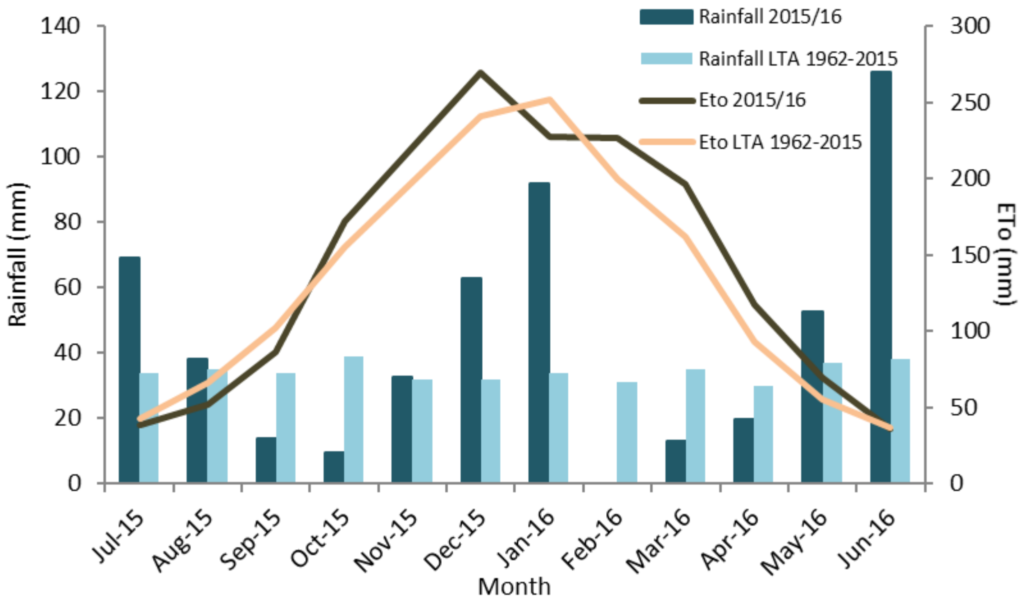
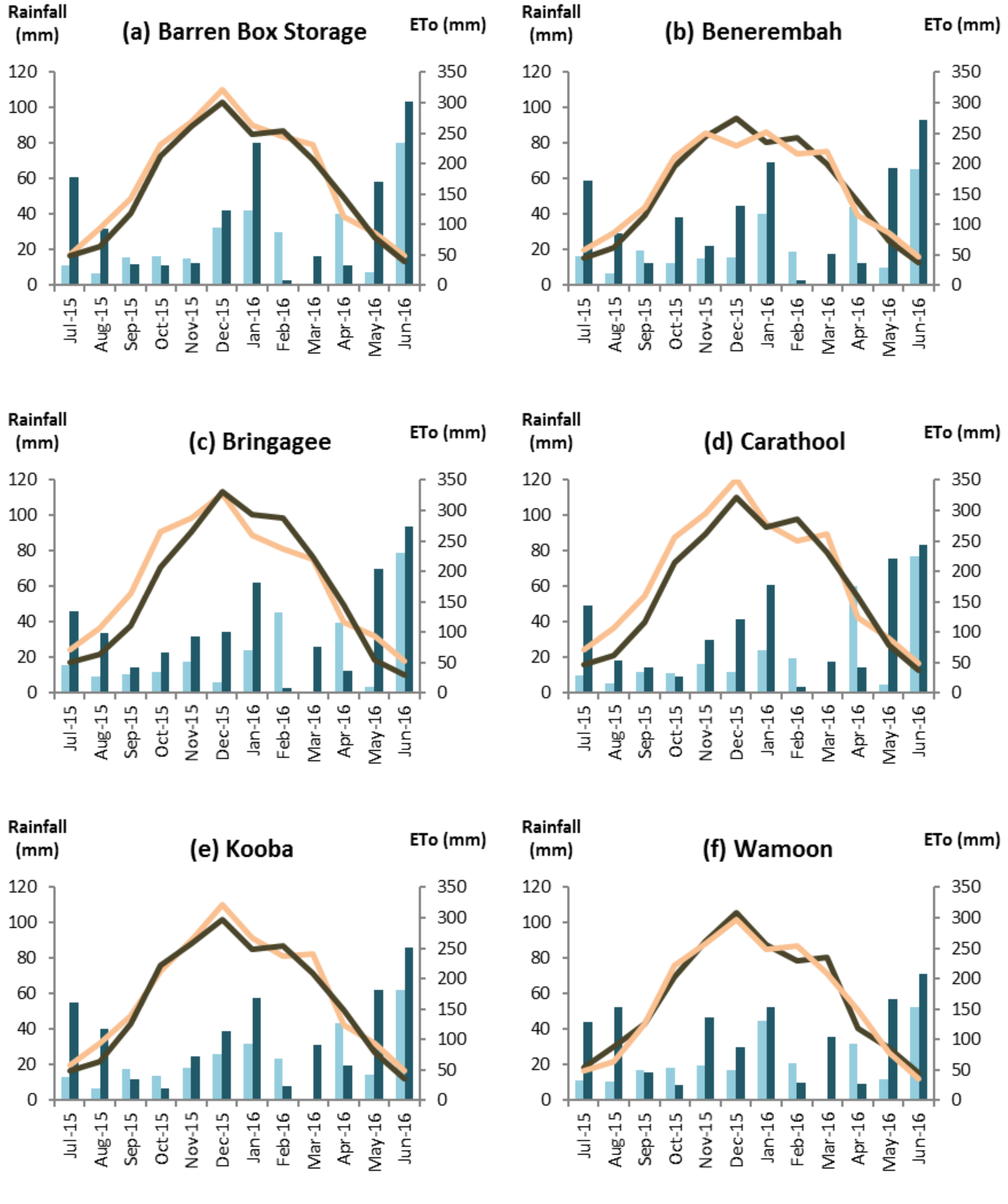
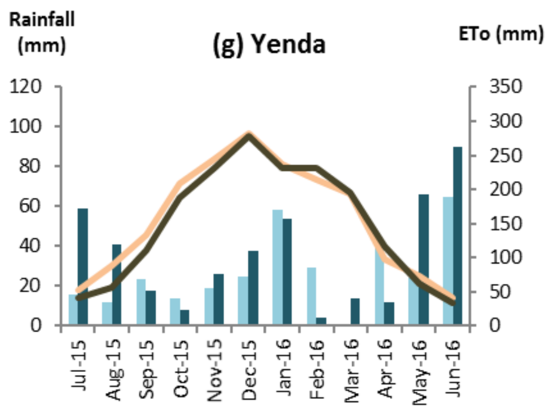


Figure 5 Rainfall (mm) and ETo (mm) for 2015/16 and LTA data recorded at Griffith weather station

Rainfall and ETo recorded at all other weather stations are shown in Figure 6, with comparison to 2014/15 figures. Total rainfall recorded at all weather stations was higher than the previous year, with an average 150mm increase recorded at each weather station. The MIA experienced high monthly rainfall throughout 2015/16 when compared to the previous year, with the exception of February when rainfall was significantly lower.

Peak ETo was recorded in December for 2015/16 and 2014/15. All ETo rates were consistently lower across the MIA when compared to the previous year. Weather variability causes irrigation requirements to change from year to year. The amount and timing of rainfall and ETo rates are the two main weather variables that determine irrigation requirements. Therefore, the higher rainfall and lower ETo experienced during 2015/16 is likely to have influenced all aspects of this report.





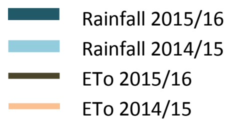


Figure 6 Rainfall (mm) and Evaporation (mm) at:
(a) Barren Box Storage
(b) Benerembah
(c) Bringagee
(d) Carathool
(e) Kooba
(f) Wamoon
(g) Yenda.

3.2 Calibration Report for Main Canal and Sturt Canal AFFRA Units

The calibration reports for Narrandera Regulator (NARREG) and Sturt Canal offtake (STURT) AFFRA units have been provided by Ventia as part of the contract with MI to provide qualified hydrographic services in accordance with the conditions of Combined Approval 40CA403245.

Refer to Table 3 for the NARREG AFFRA calibration report and Table 4 for the STURT AFFRA calibration report.

Table 3 Main Canal at NARREG (410127) calibration report

Date	Time	Calibration Measurements: Q Measured discharge ML/day	AFFRA Sensor: Q Recorded mean ML/day	Deviation (%)
18/08/2015	10:50	621	645	-3.71
18/08/2015	11:46	620	639	-2.97
19/10/2015	13:17	2,641	2,727	-3.51
13/01/2016	11:30	3,530	3,620	-2.47
13/04/2016	11:51	942	1,008	-6.55*

** Site was particularly windy, leading to deviation between measurement and recorded flow. A measurement was taken at the next available time during flow conditions and confirmed the measurement to be 5.0% and within acceptable deviation limits. Details of this measurement are available upon request and will be included in 2016/17 report.*

Table 4 Sturt Canal at STUR (410129) calibration report

Date	Time	Calibration Measurements: Q Measured discharge ML/day	AFFRA Sensor: Q Recorded mean ML/day	Deviation (%)
8/12/2015	15:42	829	849	-2.37
11/02/2016	13:38	952	953	-0.10
7/03/2016	16:07	732	747	-2.01
15/04/2016	14:20	220	145	51.52*
21/04/2016	11:37	92	88	4.55

**This measurement was affected by the wind, and has not been considered for comparison. A measurement was done the following week to confirm the flow was in an acceptable deviation range.*

3.3 Diversions and Water Allocation

A monthly summary of gross water diversions is presented in Table 5. These volumes represent gross diversions entering the supply system from MI's two authorised water supply Works at NARREG and STUR. It is important to note that the total diversion volume of 643,957 ML does not include an environmental water diversion volume of 2,977 ML.

Table 5 Monthly summaries of gross diversions (ML) at authorised supply works NARREG and STUR and total deliveries to customers (ML) for 2015/16

Month	STUR	NARREG	Total diversion	Deliveries to customers
Jul-15	2,210	778	2,988	2,988
Aug-15	5,343	17,997	23,340	15,285
Sep-15	8,107	22,513	30,620	24,126
Oct-15	32,890	78,054	110,944	93,050
Nov-15	16,399	61,029	77,428	60,027
Dec-15	21,758	83,934	105,692	91,528
Jan-16	21,487	79,972	101,459	84,202
Feb-16	18,033	60,838	78,871	64,463
Mar-16	9,891	46,064	55,955	44,425
Apr-16	4,876	28,446	33,322	24,005
May-16	45	8,902	8,947	6,185
Jun-16	50	14,341	14,391	15,994
Total	141,089	502,868	643,957	526,278

The irrigation demand at Wah Wah is primarily supplied from Barren Box Storage & Wetland (BBSW) and Mirrool Creek. During periods of peak demand Wah Wah is further supplemented by river water entering the system from NARREG and STUR then diverted to Wah Wah via the Mirrool Creek. Table 6 shows the adjusted volumes of water channelled through each of the main channel systems. Due to the reclamation and reuse of drainage water, the total amount of water channelled through each of these systems is greater than the total gross diversions shown in Table 5.

Table 6 Monthly Summary of adjusted diversions (ML) 2015/16

Month	Sturt Canal	Main Canal	Wah Wah
Jul-15	2,210	778	1,255
Aug-15	5,343	10,877	8,112
Sep-15	8,107	20,253	3,649
Oct-15	32,890	75,588	8,412
Nov-15	16,399	60,258	9,373
Dec-15	21,758	83,549	10,583
Jan-16	21,487	76,673	9,143
Feb-16	18,033	60,838	6,010
Mar-16	9,891	46,064	7,354
Apr-16	4,876	28,061	7,076
May-16	45	8,764	2,364
Jun-16	50	14,341	6,300
Total	141,089	486,044	79,631

Table 7 compares water allocations, diversions, total deliveries and climate data from the 2015/16 reporting year to previous years. Total diversions for 2015/16 do not include water diverted for environmental purposes and were the lowest since 2010/11 reporting year, which was also a low allocation year. Although announced allocations determine much of the irrigation demand, rainfall and ETo can significantly affect the total diversions for the year. Above average rainfall was recorded for 2015/16, however, it is likely that any effect on water supply demand will not be recognised until next reporting year since the majority of this rainfall was experienced in June. When low rainfall years are coupled with high ETo rates, as seen in 2005/06, water supply demand increases dramatically. Flows for that year were supplemented by the Snowy Hydro borrows, which added just over 100,000ML of water to the available water pool.

Table 7 Water allocation, total diversions and deliveries 2015/16 compared to previous years

Year	Announced Allocation (%) General / High	Total Diversions (ML)	Total Deliveries (ML)	Rainfall (mm) Griffith AWS	ETo (mm) Griffith AWS
2015/16	37/95	643,957	526,278	529	1712
2014/15	53/95	878,614	738,814	349	1,776
2013/14	63/95	832,758	699,308	440	1,860
2005/06	54/95	1,036,519	829,990	367	1,935

3.4 Environmental diversions

During the 2015/16 irrigation season, MI was required by the Office of Environment and Heritage (OEH) to divert water for scheduled Environmental Water Release (EWR) to five locations as shown in Table 8. A total of 1,857 ML was diverted, with the majority of water diverted in November.

Table 8 Environmental water diversions for 2015/16

Month	Gooragool Lagoon	Tuckerbill Swamp	Fivebough Swamp	Nericon Swamp	Campbell's Swamp
Jul-15	0	0	0	0	0
Aug-15	0	0	0	0	0
Sep-15	0	0	0	0	0
Oct-15	0		25	0	0
Nov-15	541	370	175	138	206
Dec-15	0	0	0	102	0
Jan-16	0	0	0	0	200
Feb-16	0	0	0	0	0
Mar-16	0	0	0	0	0
Apr-16	0	0	0	0	0
May-16	0	0	100	0	0
Jun-16	0	0	0	0	0
Total	541	370	300	240	406

3.5 Water discharged from Area of Operations

Monthly discharge volumes for each discharge monitoring point listed under the Combined Approval are shown in Table 9. A total of 1,620 ML was discharged from MI's area of operations in 2015/16. Table 10 gives total discharge volumes from MI's Area of Operation compared to previous years. In 2015/16 the highest volume was discharged from LAG, however 541 ML was deliberately diverted for an EWR to Gooragool Lagoon on direction from OEH in November.

Table 9 Monthly water volumes (ML) discharged from Area of Operations

Month	LAG (41010940)	ROCUDG (41010005)	YMS (410083)	GMSRR (41010921)	MIRFLD (41010163)
Jul-15	1.9	17.3	0	0	0
Aug-15	24.7	60.6	0	0	0
Sep-15	13.7	100.7	0	0	0
Oct-15	52.2	12.3	0	0	0
Nov-15 EWR	26.5 541	62.4	0	0	0
Dec-15	5.81	1.1	0	0	0
Jan-16	0	0	0	0	0
Feb-16	0	0	0	0	0
Mar-16	10.3	0	0	0.1	0
Apr-16	0.2	3.7	0	0	0
May-16	6	0	0	0.1	0
Jun-16	229.2	0	105.2	64.1	281.2
Total	911.5	258.1	105.2	64.3	281.2

The EWR should not be included when comparing the total volumes discharged in 2015/16 to previous years (Table 10). The total volume discharged in 2015/16 was higher when compared to 2014/15, due to the high rainfall received in May and June (Figure 6). During 2013/14, water was released through MI's discharge points to allow channels to be drained for maintenance works, causing a higher volume of water to be discharged. The increased efficiency of MI's drainage reuse system is exhibited in the reduction of discharge volumes from 2005/06.

Table 10 Total water volumes (ML) discharged from the MIA compared to previous years

Year	Total discharged (ML)
2015/16	1,079*
2014/15	671
2013/14	2,438
2005/06	8,570

** does not include EWR of 541.5 ML for LA*

3.6 Supply efficiency

Table 11 illustrates the simple efficiency of MI's supply system to be at 82% for 2015/16. The simple efficiency provides insight into how the supply system is managed under the season's climatic conditions, whilst balancing irrigation demand and minimising system losses. Operational efficiencies can be achieved through infrastructure upgrades and system rationalisation, as well as drainage reuse opportunities and management of water delivery. The water balance on page 15 of this report reconciles the losses and gains of the system and takes into account drainage reuse volumes for 2015/16. The increase in efficiency from 2005/06 when compared to the more current reporting years is attributed the completion of MI's drainage reuse system.

Table 11 Supply efficiency from 2015/16 and previous years

Year	Sturt Canal	Main Canal	Environment Diversions	NET TOTAL Irrigation Diversions	Deliveries (ML)	Conveyance (ML)	Simple Efficiency (%)
2015/16	141,089	505,845	2,977	643,957	526,278	117,679	82%
2014/15	219,272	661,814	2,472	878,614	738,814	139,800	84%
2013/14	213,806	620,138	1,186	832,758	699,308	133,450	84%
2005/06	233,388	805,277	2,146	1,036,519	829,990	206,529	80%

3.7 Storage levels

Storage flows shown in Table 12 to 14 include the initial balance of water held in these storages. These figures represent inflows and outflows from storages for 2015/16 to give insight into system flows. Volumes are calculated by using storage level measurements recorded at the end of each month.

3.7.1 Barren Box Storage and Wetland (BBSW)

In 2006, BBSW was transformed into an efficient water storage facility which returned water under the Water for Rivers program for use in the Snowy River system. Storage at this site comprises two cells:

- The Active Cell – storage capacity 24,500 ML
- The Intermediate Cell – storage capacity 4,500 ML

Table 12 Barren Box Storage flows (ML) for 2015/16

Month	Inflow	Outflow	Volume
Jul-15	6,020	830	20,598
Aug-15	9,173	4,970	25,179
Sep-15	5,110	2,275	27,284
Oct-15	6,514	6,287	24,958
Nov-15	3,231	6,555	19,326
Dec-15	3,710	7,910	13,148
Jan-16	5,465	4,790	11,729
Feb-16	2,905	2,745	8,442
Mar-16	2,480	3,242	6,089
Apr-16	470	1,850	4,005
May-16	3,763	350	6,943
Jun-16	18,818	200	26,162
Total	**67,659**	**42,004**	

3.7.2 Yenda Storage

The flows recorded for Yenda storage for 2015/16 are shown in Table 13. The Yenda Storage is primarily used to compensate for differences between customer orders and diversions from NARREG.

Table 13 Yenda Storage flows (ML) for 2015/16

Month	Inflow	Outflow	Volume
Jul-15	299	111	582
Aug-15	300	372	510
Sep-15	396	535	332
Oct-15	2,054	2,104	465
Nov-15	1,304	1,456	422
Dec-15	1,633	1,852	478
Jan-16	1,673	1,798	516
Feb-16	1,393	1,472	607
Mar-16	1,252	1,572	413
Apr-16	1,006	1,147	394
May-16	246	295	370
Jun-16	321	285	527
Total	**11,877**	**12,999**	

3.7.3 Bray's Dam Storage

Bray's Dam Storage has the operational ability to capture and redistribute drainage water from off-farm drainage and following rainfall. Water can also be pumped directly from Mirrool Creek and reused in the irrigation network. Table 14 show inflows and outflows at Bray's Dam for 2015/16.

Table 14 Bray's Dam Storage flows (ML) for 2015/16

Month	Inflow	Outflow	Balance
Jul-15	819	267	2,098
Aug-15	554	306	2,153
Sep-15	4	806	1,029
Oct-15	2,860	2,241	1,082
Nov-15	2,924	1,758	1,414
Dec-15	3,695	2,893	1,334
Jan-16	3,158	1,981	1,785
Feb-16	1,373	1,328	1,149
Mar-16	1,875	1,505	1,015
Apr-16	2,244	1,809	937
May-16	1,379	376	1,674
Jun-16	2,357	1,181	2,353
Total	**23,242**	**16,451**	

3.8 Drainage reuse

MI has continued to actively pursue recovery and reuse of water from its drainage system. Table 15 provides monthly information on drainage reuse volumes for each drainage site for 2015/16. Barren Box Storage to Outfall also includes 281 ML of water diverted to Mirrool Creek Floodway.

It should be noted that the water recovered at these sites may also include water that is diverted from our supply system during peak demand periods. As MI continues to operate its system more efficiently, some of the drainage sites are now used as connector channels between supply sites.

Table 15 **Monthly drainage reuse volumes (ML) 2015/16**

Drainage reuse site	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	**Total**
GMSD Pumps (Yanco esc + Stormwater)	24	104	157	319	399	333	608	331	411	191	221	445	3,543
YMSD	134	236	118	136	204	136	121	80	178	135	110	343	1,931
Collina Pump (N.B.C. Drainage + Stormwater)	0	0	0	0	0	0	0	0	0	0	0	0	0
Lake Wyangan Pumps to L.V.B.C.	0	0	0	0	0	0	0	0	0	0	0	0	0
Brays Dam Storage to Benerembah Channel (BID Outlet)	0	0	0	0	0	0	0	0	0	0	0	766	766
Mirrool Creek Diversion to Benerembah (@ Brays)	317	151	1,510	3,709	2,527	3,277	1,778	1,656	2,253	1,573	559	3,321	22,631
Mirrool Creek Pumps to Benerembah Channel (BID Pumps)	0	0	0	65	20	0	0	0	0	0	0	0	85
Mirrool Creek to Wah Wah Main	310	3,112	1,374	2,125	2,818	1,460	4,503	3,210	4,112	5,226	2,014	5,610	35,874
Mirrool Creek & Barren Box Licensed Diverters	22	75	350	1,771	868	631	749	781	468	3	18	141	5,877
Barren Box Storage to Wah Wah Main @ B.B.S. Pumps	350	500	50	1,860	1,050	2,750	700	450	3,342	1,850	350	200	13,452
Barren Box Storage to Wah Wah Main @ Pipes	0	0	0	0	0	0	0	0	0	0	0	0	0
Barren Box Storage to Outfall (includes Mirrool Creek Floodway releases)	480	4,470	2,225	4,427	5,505	5,160	4,090	2,295	0	0	0	0	28,652
Channel 13 Escape (Benerembah Drainage)	115	30	0	0	0	0	155	55	0	0	0	490	845
Sub Total	1,752	8,678	5,784	14,412	13,391	13,747	12,704	8,858	10,764	8,978	3,272	11,316	113,656
Less: First Use Water Diversions	0	7,120	2,260	2,466	771	385	3,299	0	0	385	138	0	16,824
Total Water Re-Used	1,752	1,558	3,524	11,946	12,620	13,362	9,405	8,858	10,764	8,593	3,134	11,316	96,832

3.9 Water balance

Table 16 shows the Annual Water Balance for MI’s network. For the 2015/16 reporting year, the annual water balance has been refined to provide a clearer representation of system operations. These changes include more storage and additional drainage and water re-use information that include Yenda en-route storage and the Brays Dam complex. The amount of water captured and re-used through MI’s drainage network is a major component of this Annual Water Balance. The drainage network was not operational in 2005/06 and therefore this year cannot provide a comparison to current years. The drainage network was completely operational in 2009/10 and has been chosen as this historic comparison year for this reporting requirement.

Total gross diversions for 2015/16 were used to generate water deliveries of 526,278 ML. The apparent conveyance was a total of 117,679 ML providing a simple efficiency of 82%. The total water captured and reused was 96,832 ML. Combined with the gross diversions of 643,957 ML, a corrected total system supply is therefore 740,789 ML, resulting in real conveyance being 214,511 ML and system efficiency of 71%.

A breakdown of the total water captured and re-used is provided for in Table 15. Water captured and re-used represents the additional water that was diverted to supplement total deliveries. This includes all water captured from surface drainage, rainfall runoff and all flows that have been re-diverted to the Wah Wah Irrigation district via Mirrool Creek. The total true losses have been assessed at 131,494 ML, leaving unaccounted losses at 83,017 ML of the total system losses.

Table 16 Annual Water Balance (ML) 2015/16

Factor	2009/10	2013/14	2014/15	2015/16
Climatic				
Rainfall (mm)	336	493	349	529
Evaporation (mm)	2,085	1,859	1,776	1,712
Type of Year (% dry)	75	35	55	26
Main gross data				
Gross diversions	505,176	832,758	878,614	643,957
Total deliveries	368,269	699,308	738,814	526,278
Conveyance	136,907	133,450	139,800	117,679
Simple efficiency (%)	73	84	84	82
Water captured and re-used	**52,570**	**134,651**	**128,482**	**96,832**
Corrected total system supply	557,746	967,409	1,007,096	740,789
Real conveyance value	189,477	268,101	268,282	214,511
Inevitable real losses				
Net storage	5,918	23,612	8,369	31,324
Change in storage volume	1,442	7,224	-3,395	13,421
Storage loss	**4,476**	**16,388**	**11,764**	**17,903**
Seepage from channels	21,000	20,700	21,000	20,500
Evaporation from channels	24,000	19,750	22,000	18,200
Unauthorised use/theft	10,000	10,000	5,000	10,526
System fill	18,000	18,000	18,000	18,000
Subtotal	**84,836**	**115,674**	**82,738**	**129,874**
System flow losses				
Drainage volume to river	598	2,438	671	1,339
Floodway releases	0	0	0	281
Subtotal	598	2,438	671	1,620
Total true losses	85,434	118,112	83,409	131,494
Unaccounted losses	104,043	149,989	193,671	83,017
Total system losses	189,477	268,101	268,282	214,511
System efficiency (%)	**66%**	**72%**	**73%**	**71%**

Water Use

3.10 Crop statistics

For each water order customers are required to nominate their water use to a particular crop or purpose. This data is not validated at the farm level and is therefore an estimate only. This data is used to report the total area, water deliveries and crop water use for 2015/16 which are presented in Table 17. It is important to note the water use data presented for the total area of crop are also influenced by rainfall, ETo and irrigation practices, which are not considered in these figures.

Table 17 Summary of reported deliveries (ML) and areas (ha) for the major crop groupings during 2015/16

Crop	Area (ha)	Volume Delivered (ML)	Crop Water Use (ML /ha)
Citrus	7,865	35,582	4.5
Cotton	12,647	79,812	6.3
Industrial	27	5,812	-
Other crops	525	21,853	-
Other fruits	4,229	27,889	6.6
Plantation	2,857	877	0.3
Rice	12,265	136,805	11.2
Stock & domestic	268	14,247	-
Summer cereals	1,587	7,179	4.5
Summer oilseeds	503	2,512	5.0
Summer pasture	1,612	7,938	4.9
Town supply	5	11,773	-
Vegetables	1,667	10,011	6.0
Vines	18,631	65,318	3.5
Winter cereals	44,755	82,500	1.8
Winter oilseeds	2,350	4,660	2.0
Winter pasture	4,262	11,511	2.7
Total	116,053	526,278	

A comparison of crop water use for 2015/16 with previous years is presented in Table 18 and illustrated in Figure 7. Although winter cereals were the dominant crop type grown in the MIA, rice accounted for the highest portion of total water delivered per crop type (26%) due to its higher irrigation requirement. This is shown in Figure 7, which also highlights the rise in total water delivered for cotton compared to 2014/15.

Table 18 Total deliveries (ML) to major crop types in the MIA for 2015/16

Year	Rice	Pasture	Cereal and Oil Seeds	Vegetables	Citrus + Vines + Other Fruits	Other Crops + Plantations	S&D + Towns + Industrial	Cotton
2015/16	136,805	19,449	96,851	10,011	128,789	22,729	31,832	79,812
2014/15	255,384	32,206	171,645	12,216	149,045	20,547	28,295	60,678
2013/14	237,957	27,454	165,149	18,060	138,427	14,347	24,588	73,326
2005/06	355,254	65,878	181,641	27,588	142,025	9,481	48,123	n/a

***Note**: Cotton was considered as 'other crops and plantations' before 2011/12*

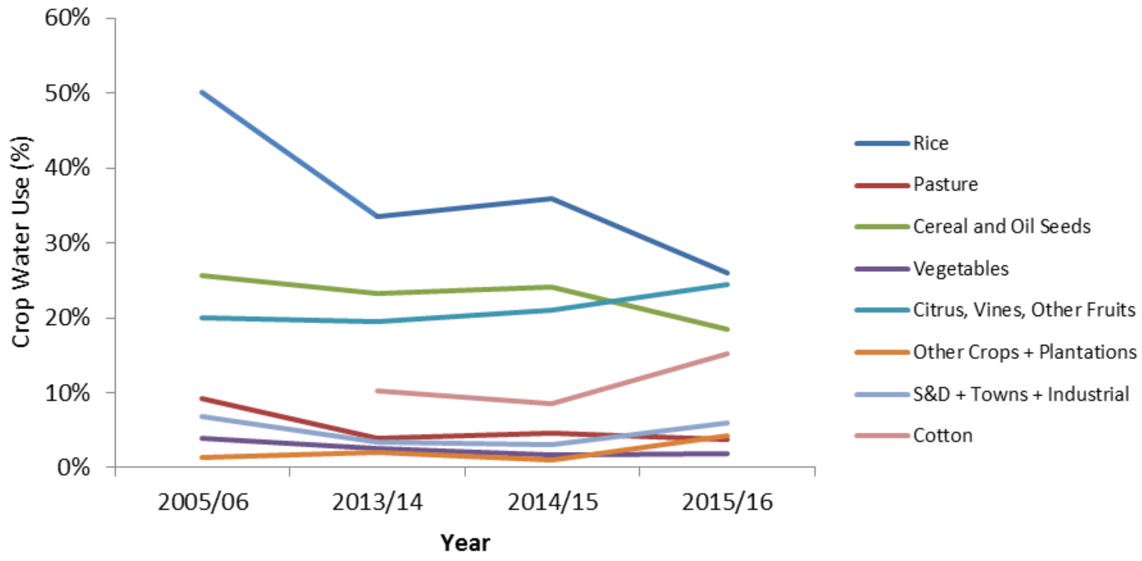


Figure 7 Crops water use (%) for total water deliveries from 2005/06, 2013/14, 2014/15 and 2015/16

3.11 Irrigation intensity

Irrigation intensity is displayed in Figure 8 by water use (ML/ha) at a property level. This map identifies locations of landholdings using between 0 and 4 ML/ha, 4 and 4.1-8 ML/ha and above 8.1 ML/ha.

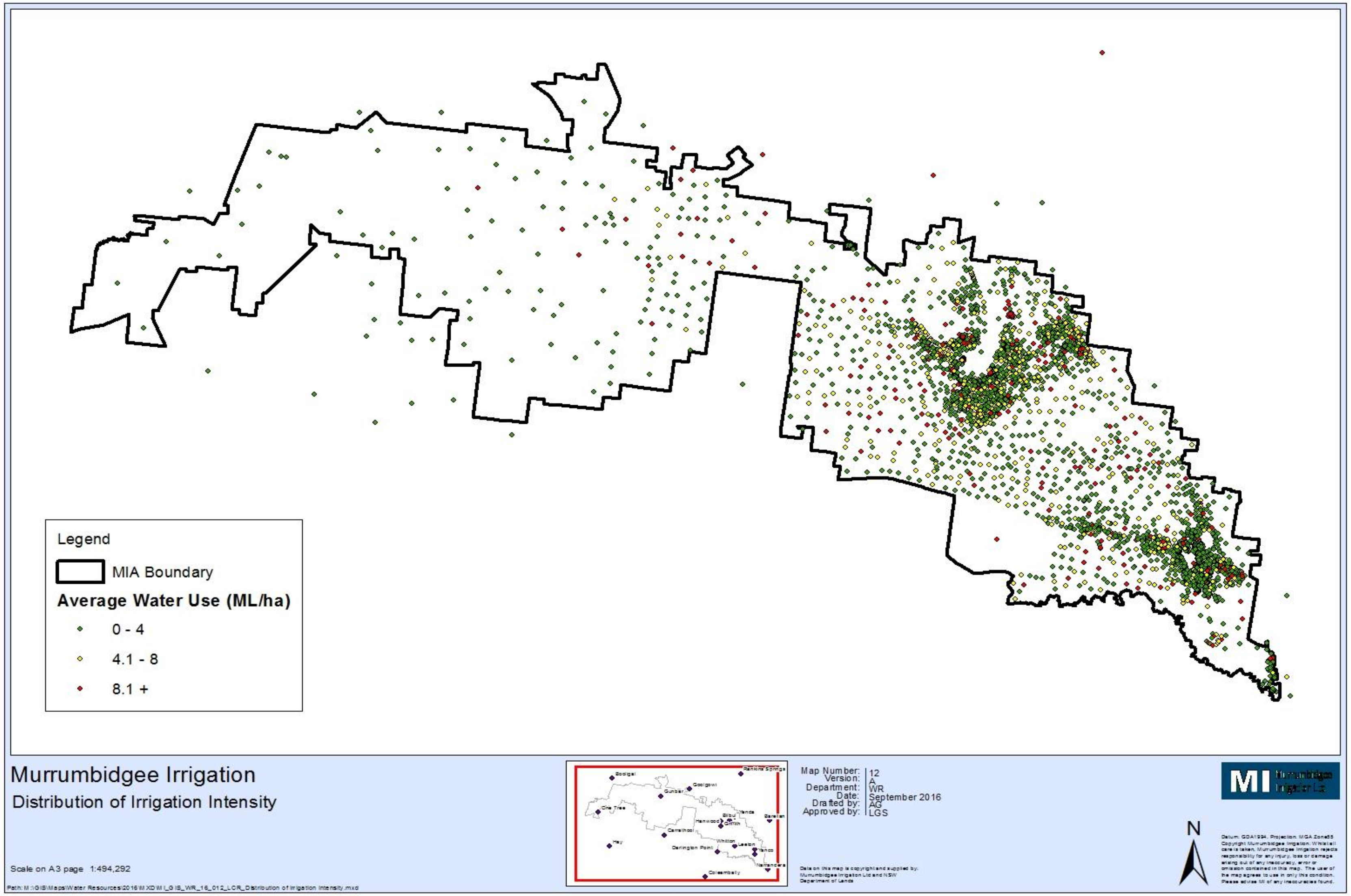


Figure 8 Distribution of irrigation intensity across the MIA

4 Salinity and salt load

4.1 Extracted salt-load

The salt load for NARREG and STUR are calculated using flow data reported by Ventia and salinity data from DPI Water monitoring site 410001, which is the closest monitoring point on the Murrumbidgee River to MI's offtakes. Monthly mean salinity values from site 410001 were used for salt load calculations for both NARREG and STUR. The mean EC values and extracted salt loads are presented in Table 19.

Table 19 Total extracted salt load for 2015/16

Month	Site 410001 mean EC (µS/cm)	STUR (t)	NARREG (t)	Total salt load extracted
Jul-15	225	318	112	430
Aug-15	206	704	2,373	3,077
Sep-15	220	1,141	3,170	4,311
Oct-15	101	2,126	5,045	7,171
Nov-15	149	1,564	5,820	7,384
Dec-15	88	1,225	4,727	5,953
Jan-16	92	1,265	4,709	5,974
Feb-16	101	1,166	3,933	5,098
Mar-16	150	950	4,422	5,372
Apr-16	150	468	2,731	3,199
May-16	153	4	872	876
Jun-16	200	6	1,845	1,851
Total		10,939	39,758	50,696

During 2015/16, an estimated 50,696 tonnes of salt entered the MIA from the Murrumbidgee River. The salt load entering the MIA from supply works is lower compared to 2014/15 (Table 20). The amount of salt is relative to the volume of water diverted from the river, which is represented by the strong relationship exhibited between total diversions and salt loads in Figure 9.

Table 20 Extracted salt-load (t) for 2015/16 compared to previous years

Year	Diversions (ML)	Extracted salt load		
		STUR	NARREG	Total
2015/16	643,957	10,939	39,758	50,696
2014/15	878,614	14,587	44,270	58,858
2013/14	832,758	13,905	38,271	52,177
2007/08	393,973	1,778	26,816	28,594

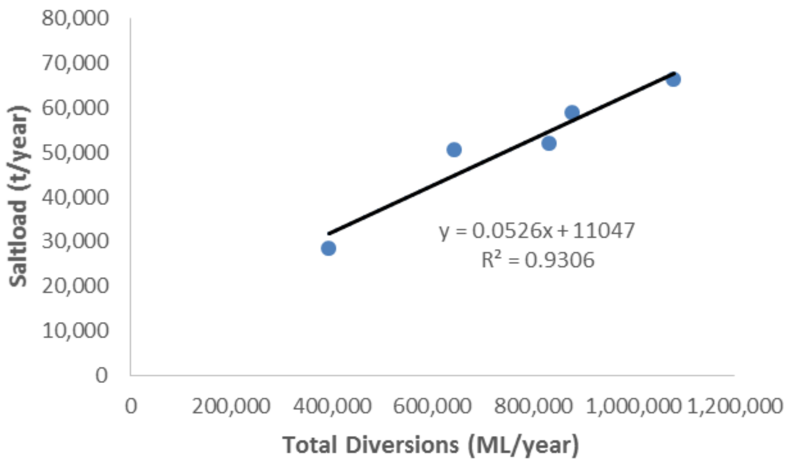


Figure 9 The relationship between salt load (t/year) and total diversions (ML/year)

4.2 Discharged salt load

There are four river drain sites and one floodway site that are licensed to discharge water out of MI's area of operation. The locations of these sites are shown in Figure 3 of this report. Flow, electrical conductivity (EC) and salt load data for these sites are presented in Table 22 with previous year comparison presented in Table 21.

An estimated 201 tonnes was discharged from MI's Area of Operation in 2015/16, which was higher compared to the amount recorded last year, corresponding to the volume of water discharged. The majority of salt discharged from the MIA in 2015/16 was from site LAG, however 541.2ML was diverted for environmental water, carrying a salt load of 70 tonne. In 2005/06 MI's drainage reuse system was not complete, which explains the high volumes and subsequent salt load discharged during that year.

Table 21 Discharged salt load for 2015/16 compared to previous years

Year	Water discharged (ML)	Discharged Salt load (t)
2015/16	1,620	201
2014/15	675	96
2013/14	2,438	242
2005/06	8,570	1,887

Table 22 Flow, EC values and salt loads for EPL sites 2015/16

Month	Flow (ML)	Mean EC (µS/cm)	Min.EC (µS/cm)	Max. EC (µS/cm)	Salt load (t)	Flow (ML)	Mean EC (µS/cm)	Min.EC (µS/cm)	Max. EC (µS/cm)	Salt load (t)
Yanco Main Southern Escape (YMS) 410083						**Gooragool Lagoon Escape (LAG) 41010940**				
Jul-15	0	-	-	-	0	1.9	319	176	413	0.4
Aug-15	0	-	-	-	0	24.7	419	69	773	6.6
Sep-15	0	-	-	-	0	13.7	*	*	*	1.3
Oct-15	0	-	-	-	0	52.2	330	191	830	11.0
Nov-15	0	-	-	-	0	567.5	204	56	373	74.0
Dec-15	0	-	-	-	0	5.81	*	*	*	0.6
Jan-16	0	-	-	-	0	0	-	-	-	0
Feb-16	0	-	-	-	0	0	-	-	-	0
Mar-16	0	-	-	-	0	10.3	*	*	*	0.1[1]
Apr-16	0	-	-	-	0	0.2	**	**	**	0.02[1]
May-16	0	-	-	-	0	6.0	**	**	**	0.6[1]
Jun-16	105.2	**	**	**	10.1[1]	229.2	**	**	**	22[1]
Total	**105.2**				**10.1**	**911.5**	*541ML diverted for EWR in November*			**117**
Gogeldrie Main Southern Escape (GMSRR) 41010921						**Cudgel Creek Escape (ROCUDG) 41010005**				
Jul-15	0	-	-	-	0	17.3	95	84	108	1.1
Aug-15	0	-	-	-	0	60.6	104	89	150	4.0
Sep-15	0	-	-	-	0	100.7	146	125	203	9.4
Oct-15	0	-	-	-	0	12.3	*	*	*	1.2[1]
Nov-15	0	-	-	-	0	62.4	145	90	190	5.8
Dec-15	0	-	-	-	0	1.1	*	*	*	0.1[1]
Jan-16	0	-	-	-	0	0	-	-	-	0
Feb-16	0	-	-	-	0	0	-	-	-	0
Mar-16	0.1	*	*	*	0.01[1]	0	-	-	-	0
Apr-16	0	-	-	-	0	3.7	*	*	*	0.4[1]
May-16	0.1	*	*	*	0.01[1]	0	-	-	-	0
Jun-16	64.1	*	*	*	6.15[1]	0	-	-	-	0
Total	**64.3**				**6.17**	**258.1**				**20**
Mirrool Creek Floodway (MIRFLD) 41010163						* Probe out of water	** Equip malfunction			
Total	**281.2**	**264.1**	one EC reading during flow		**47.5**	[1] Salt load determined using discharge average of 150 µS/cm				

4.3 Salt balance

The basic salt balance presented in Table 23 suggests that of the 50,696 tonnes of salt received through diversions recorded at MI's authorised supply works, 201 tonnes was discharged back to the river, leaving an estimated balance of 50,495 tonnes of salt retained within the MIA. It is important to note that this is a simple salt balance that considers salt loads entering and leaving the MIA via extraction and discharge points only and does not account for salinity losses to shallow groundwater tables or takes into account other factors that impact total salt loads in the MIA.

Table 23 Salt balance for 2015/15 (t)

Extracted	Salt load (t)
STUR	10,939
NARREG	39,758
Total extracted	**50,696**
Discharged	**Salt load (t)**
YMS	10.1
GMSRR	6.2
LAG	117
ROCUDG	20
MIRFLD	48
Total discharged	**201**
Balance	**50,495**

4.4 Salinity targets

As set out in our Network Service Plan (pg.7, *2.4 Water Quality)* MI endeavours to maintain Electrical Conductivity (EC) levels below 700 µS/cm for water diverted to Wah Wah customers, downstream of BBSW. This salinity target was achieved during 2015/16 sites monitored at and downstream of BBSW.

5 Groundwater conditions

5.1 Groundwater Monitoring and Reporting

A total of 641 piezometers are listed in Schedule 2 of the Combined Approval and the locations of these bores are displayed in Figure 10. A current listing and condition of each of piezometer is provided in Appendix 1. In 2015/16, 578 piezometers returned a reading, which equates to 92.5% of the total piezometer network listed in Schedule 1.

Table 24 Groundwater piezometer status summary

Total bores	Total destroyed	Total dry	Total read	Total unable to read
641	35	14	593	48

Groundwater levels and EC are measured in September to give insight into groundwater levels prior to the irrigation season and again in March to identify regional groundwater trends. The network consists of piezometers in the Shallow and deep Shepparton Formation and a smaller monitoring network in the Calivil Formation.

Depth to water table maps have been developed to report changes in groundwater levels from September to March for 2015/16, 2013/14, 2012/13, and 2005/2006. The historical year 2005/06 was chosen as this was the peak of the drought for the MIA. EC maps have also been developed to report changes in groundwater salinity from September to March for 2015/16, 2014/15, 2013/14 and for September only in 2002 and 1980. Due to the limited data sets from 2005/06, data from 2002 and 1980 was chosen to represent suitable comparisons for salinity changes from a historical perspective.

In consultation with DPI Water, an alternative presentation format for requirement 1 of Attachment 2 of the Combined Approval was agreed upon to better represent the water table depth data for the rationalised bore network for 2015/16. It was also agreed that due to accuracy limitations for calculating groundwater depth areas, requirement 3 and 4 would be removed from the 2015/16 reporting requirement. A copy of this consent from DPI Water is available upon request.

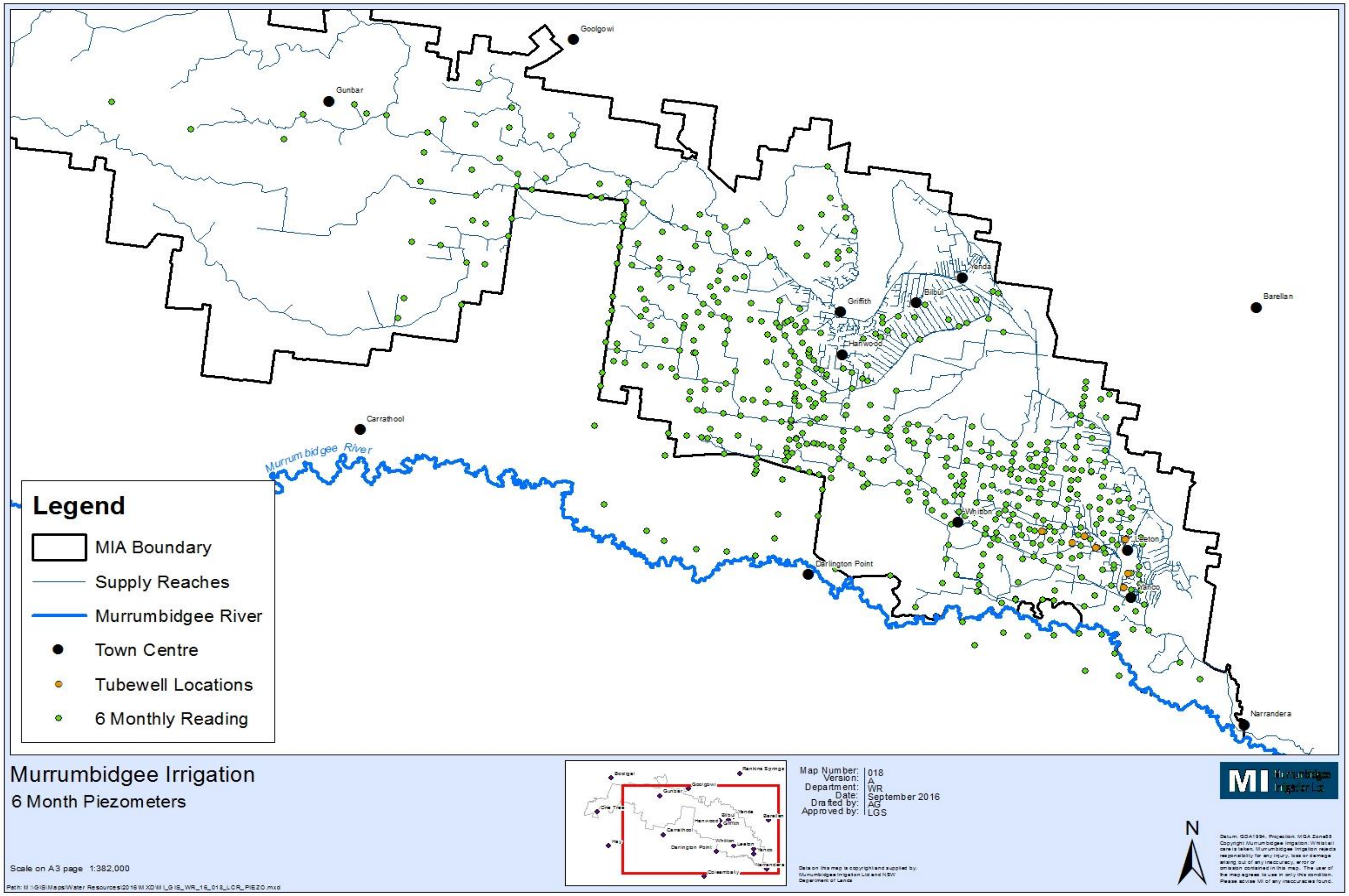


Figure 10 Location of piezometers and tubewells in the MIA 2015/16

5.2 Shallow Shepparton Formation

5.2.1 Groundwater levels

Depth to water table maps for the shallow Shepparton Formation are presented in reporting years in Figures 11 to 18. Groundwater levels in this formation are expected to be highly influenced by seasonal rainfall and in part, irrigation. Due to on farm water use efficiencies and changes in land management practices, the impact on groundwater from irrigation is likely to be minimal. The maps for the shallow Shepparton from September to March for each reporting year show an increase in groundwater levels, driven by season rainfall and irrigation. The presentation format for 2015/16 provides a clear view of the change in groundwater levels and the marginal rise in localised areas from September to March. This rise coincides with the high rainfall recorded in December and January and peak irrigation season.

When compared to recent years, 2005/06 groundwater levels (Figure 17 and 18) in the shallow Shepparton Formation appear to be consistently deeper across the MIA, with only small areas with groundwater 1-3m below surface level. This is likely a result of reduced recharge from rainfall and increased groundwater pumping in response to drought conditions in 2005/06.

2015/16

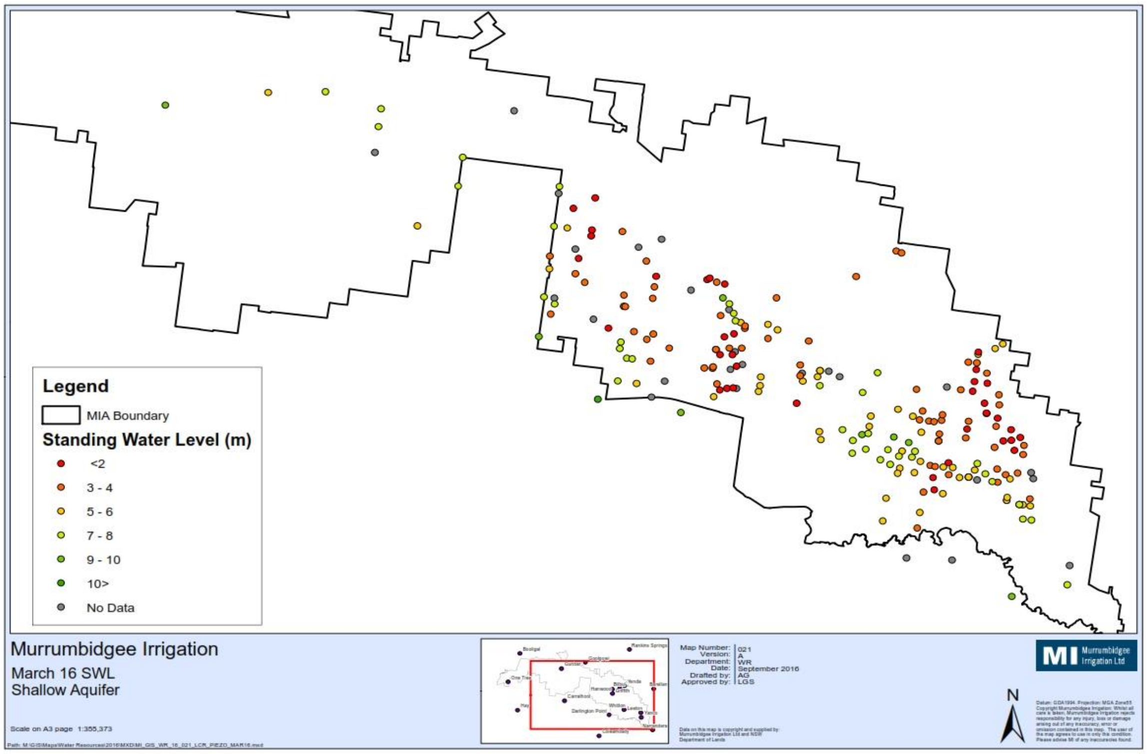


Figure 11 Depth (m) to water table in the Shallow Shepparton Formation, March 2016

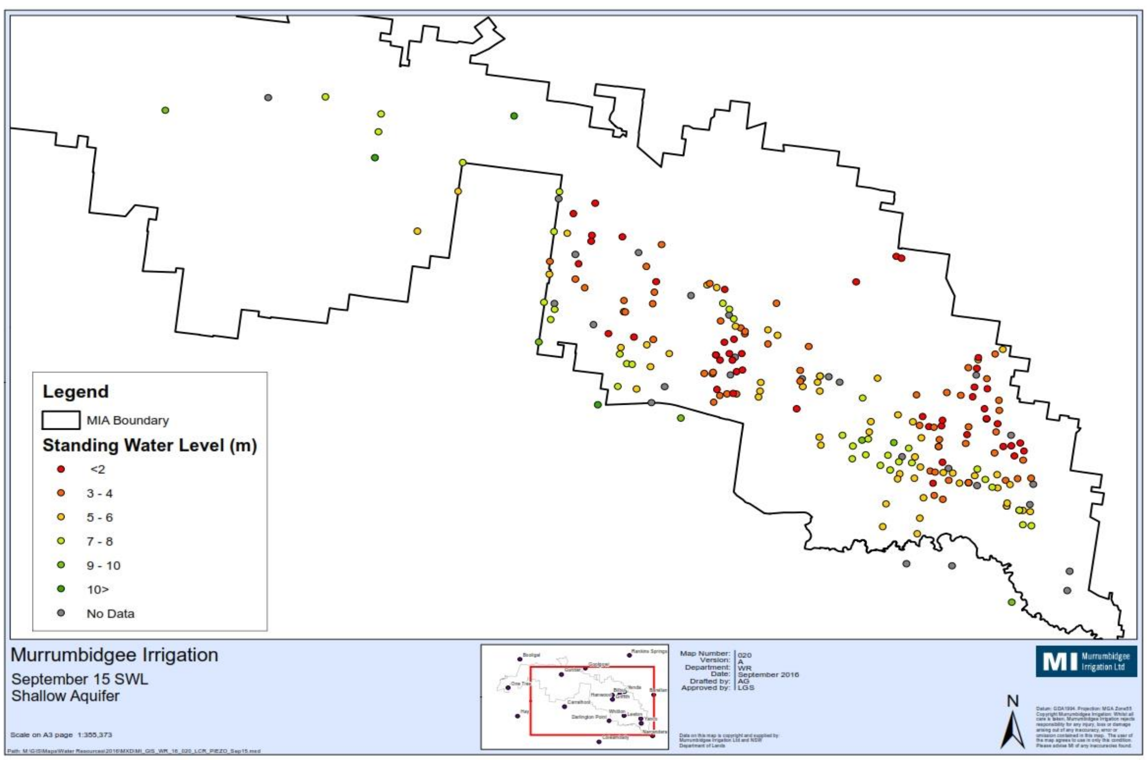


Figure 12 Depth (m) to water table in the Shallow Shepparton Formation, September 2015

2014/15

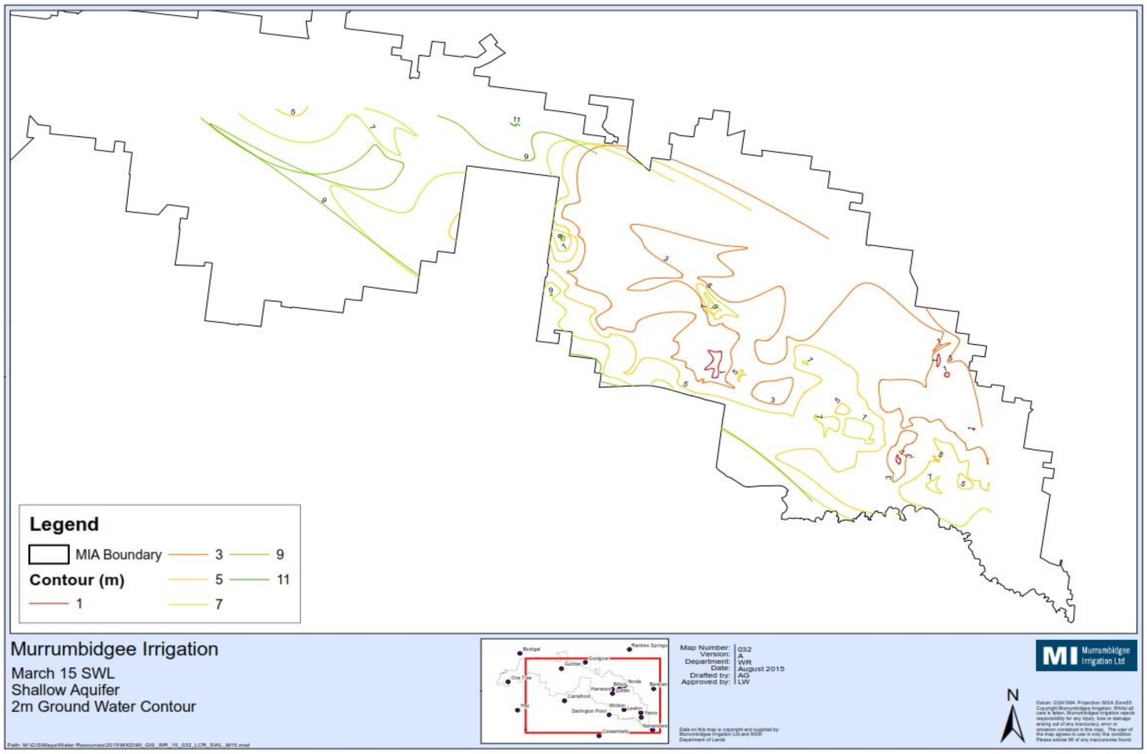


Figure 13 Depth (m) to water table in the Shallow Shepparton Formation, March 2015

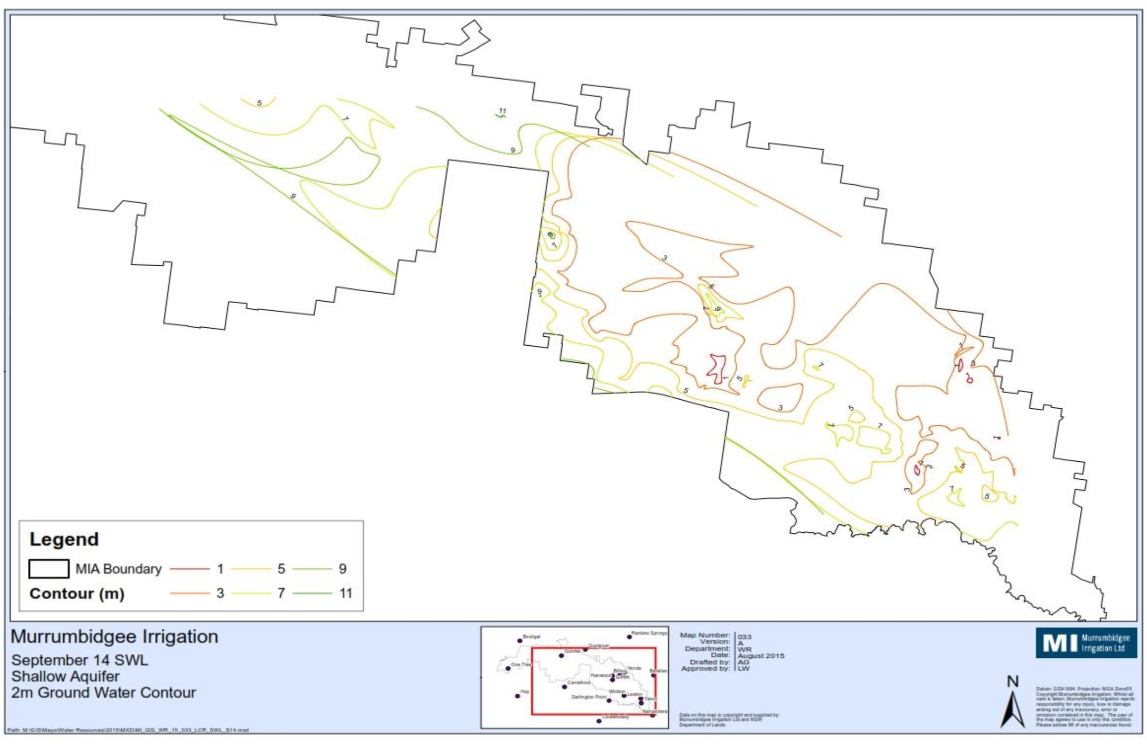


Figure 14 Depth (m) to water table in the Shallow Shepparton Formation, September 2014

2013/14

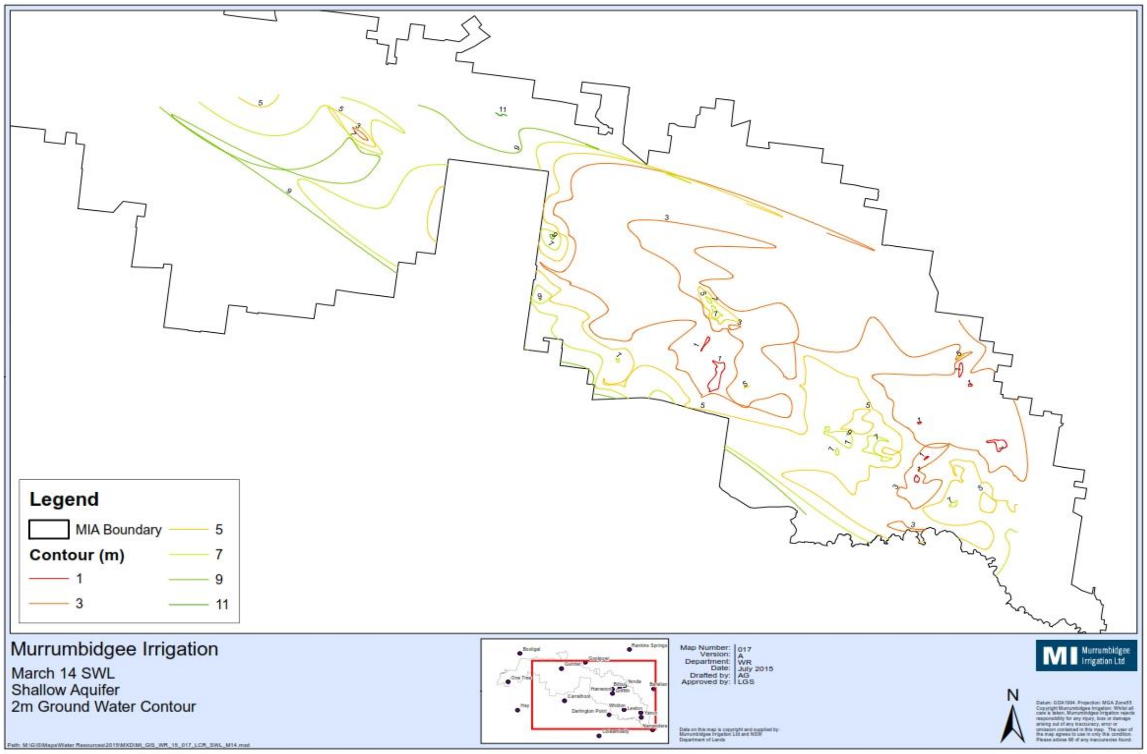


Figure 15 Depth (m) to water table in the Shallow Shepparton Formation, March 2014

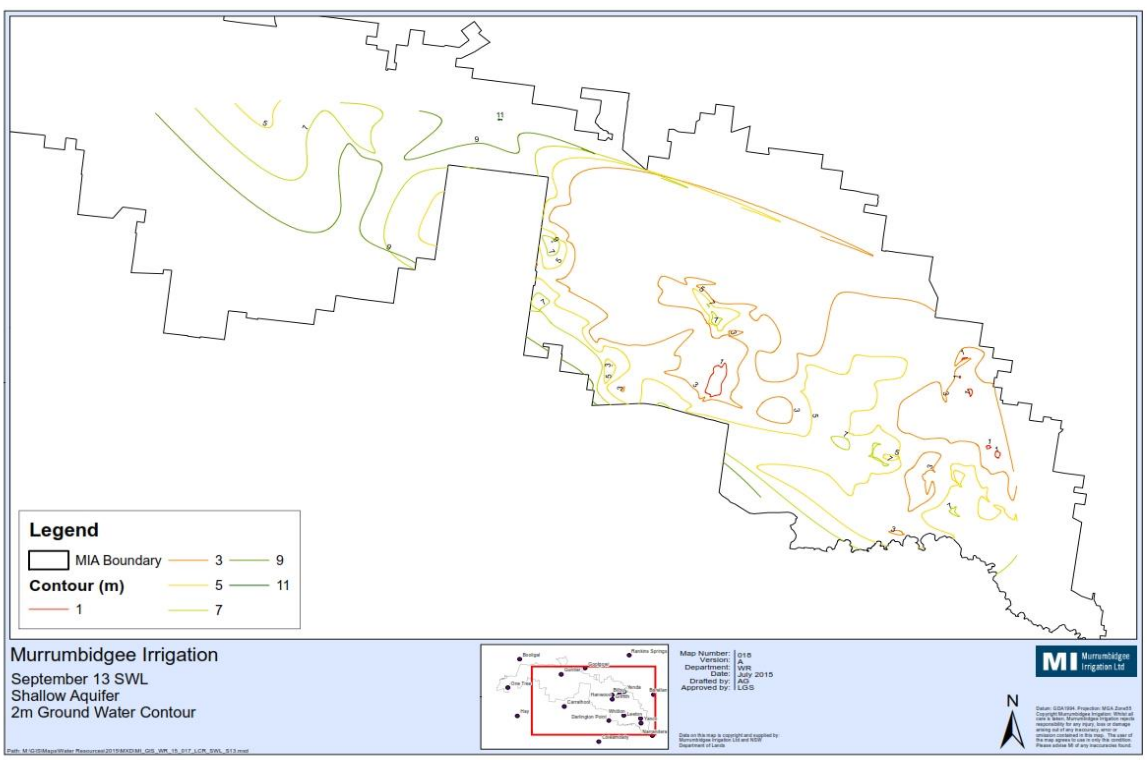


Figure 16 Depth (m) to water table in the Shallow Shepparton Formation, September 2013

2005/06

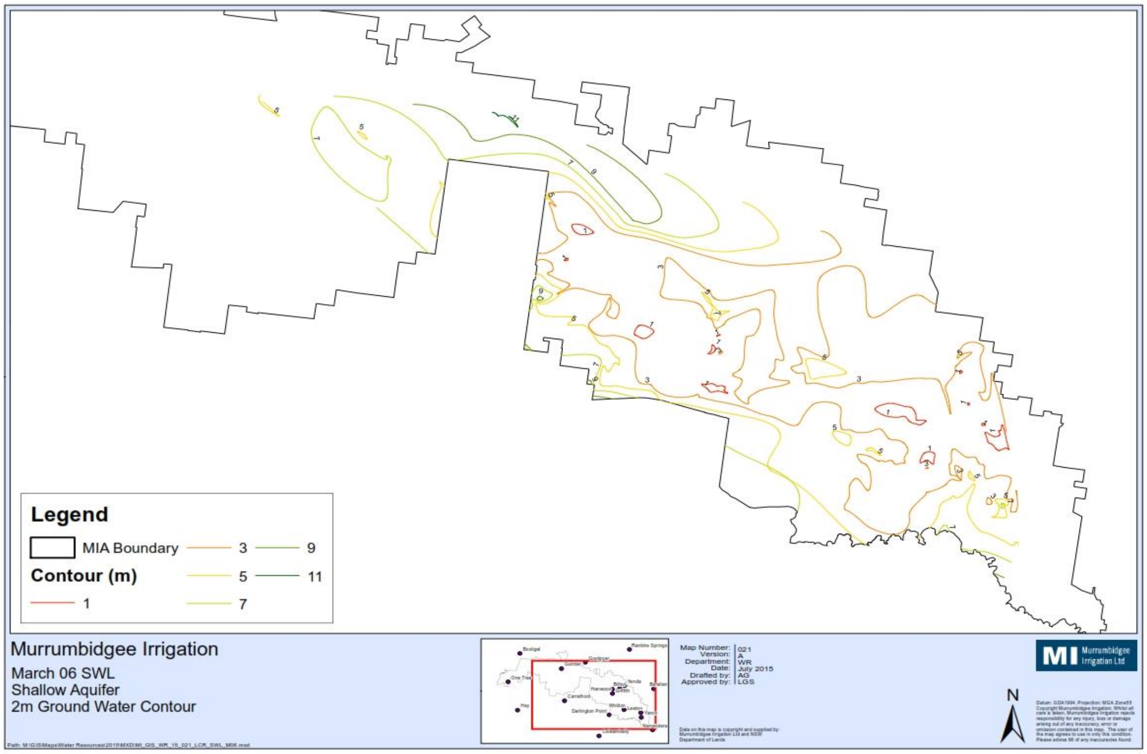


Figure 17 Depth (m) to water table in the Shallow Shepparton Formation, March 2006

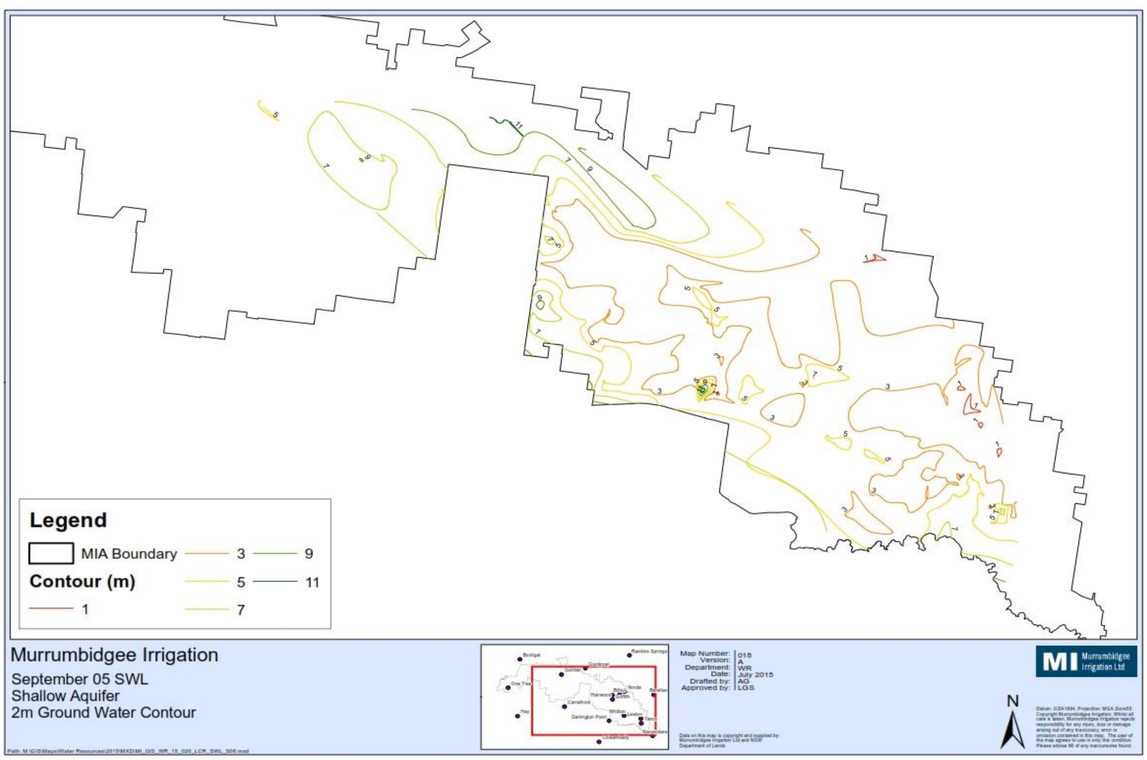


Figure 18 Depth (m) to water table in the Shallow Shepparton Formation, September 2005

5.2.2 Groundwater salinity

Groundwater salinity interval areas (ha) for September are shown in Table 27 with figures presenting a positive trend in groundwater quality. In reference to both historical years, the area of groundwater with high salinity has decreased and the area of lower salinity has increased. This shift in groundwater salinity may be a result of the fresh water recharge generated by rainfall events.

General salinity changes in the Shallow Shepparton Formation (Figure 19-26) from September to March for each reporting year show decreases in EC values across the MIA. These areas of reduced salinity correlate with an increase in groundwater levels, highlighting potential recharge areas from irrigation and rainfall.

Table 25 Groundwater salinity area (ha) for the shallow Shepparton formation, using September data

Year	0-2000 (µS/cm)	2001-5000 (µS/cm)	5001-10000 (µS/cm)	10001-20000 (µS/cm)	20001-30000 (µS/cm)	30001-40000 (µS/cm)	>40000 (µS/cm)
2015/16	230,527	118,258	19785	3322	98	0	0
2014/15	218,000	149,000	6,000	0	0	0	0
2013/14	167,000	144,700	14,000	4,000	0	0	0
2002	85,600	210,000	74,500	6,057	550	60	
1980	41,000	160,000	121,000	16,500	1,150	450	N/A

NB. Figures are estimations only which have been generated using a GIS tool and provides limited accuracy.

Figure 25 and 26 present groundwater EC for September 2002 and 1980, both of which show larger areas of higher EC when compared to September EC values recorded in recent years (Figure 19-24). This indicates that groundwater quality has improved across the MIA.

Salinity readings in close proximity to the Murrumbidgee River are consistently low in EC for historical and recent reporting years, suggesting there is a significant source of recharge from the Murrumbidgee River.

2015/16

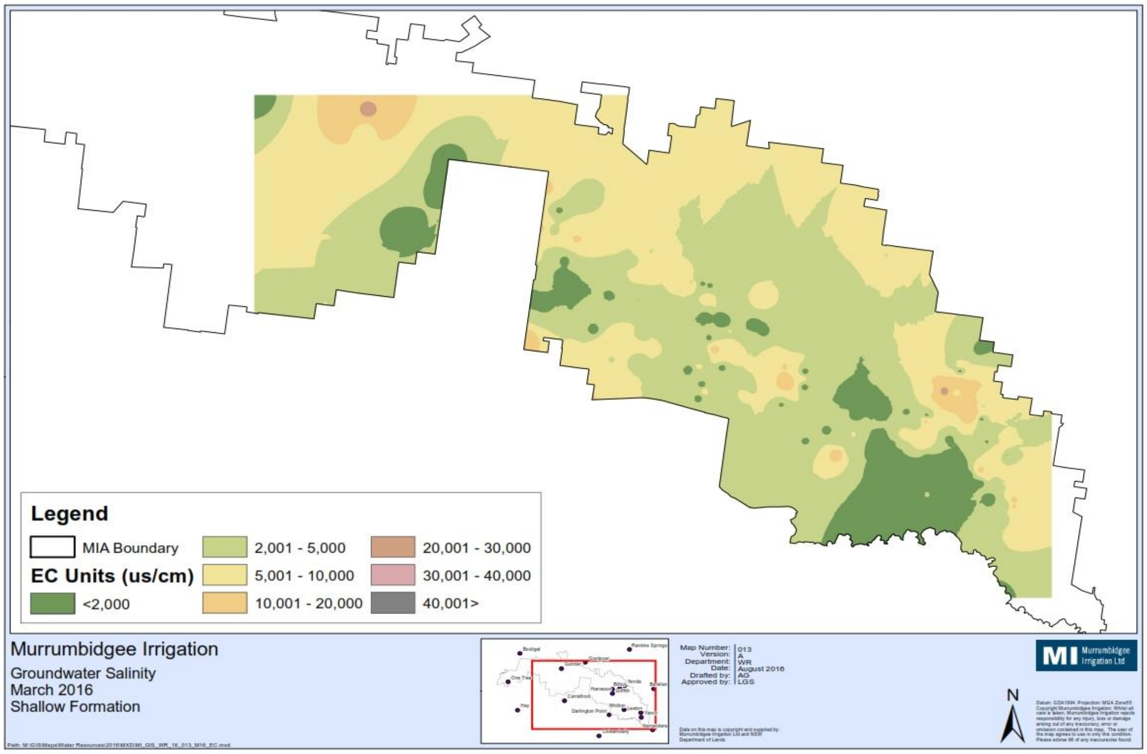


Figure 19 Groundwater salinity (µS/cm) in the Shallow Shepparton Formation, March 2016

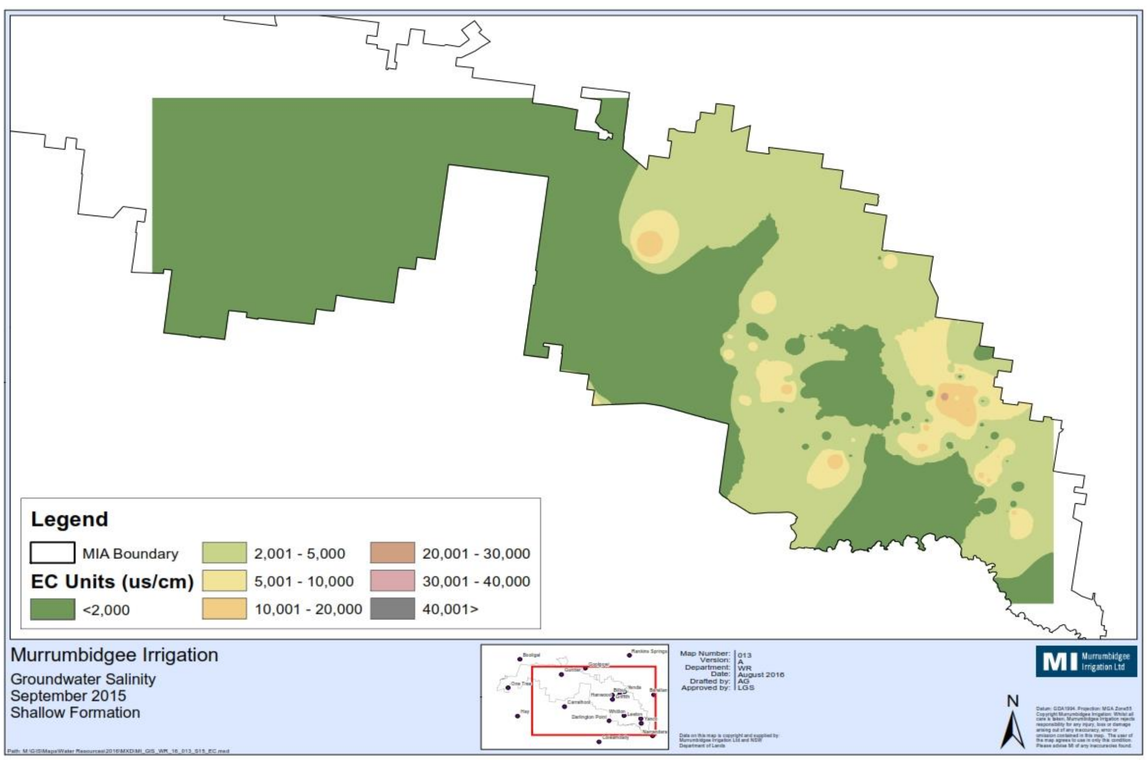


Figure 20 Groundwater salinity (µS/cm) in the Shallow Shepparton Formation, September 2015

2014/15

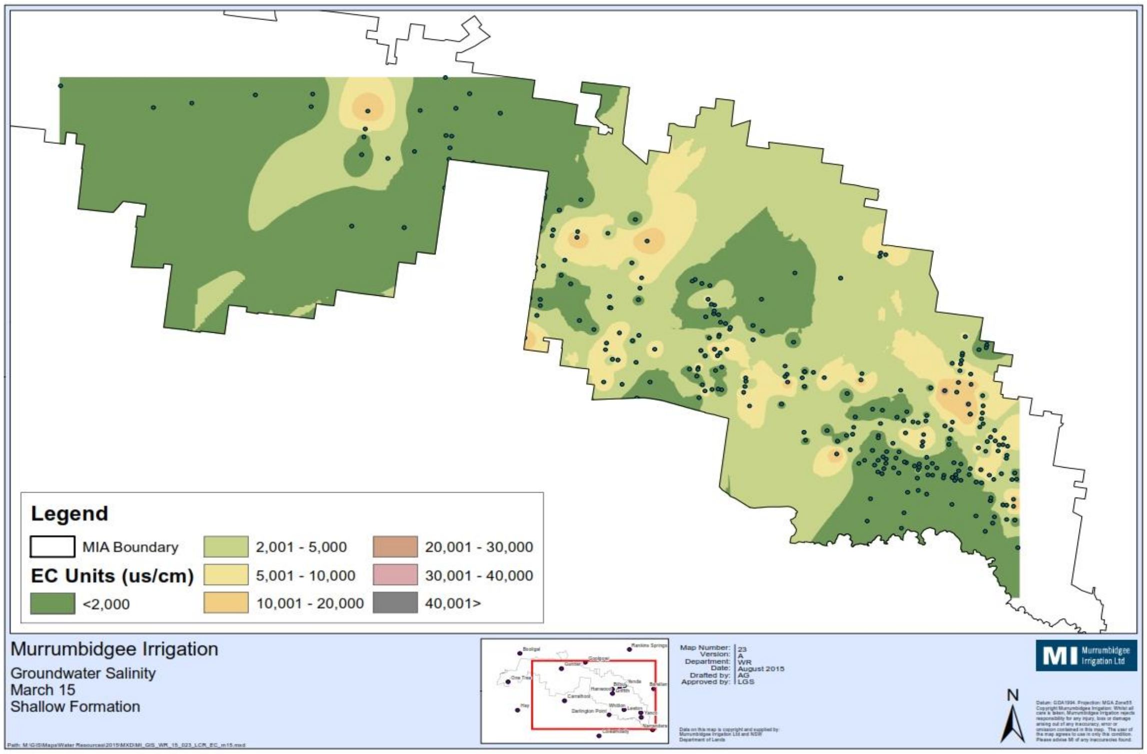


Figure 21 Groundwater salinity (µS/cm) in the Shallow Shepparton Formation, March 2015

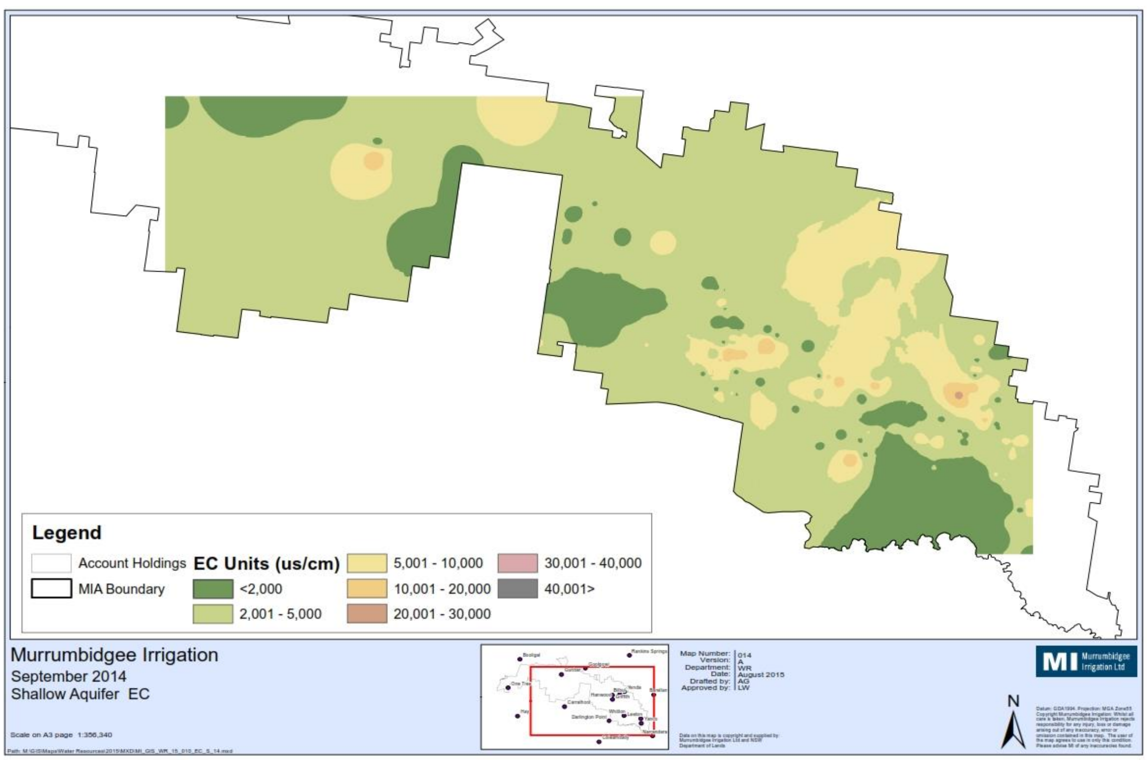


Figure 22 Groundwater salinity (µS/cm) in the Shallow Shepparton Formation, September 2014

2013/14

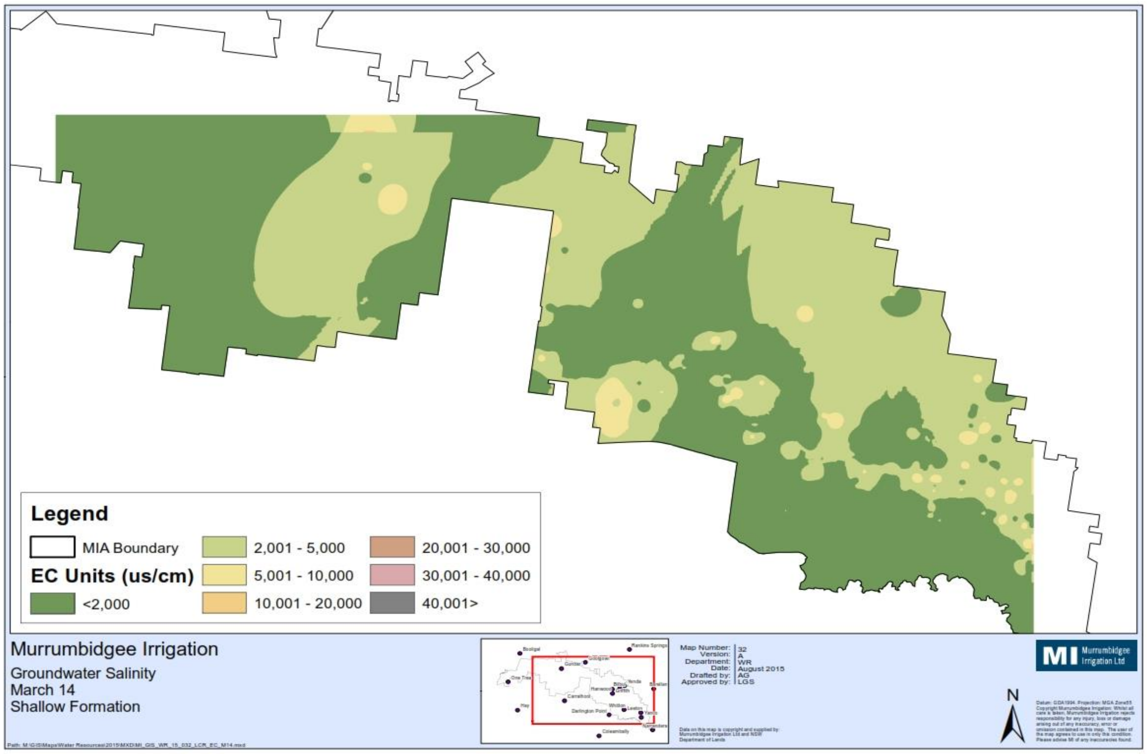


Figure 23 Groundwater salinity (µS/cm) in the Shallow Shepparton Formation, March 2014

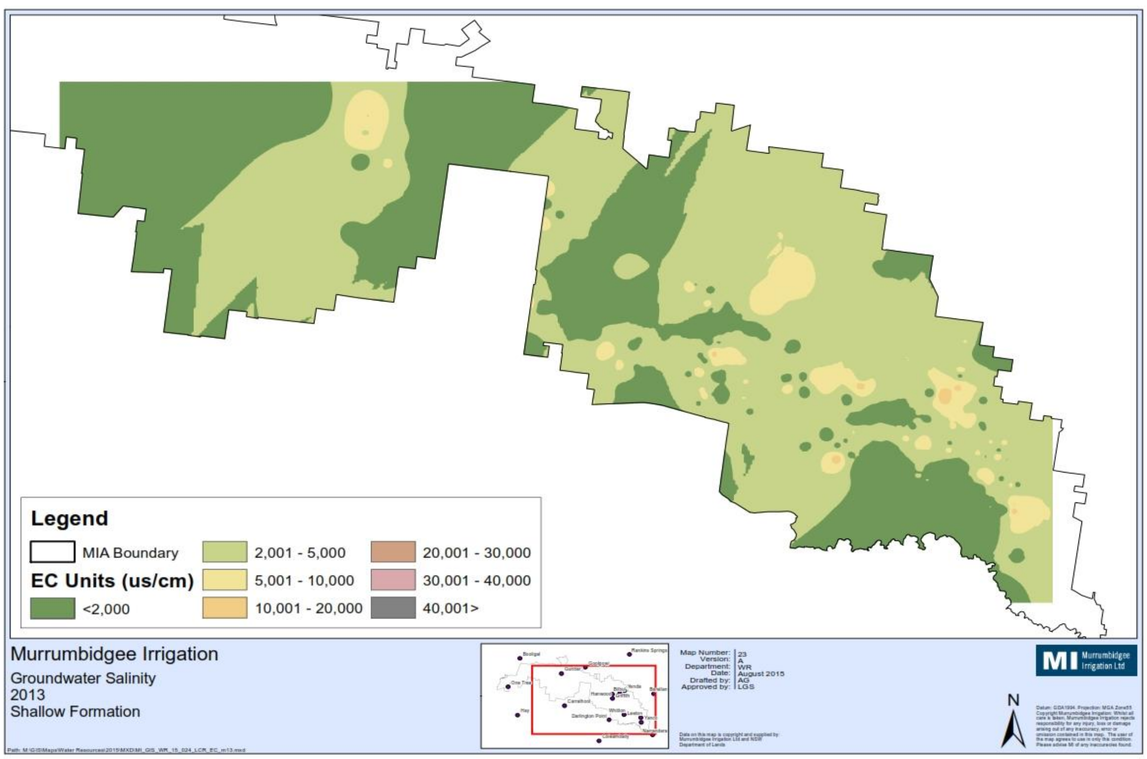


Figure 24 Groundwater salinity (µS/cm) in the Shallow Shepparton Formation, September 2013

1980/2002

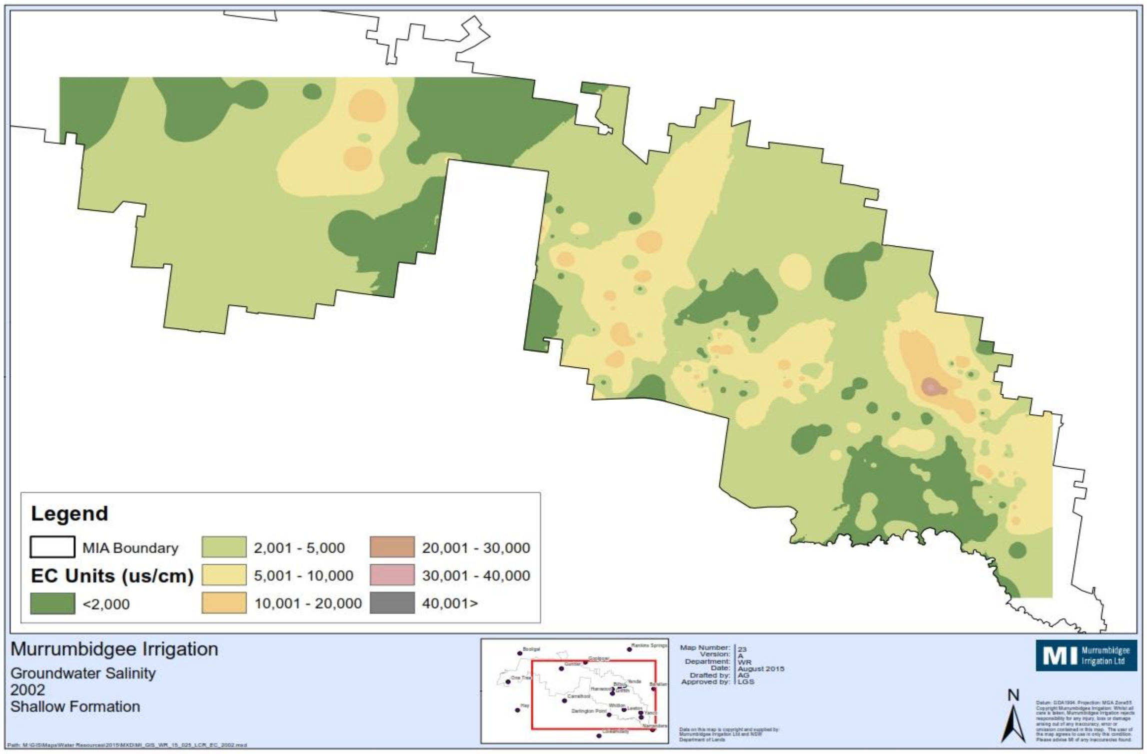


Figure 25 Groundwater salinity (µS/cm) in the Shallow Shepparton Formation, September 2002

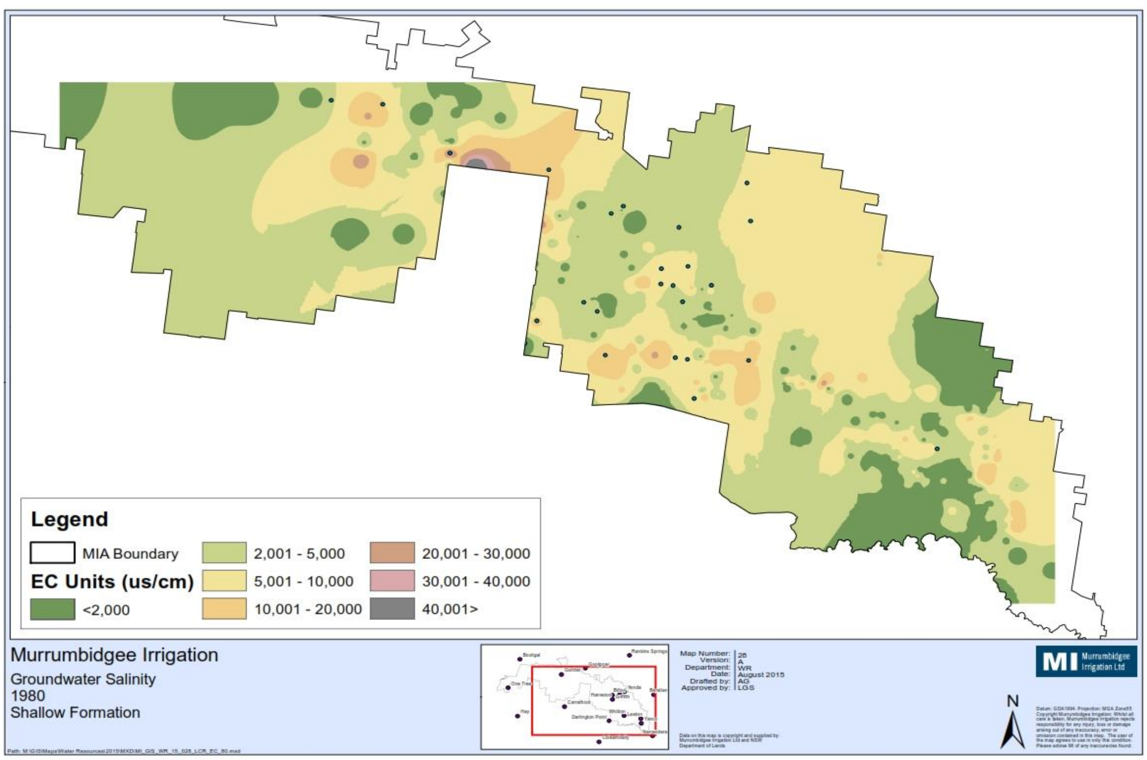


Figure 26 Groundwater salinity (µS/cm) in the Shallow Shepparton Formation, September 1980

5.3 Deep Shepparton Formation

5.3.1 Groundwater levels

Depth to water table maps for the deep Shepparton Formation are presented in Figures 27 to 34. Groundwater levels in the deep Shepparton Formation can be influenced by connectivity with the shallow Shepparton Formation, therefore the trends observed in the shallow Shepparton Formation also occur in the deep Formation. These maps also highlight the general east to west directional flow of groundwater across the area. The depth to water table maps show a consistent trend across the MIA for all reporting years, with slightly higher groundwater levels recorded in March when compared to levels recorded in September. In the alternative presentation format for 2015/16 seen in Figure 27 and Figure 28, it is clear to see that recharge areas are localised and that the rise is minimal.

2015/16

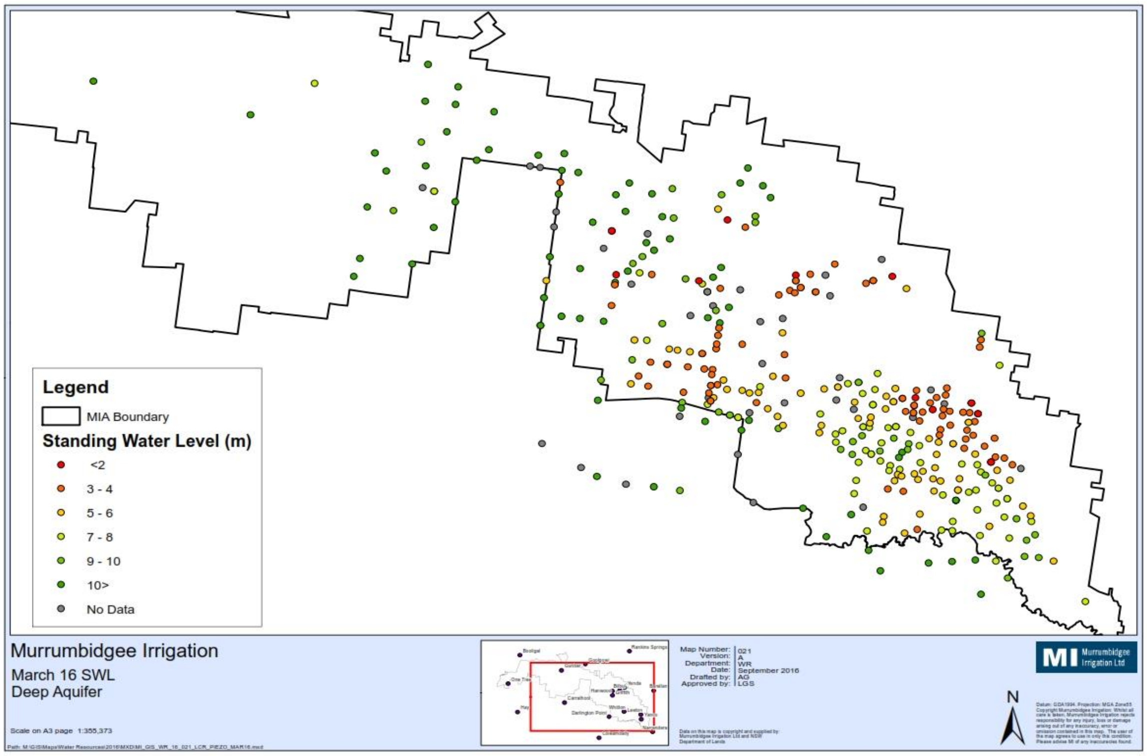


Figure 27 Depth (m) to water table in the Deep Shepparton Formation, March 2016

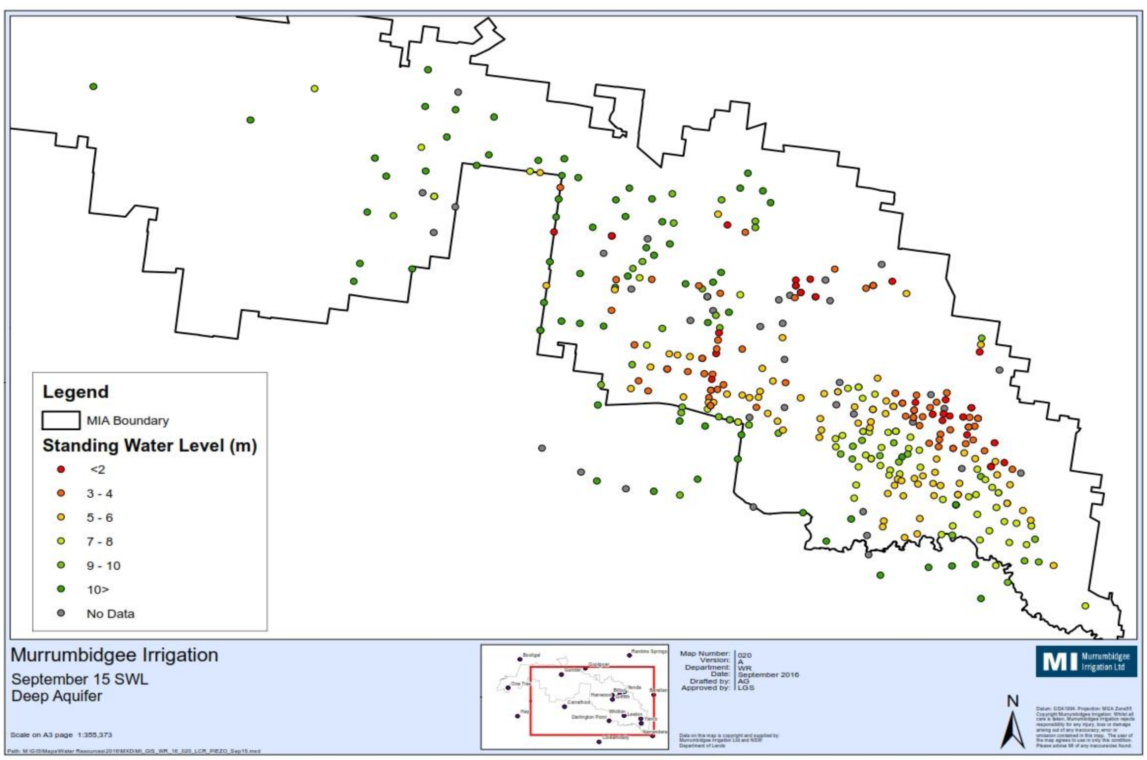


Figure 28 Depth (m) to water table in the Deep Shepparton Formation, September 2015

2014/15

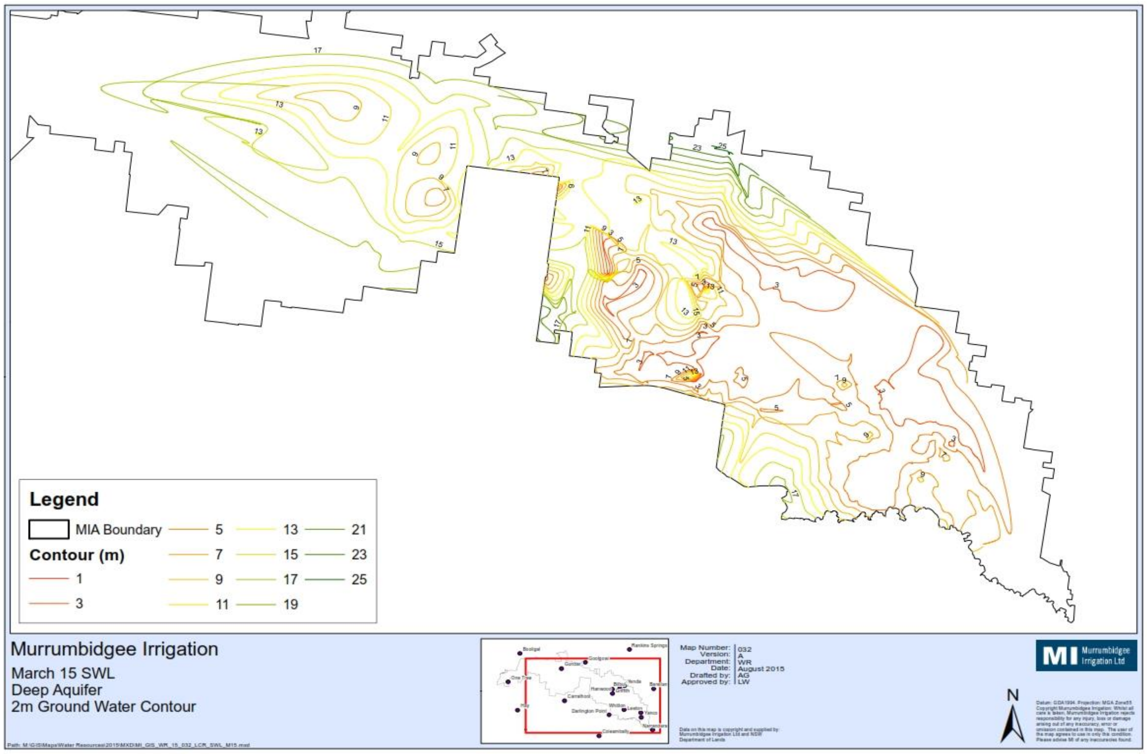


Figure 29 Depth (m) to water table in the Deep Shepparton Formation, March 2015

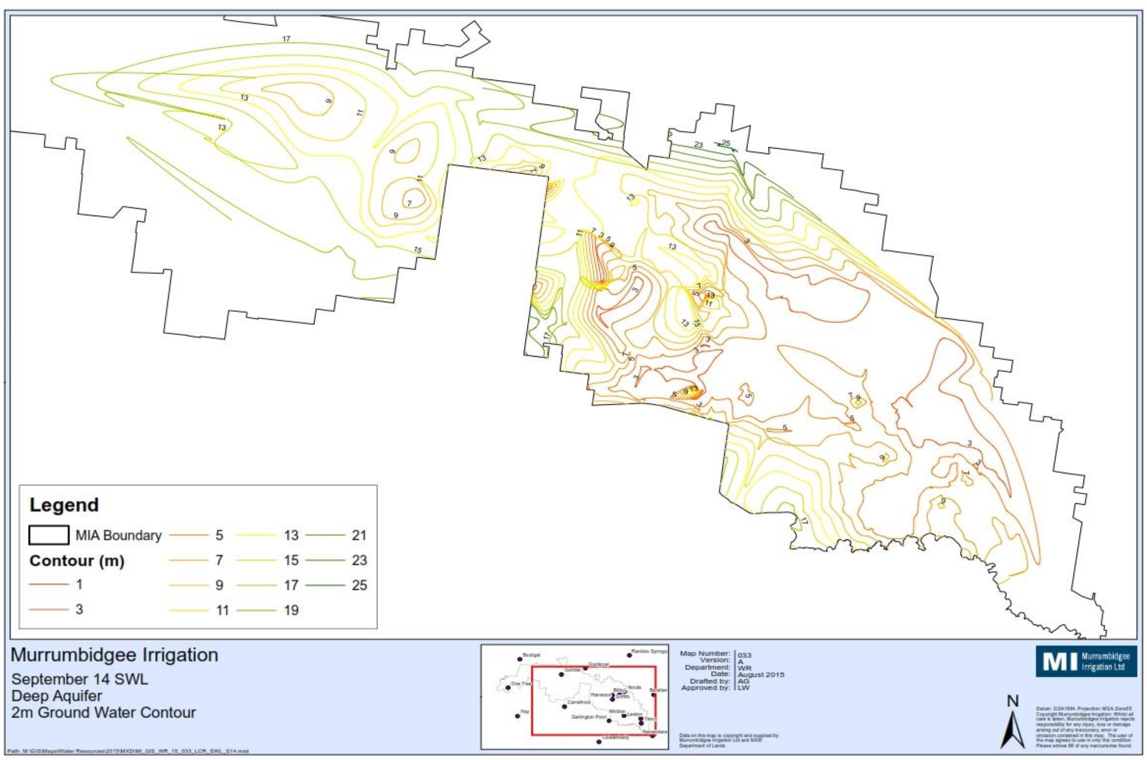


Figure 30 Depth (m) to water table in the Deep Shepparton Formation, September 2014

2013/14

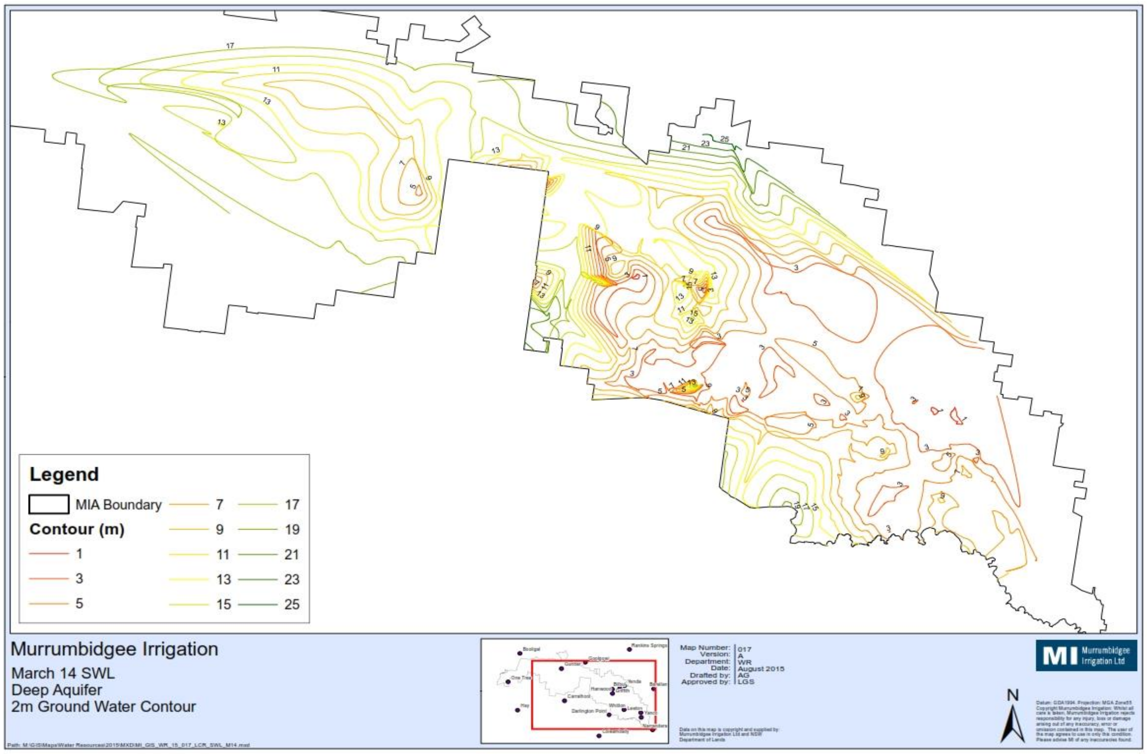


Figure 31 Depth (m) to water table in the Deep Shepparton Formation, March 2014

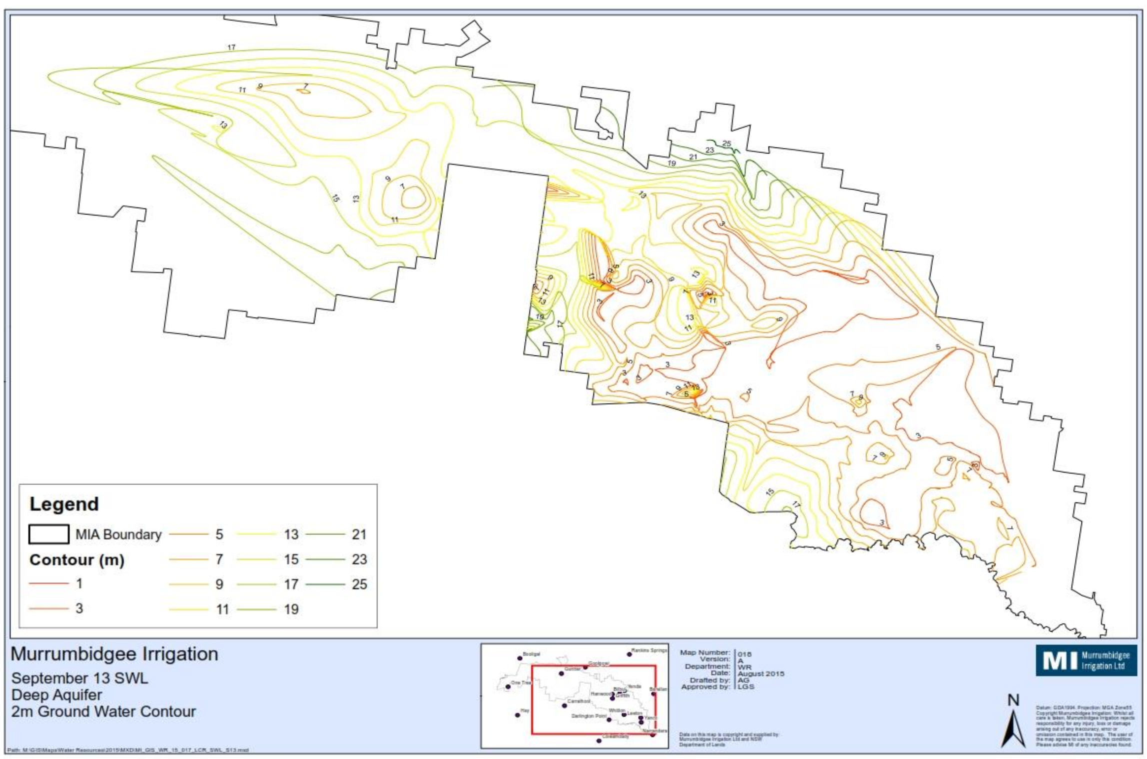


Figure 32 Depth (m) to water table in the Deep Shepparton Formation, September 2013

2005/06

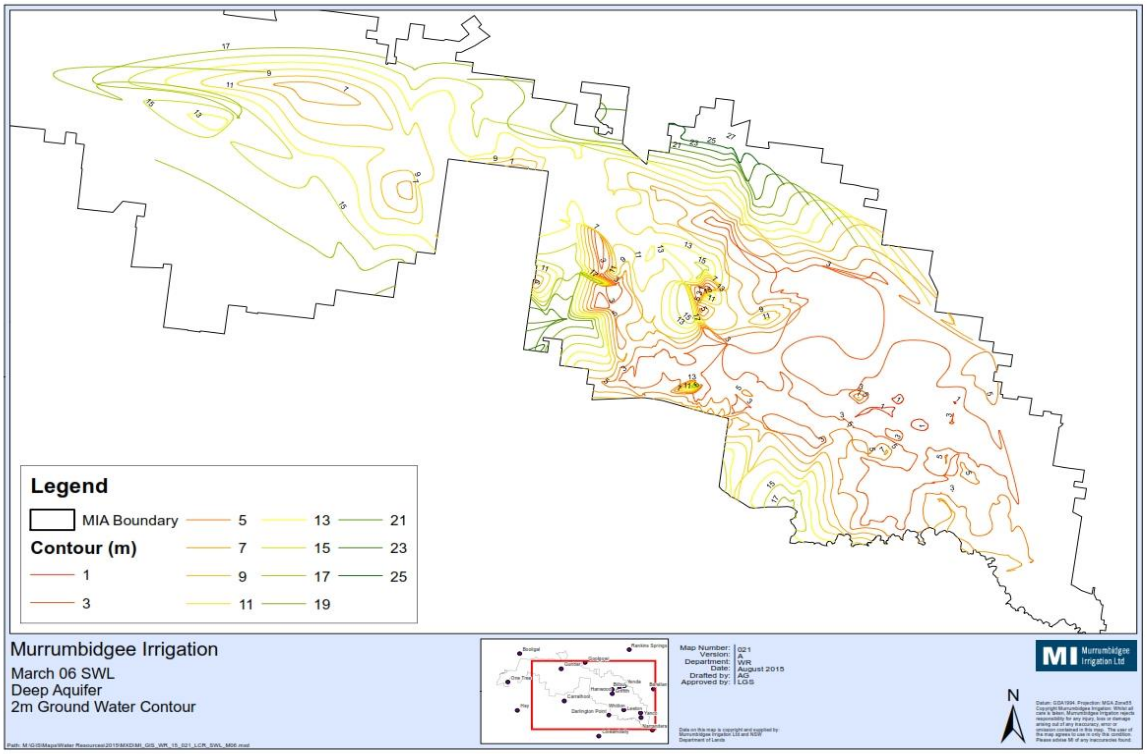


Figure 33 Depth (m) to water table in the Deep Shepparton Formation, March 2006

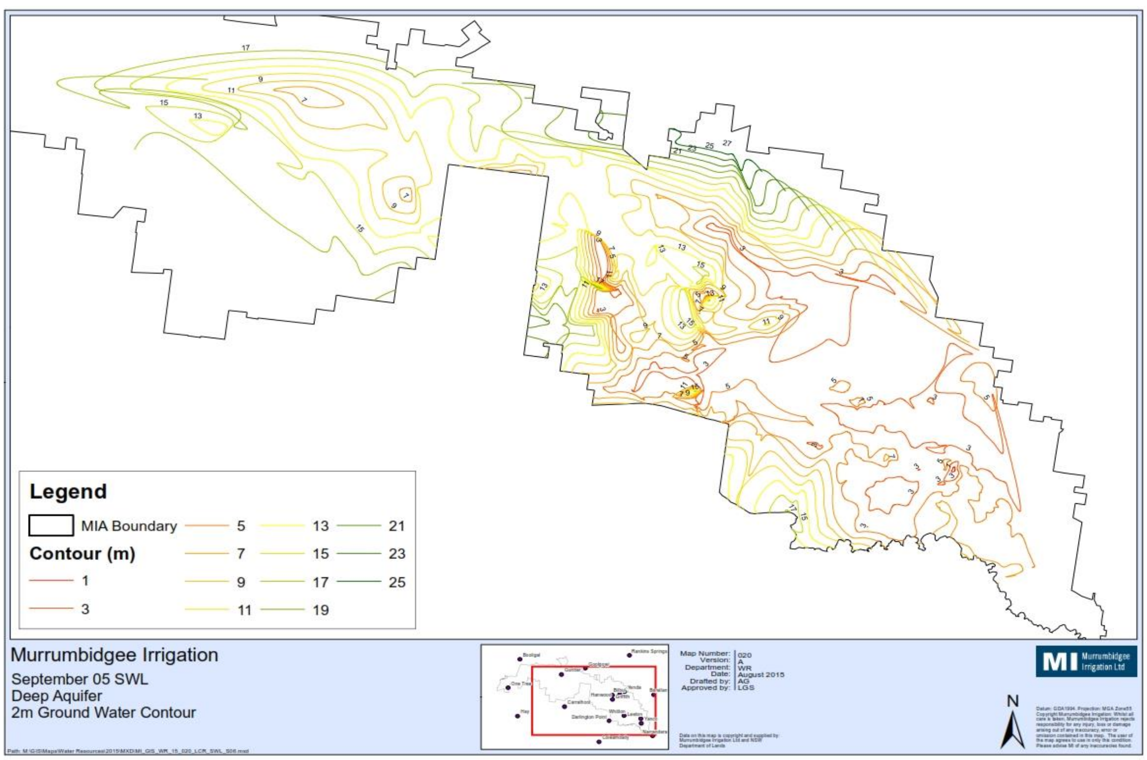


Figure 34 Depth (m) to water table in the Deep Shepparton Formation, September 2005

5.3.2 Groundwater salinity

Figures 35 to 42 show the salinity changes in the Deep Shepparton Formation. Salinity changes in the Deep Formation mirror changes shown in the Shallow Formation with lower EC values recorded following the irrigation season. The change in EC from September 15 (Figure 36) to March 16 (Figure 35) suggest that water quality is digressing to a more saline state, similar to those observed in historical reference years. The 2014 September EC readings (Figure 34) are comparable to both historical references, whereas EC readings for September 2013 (Figure 36) are considerably lower across the MIA, likely caused by recharge from the 2012 flood.

High saline areas are observed in the Mirrool Irrigation Area and Benerembah Irrigation District, again, with the exception of 2013/14 reporting year, where lower EC values are observed in these areas. Due to the attenuation time for groundwater to infiltrate through layers or for gradient movement across the MIA, groundwater changes can be seen long after a flood event has occurred. The flood that occurred in 2012 is likely the cause of these lower EC values recorded in 2013/14.

2015/16

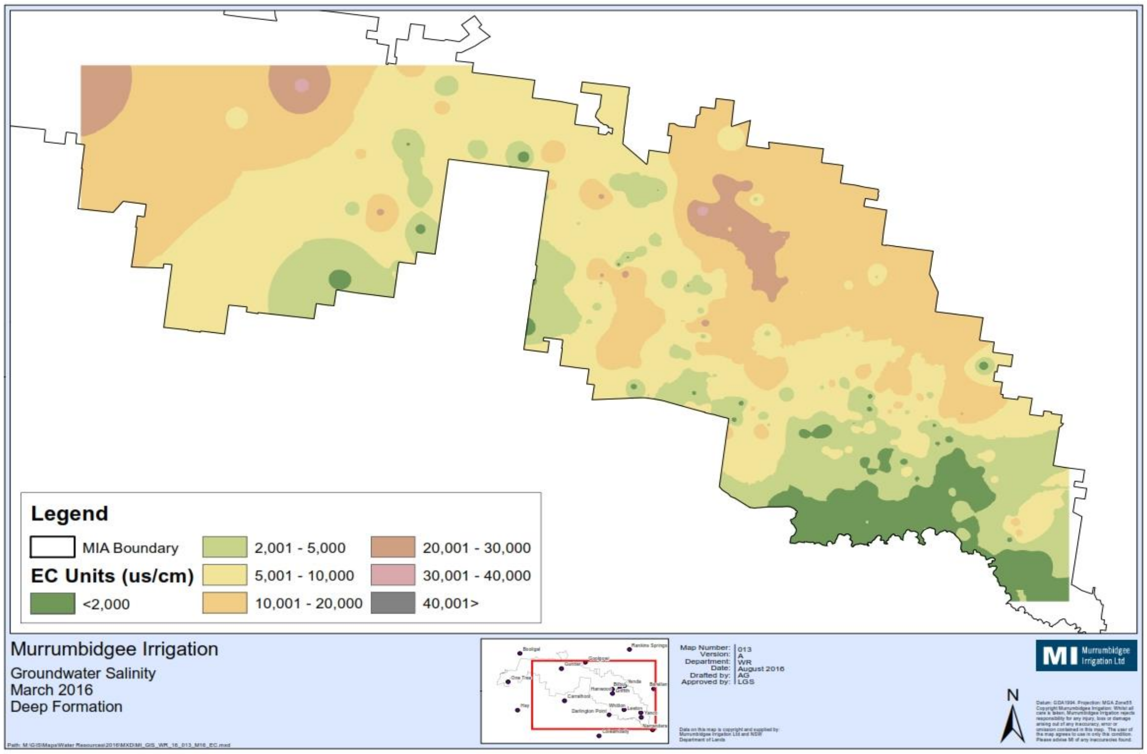


Figure 35 Groundwater salinity (µS/cm) in the Deep Shepparton Formation, March 2016

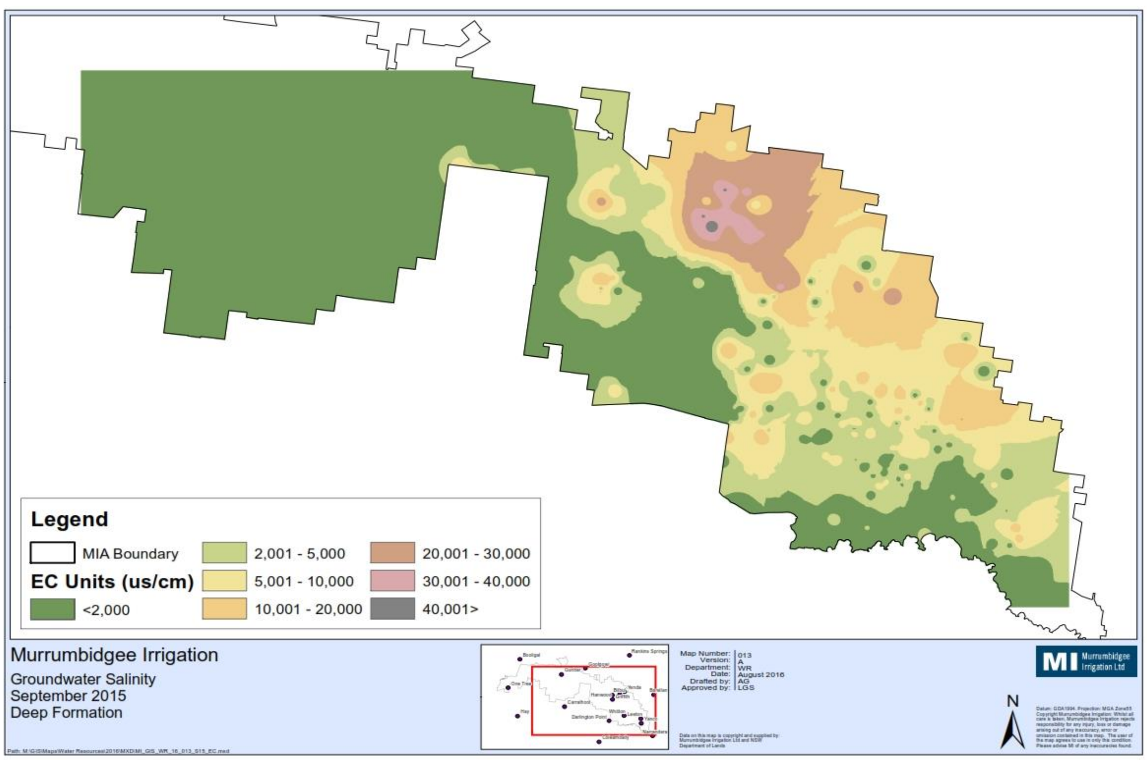


Figure 36 Groundwater salinity (µS/cm) in the Deep Shepparton Formation, September 2015

2014/15

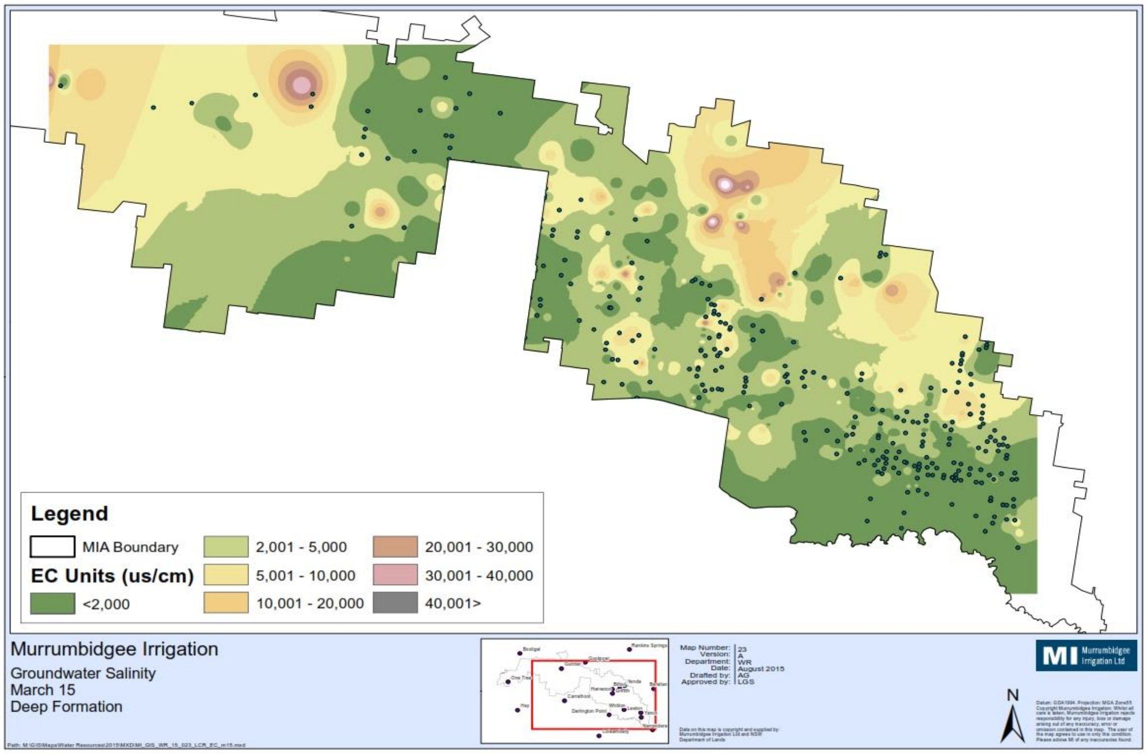


Figure 37 Groundwater salinity (µS/cm) in the Deep Shepparton Formation, March 2015

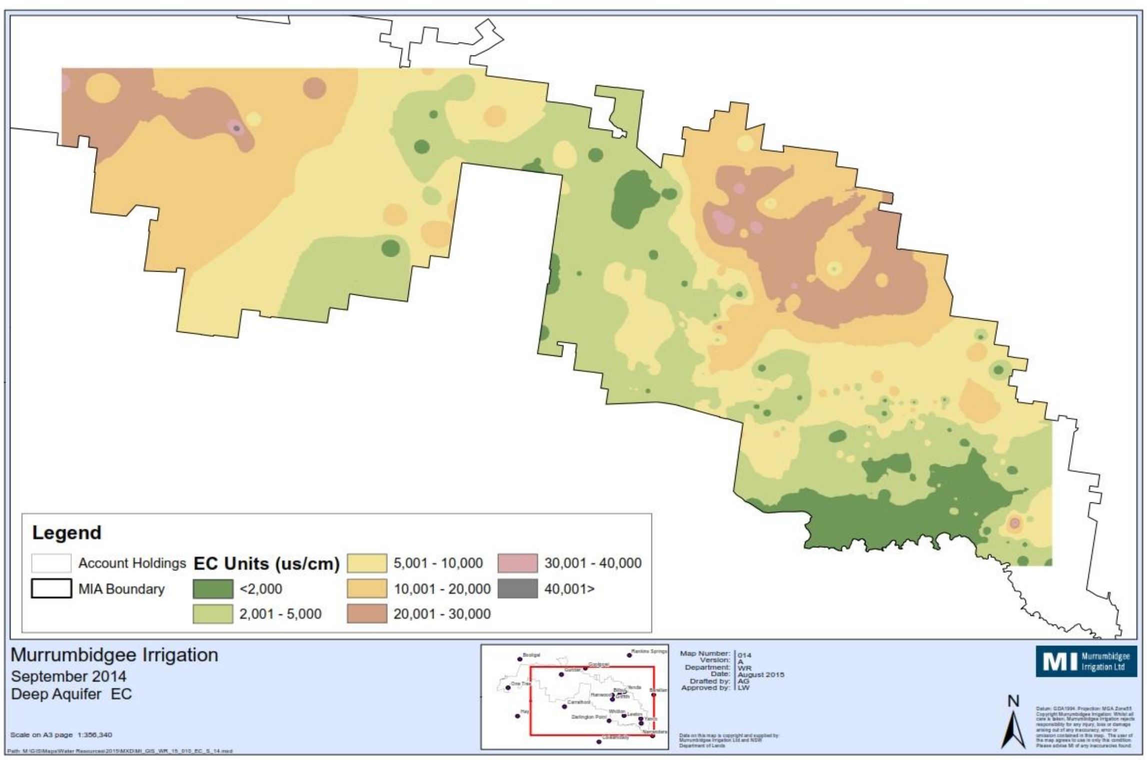


Figure 38 Groundwater salinity (µS/cm) in the Deep Shepparton Formation, September 2014

2013/14

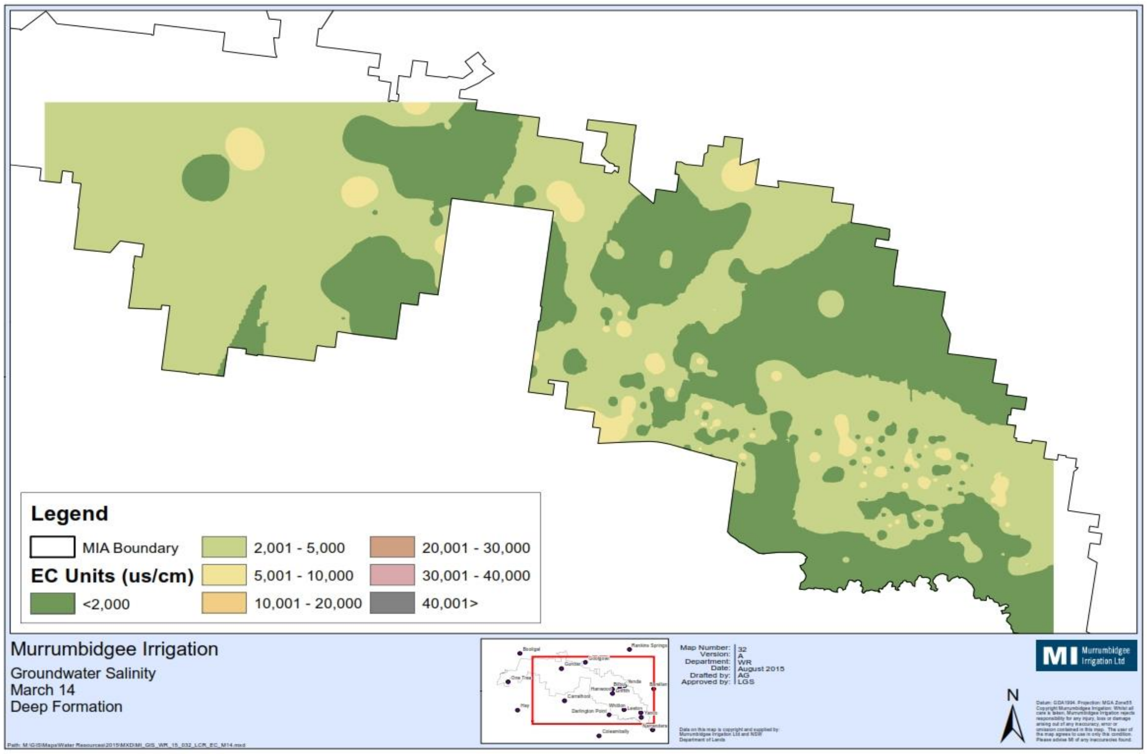


Figure 39 Groundwater salinity (µS/cm) in the Deep Shepparton Formation, March 2014

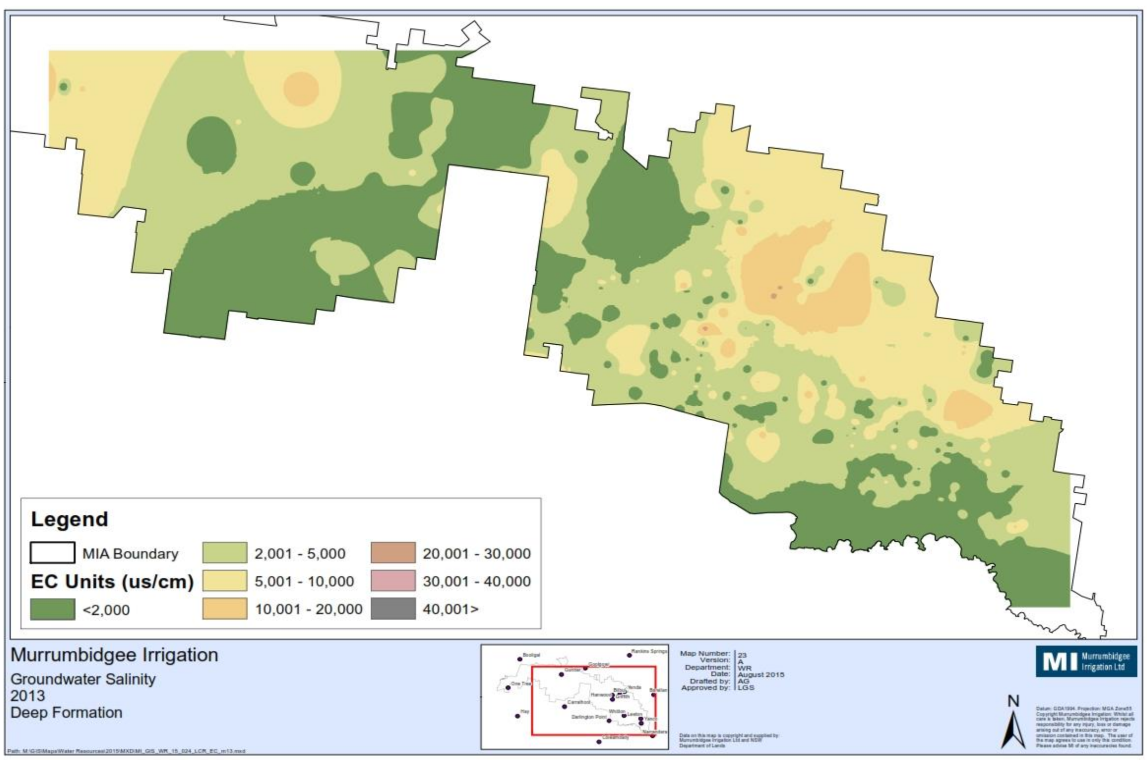


Figure 40 Groundwater salinity (µS/cm) in the Deep Shepparton Formation, September 2013

2005/06

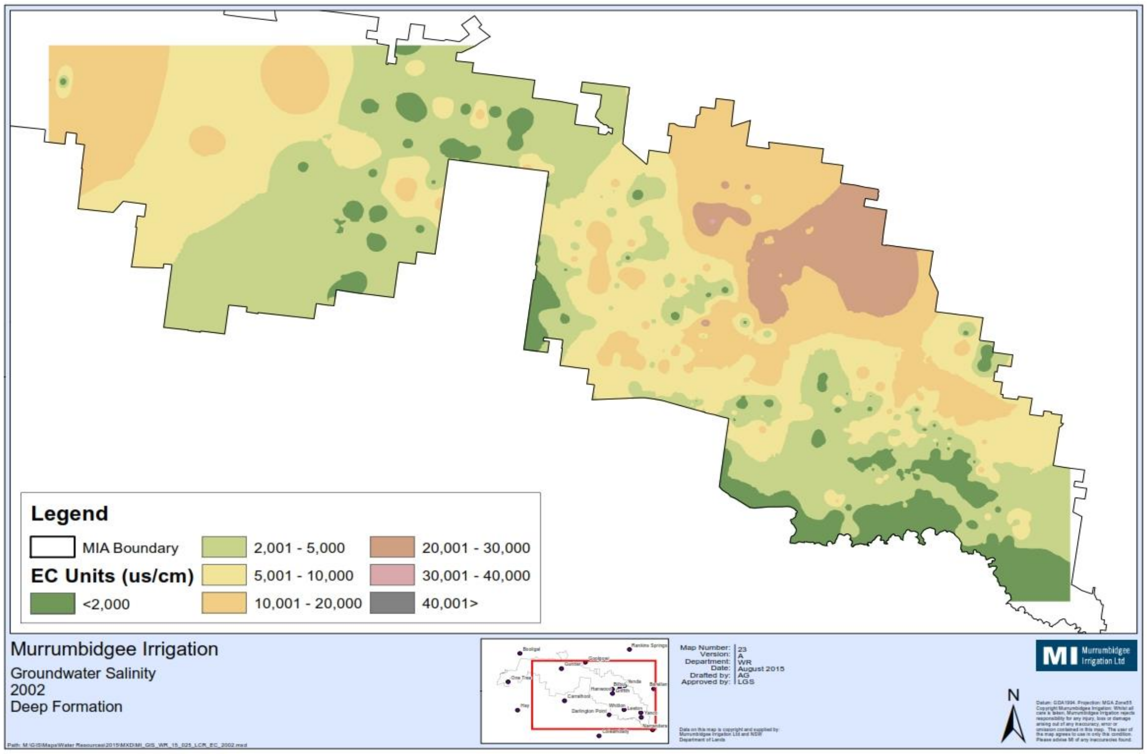


Figure 41 Groundwater salinity (µS/cm) in the Deep Shepparton Formation, September 2002

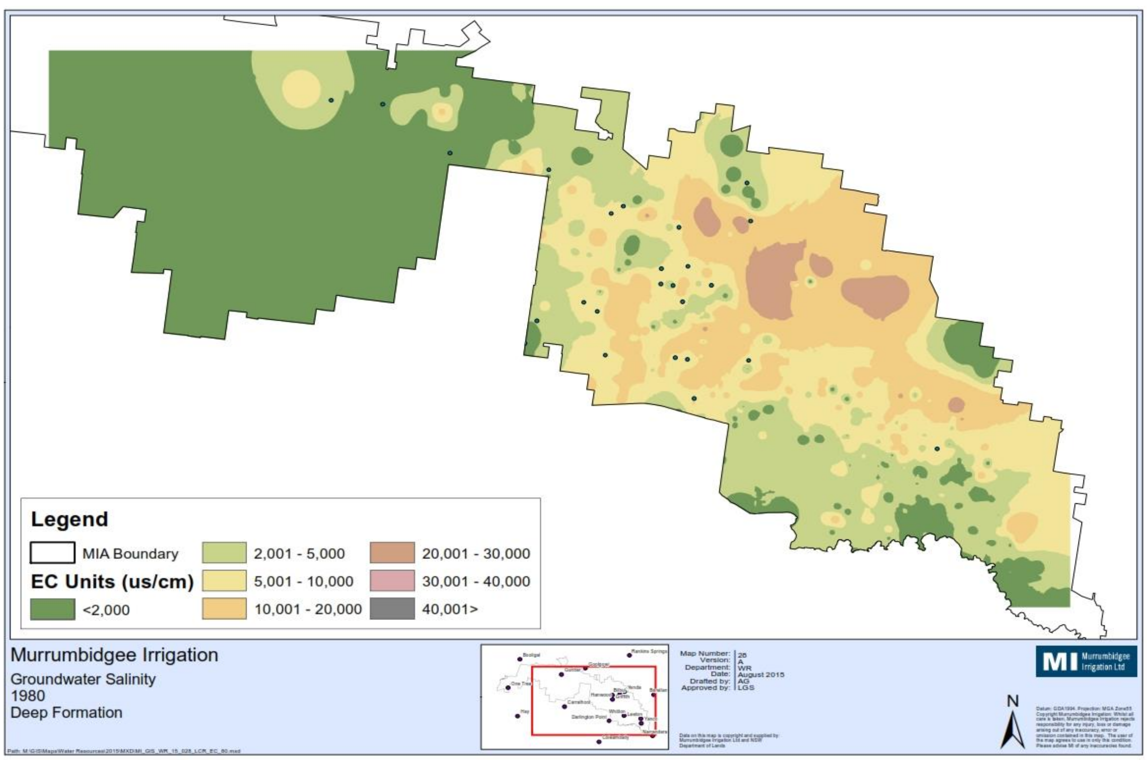


Figure 42 Groundwater salinity (µS/cm) in the Deep Shepparton Formation, September 1980

5.4 Calivil Formation

5.4.1 Groundwater levels

Depth to water table maps for the Calivil Formation are presented in Figures 43 to 50. Level trends in this formation generally represents drawdown from shallow aquifers which will display a time lag effect when compared to level trends in upper aquifers. Data for 2015/16 and 2014/15 shows minimal change to groundwater level from September to March, suggesting that this formation is not easily influenced by the upper formations.

However, the increased levels seen in 2012/13 (post flood) suggests that the Calivil Formation may be influenced by large flooding events, either through direct recharge, aquifer exchange or, to a lesser degree, vertical seepage from the above Shepparton Formation. However, due to the limited number of bores monitored in this formation, it is difficult to ascertain the true origin and significance of level changes with any confidence. Levels recorded in 2005/06 were almost 4 m deeper than those recorded in 2012/13. It is expected that groundwater levels would be lower during drought periods due to limited recharge and increased groundwater pumping.

2015/16

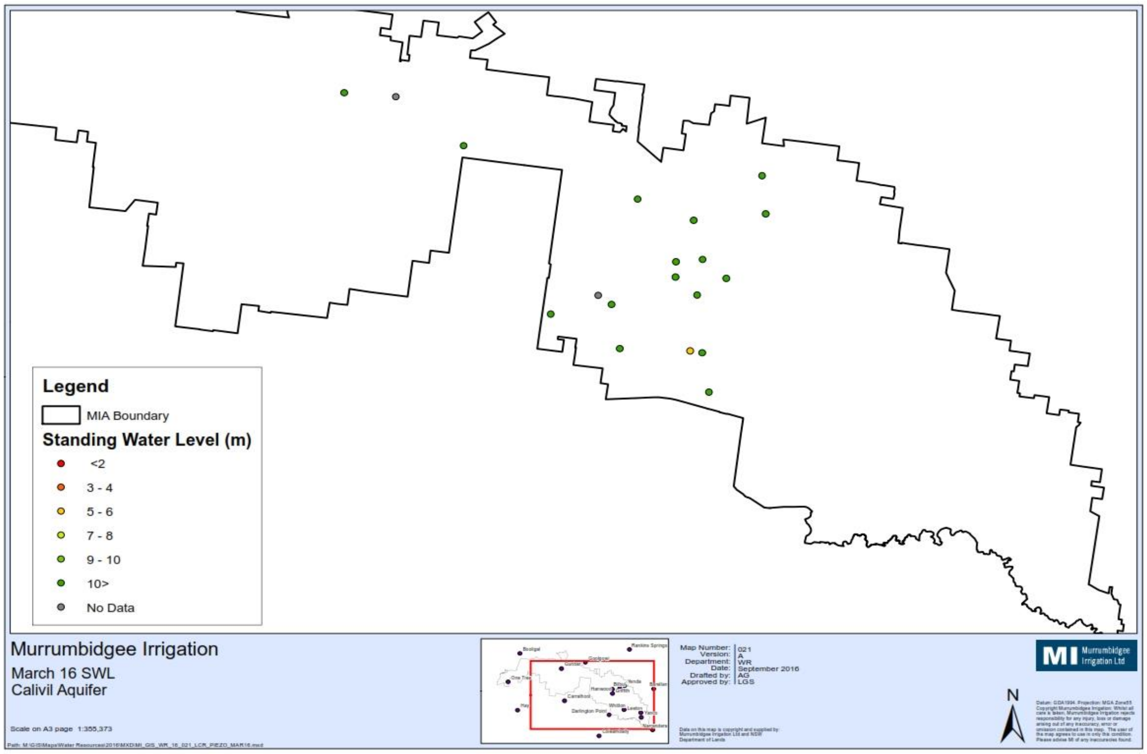


Figure 43 Depth (m) to water table in the Calivil Formation, March 2016

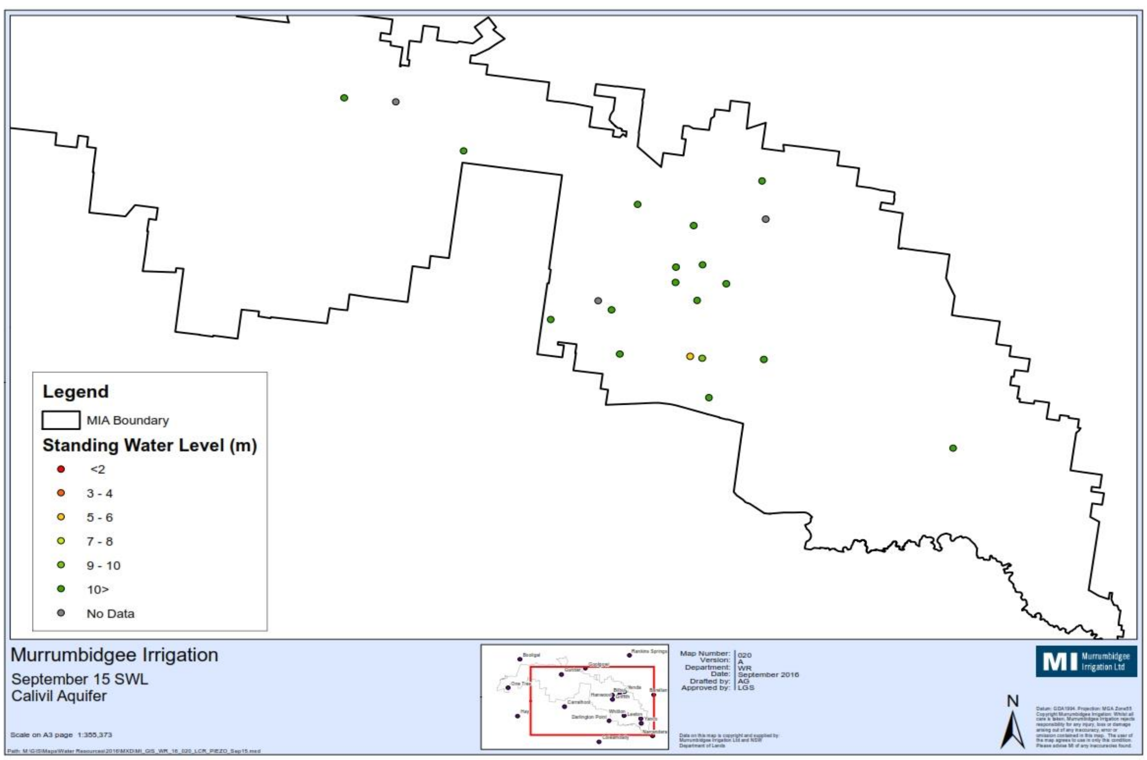


Figure 44 Depth (m) to water table in the Calivil Formation, September 2015

2014/15

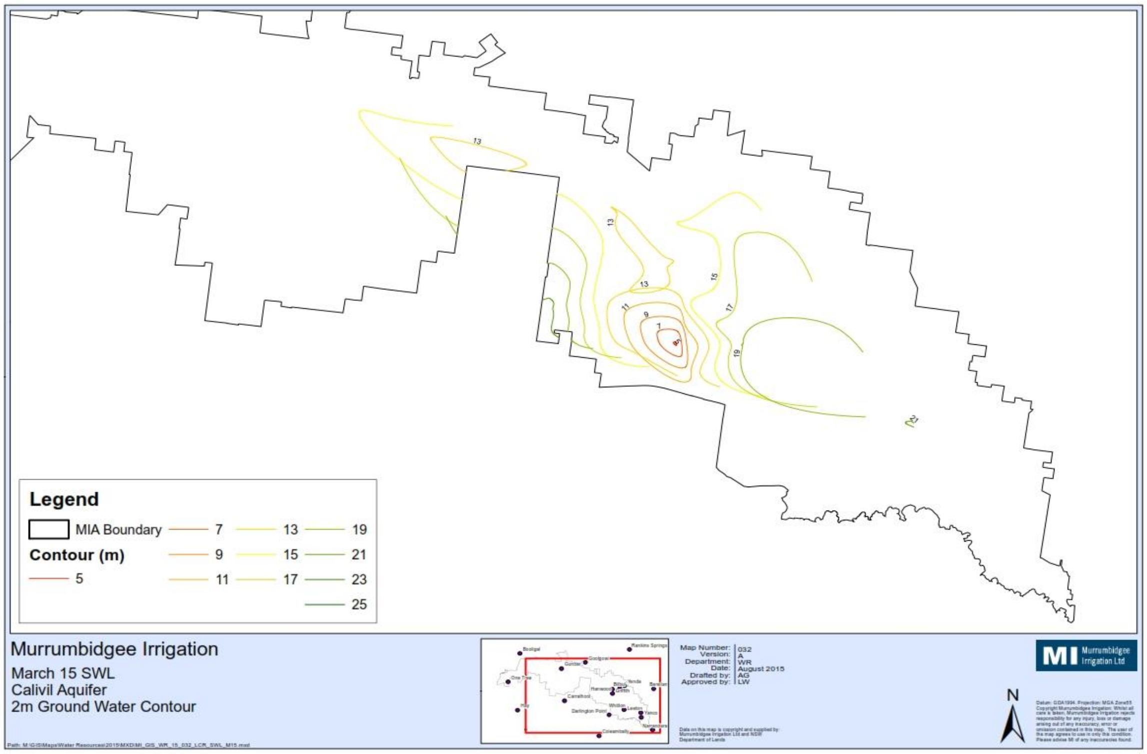


Figure 45 Depth (m) to water table in the Calivil Formation, March 2015

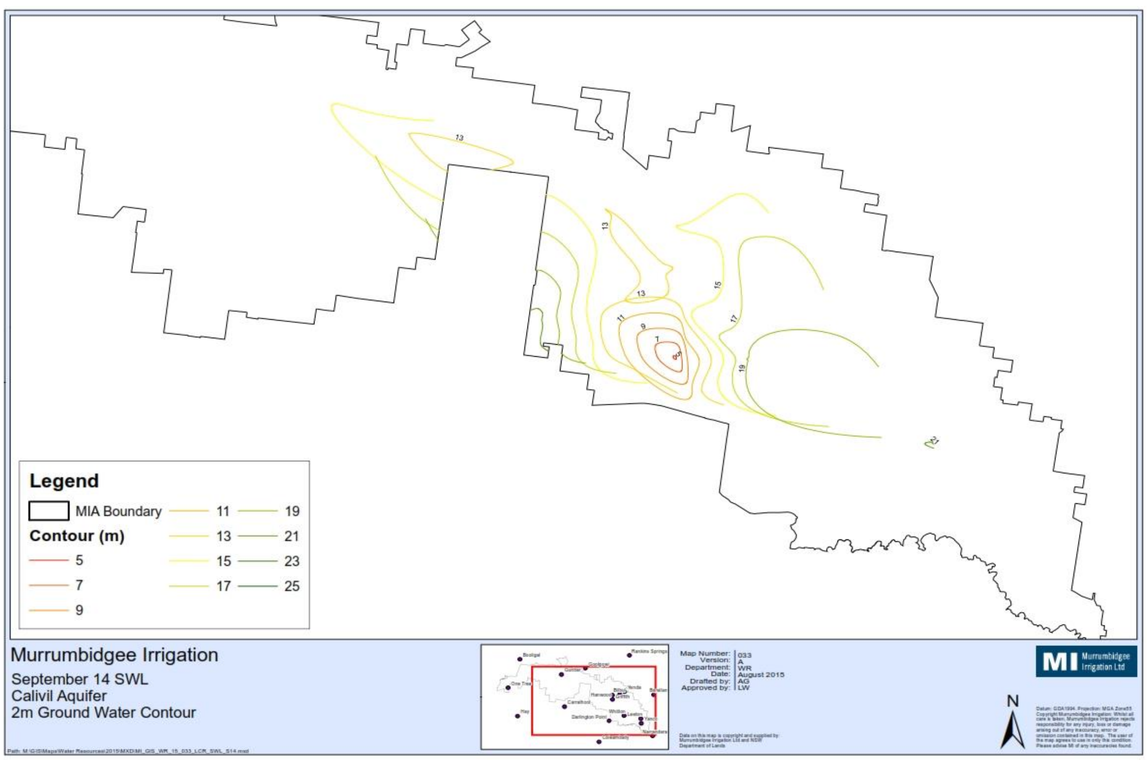


Figure 46 Depth (m) to water table in the Calivil Formation, September 2014

2013/14

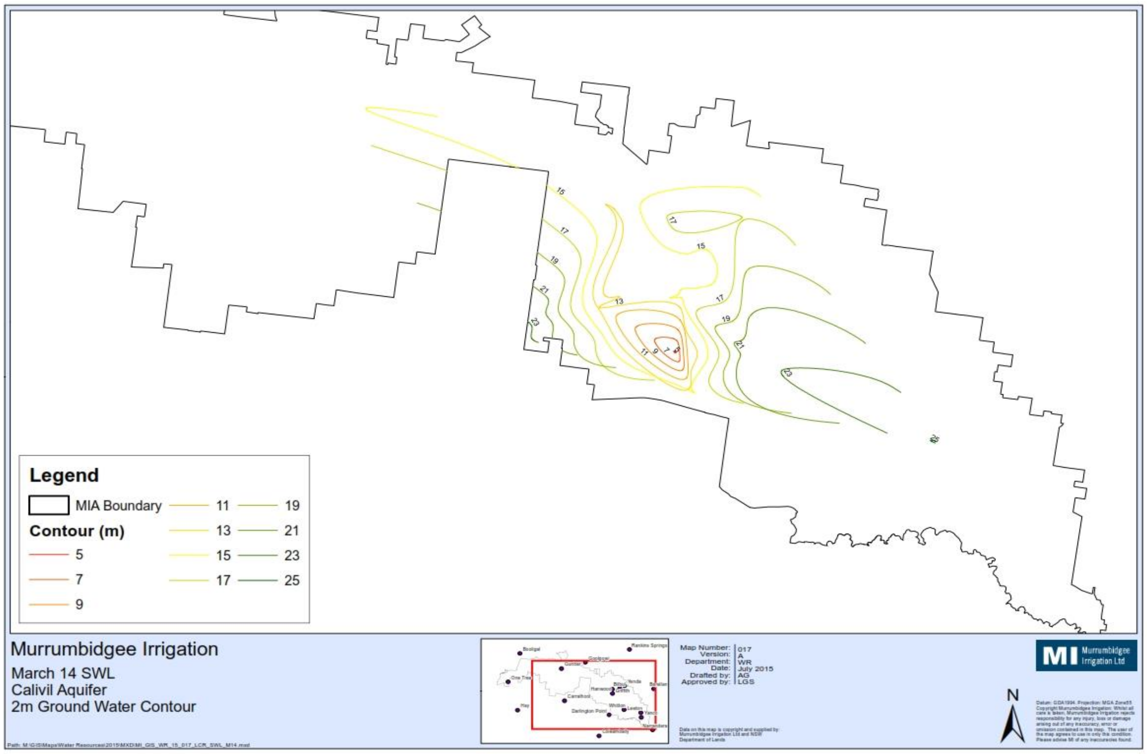


Figure 47 Depth (m) to water table in the Calivil Formation, March 2014

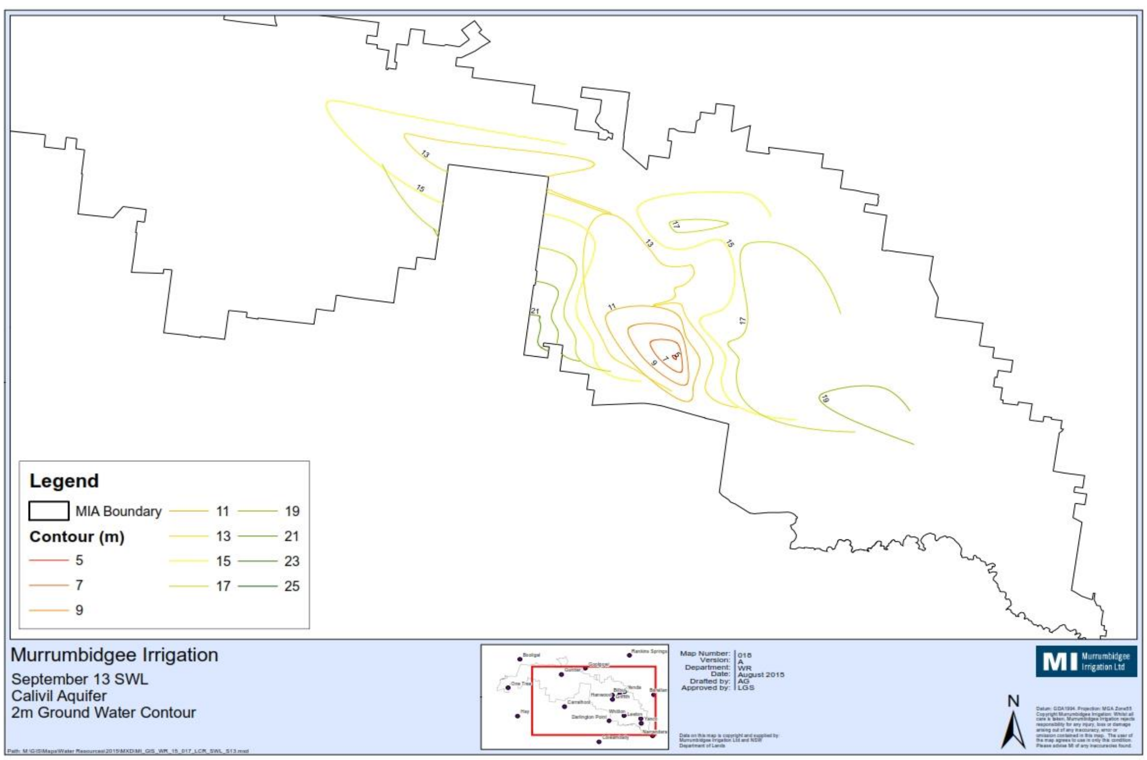


Figure 48 Depth (m) to water table in the Calivil Formation, September 2013

2005/06

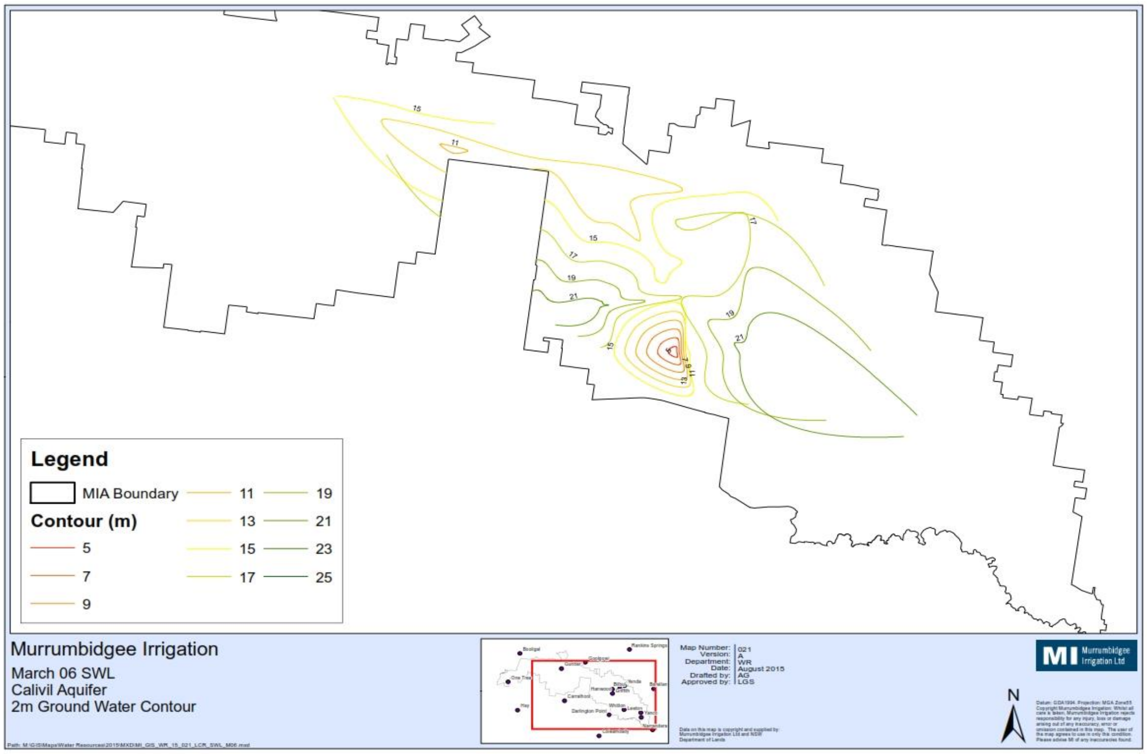


Figure 49 Depth (m) to water table in the Calivil Formation, March 2006

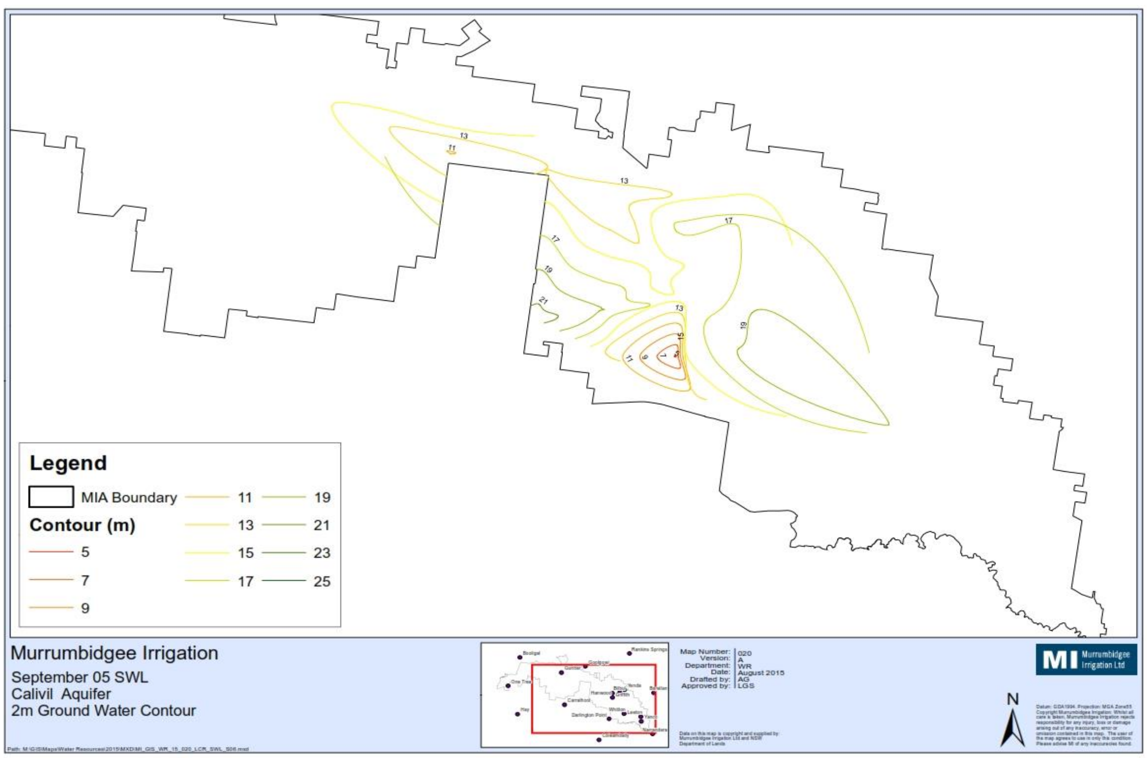


Figure 50 Depth (m) to water table in the Calivil Formation, September 2005

5.4.2 Groundwater salinity

Figures 51 to 58 show the salinity changes in the Calivil Formation compared to previous years. Due to the small amount of bores monitored in the Calivil Formation, data is only available for a small portion of the MIA.

Salinity readings in the Calivil Formation for 2013/14 mirror changes shown in the Shepparton Formation where lower EC values are displayed across the MIA. This can also be attributed to the flood experienced in 2012 and the lag time for the effects to be seen, which further suggests that the Calivil Formation is also influenced by surface water recharge, likely from connectivity to the upper formations in some areas. This also highlights the significance of rainfall and episodic recharge events on the deeper formations.

2015/16

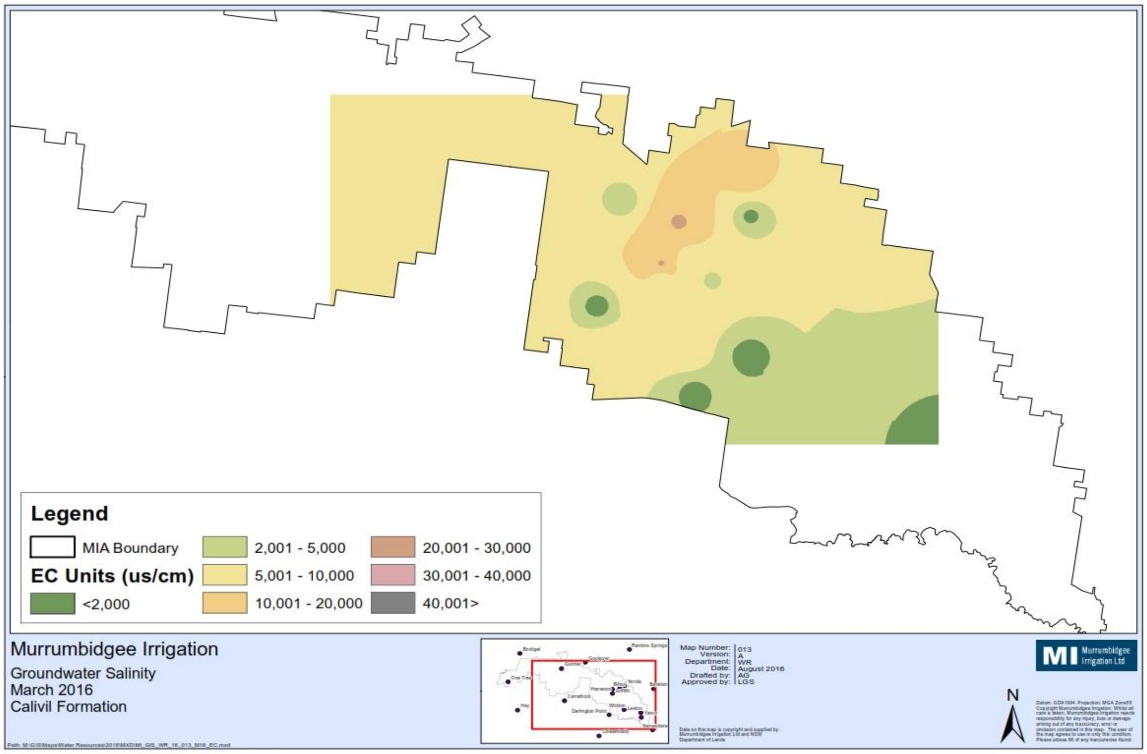


Figure 51 Groundwater salinity (µS/cm) in the Calivil Formation, March 2016

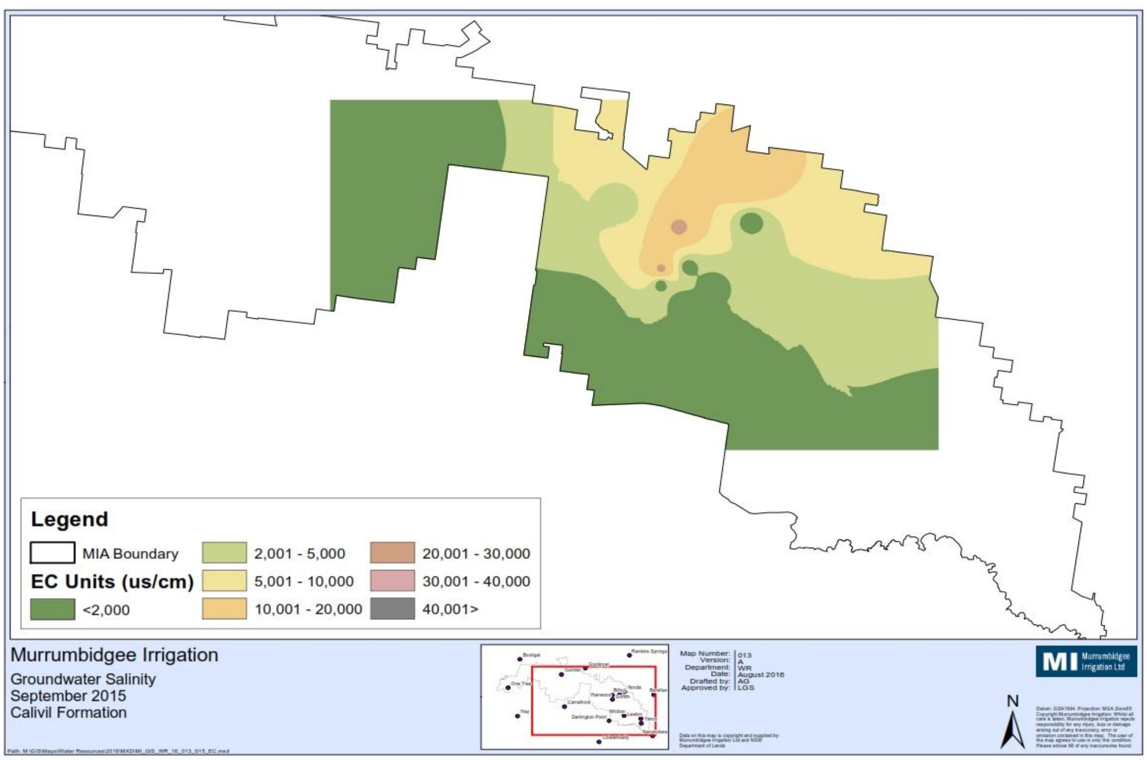


Figure 52 Groundwater salinity (µS/cm) in the Calivil Formation, September 2015

2014/15

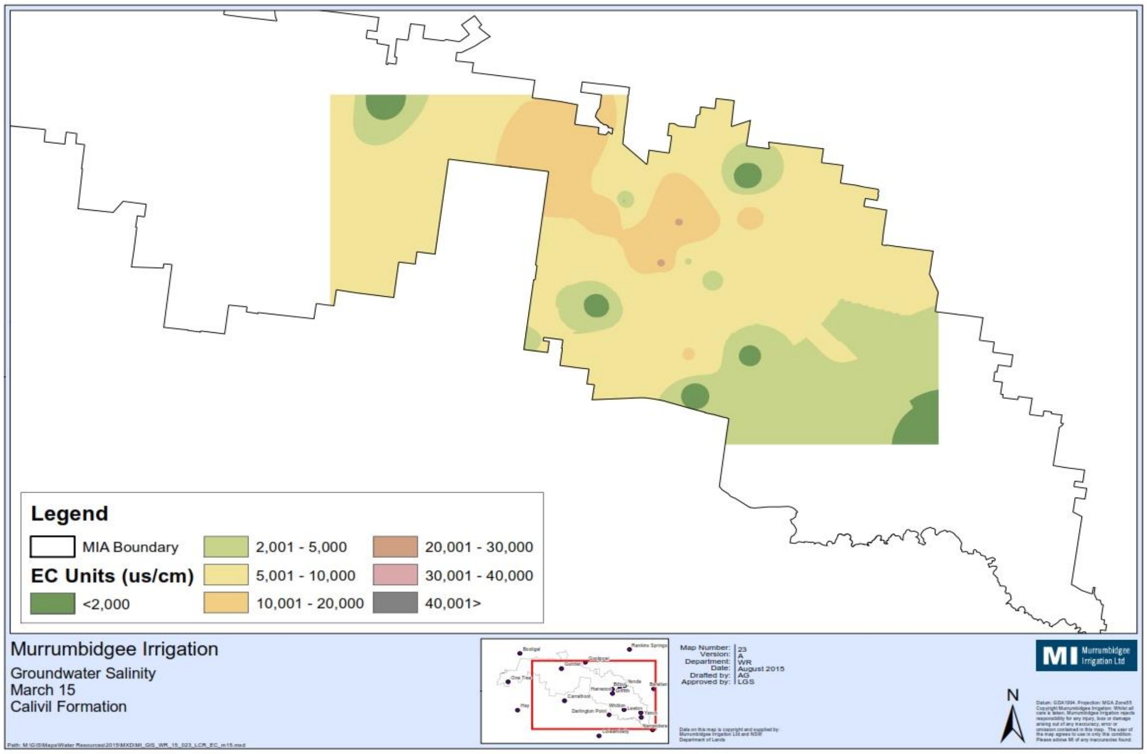


Figure 53 Groundwater salinity (µS/cm) in the Calivil Formation, March 2015

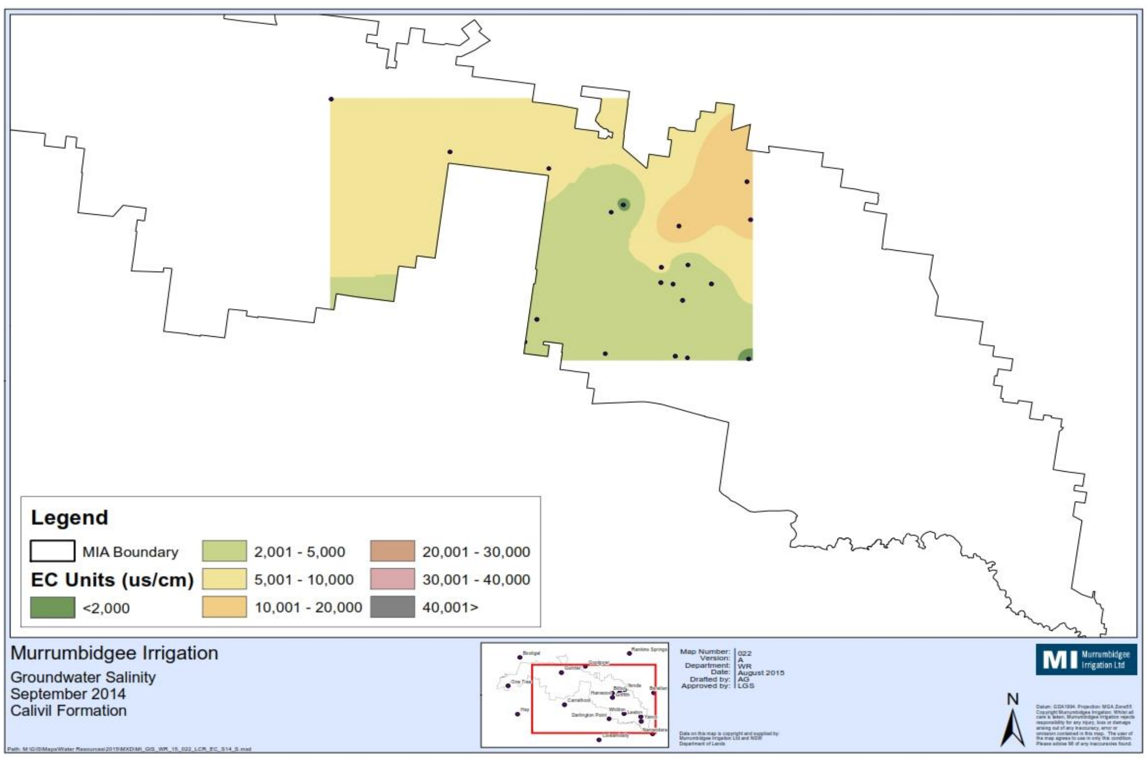


Figure 54 Groundwater salinity (µS/cm) in the Calivil Formation, September 2014

2013/14

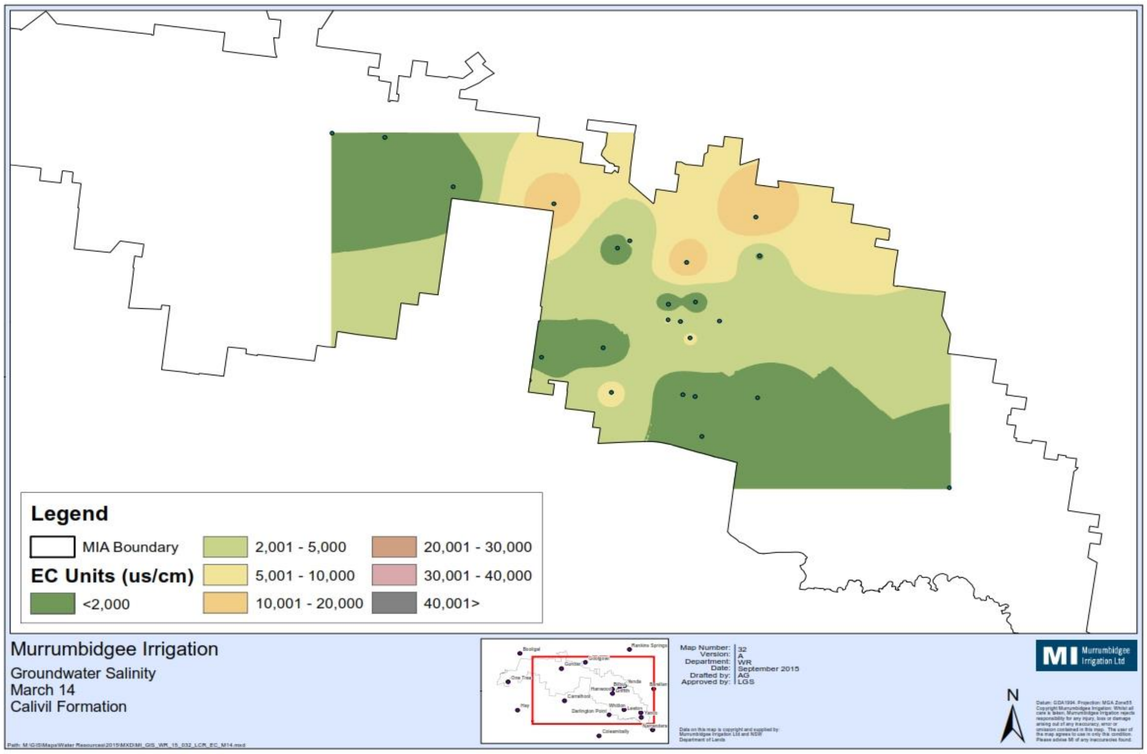


Figure 55 Groundwater salinity (µS/cm) in the Calivil Formation, March 2014

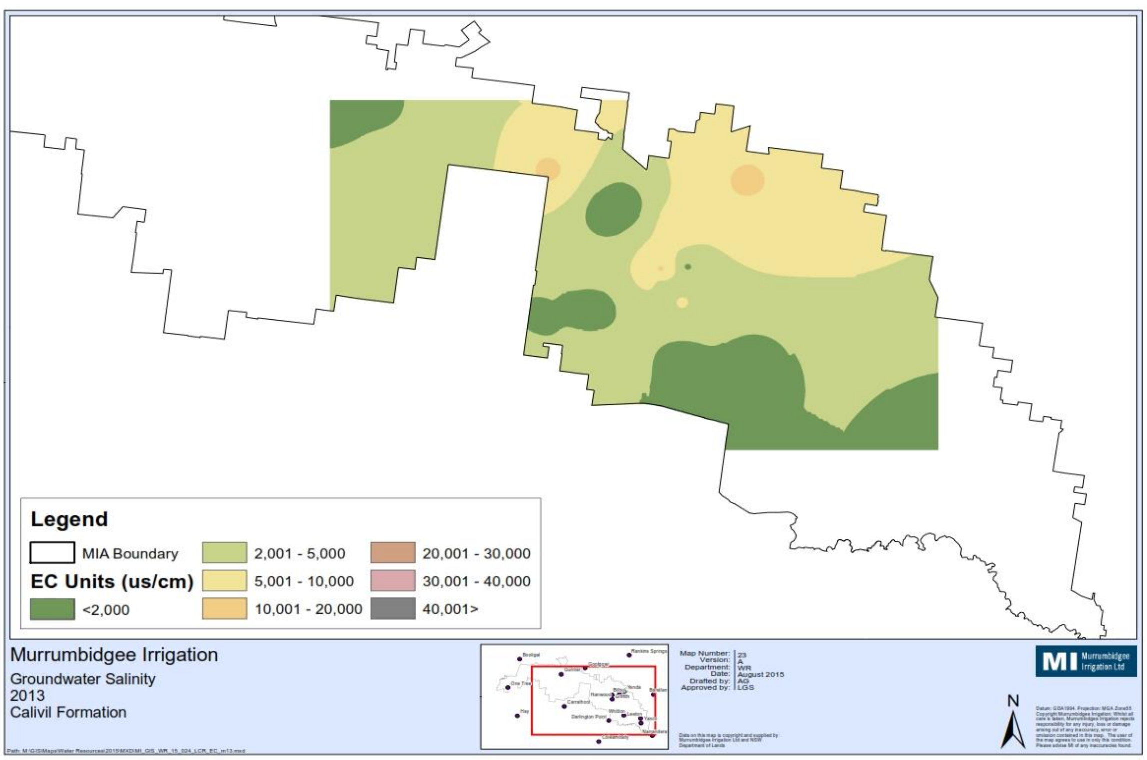


Figure 56 Groundwater salinity (µS/cm) in the Calivil Formation, September 2013

1980/2002

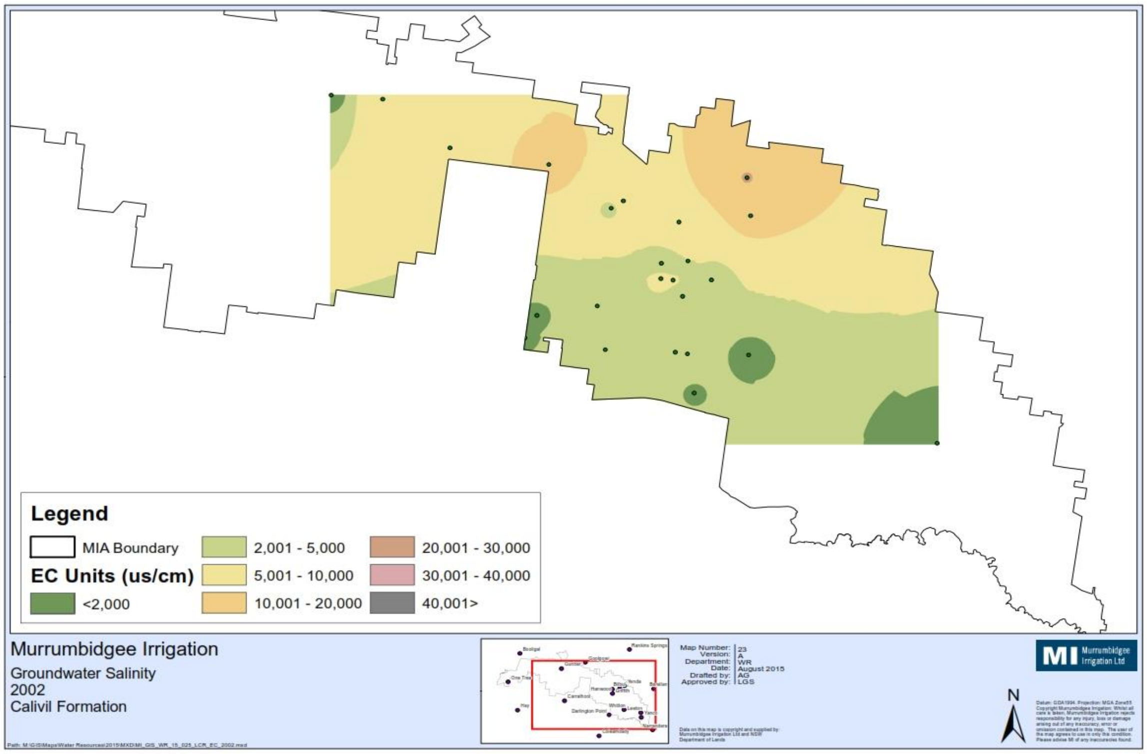


Figure 57 Groundwater salinity (µS/cm) in the Calivil Formation, September 2002

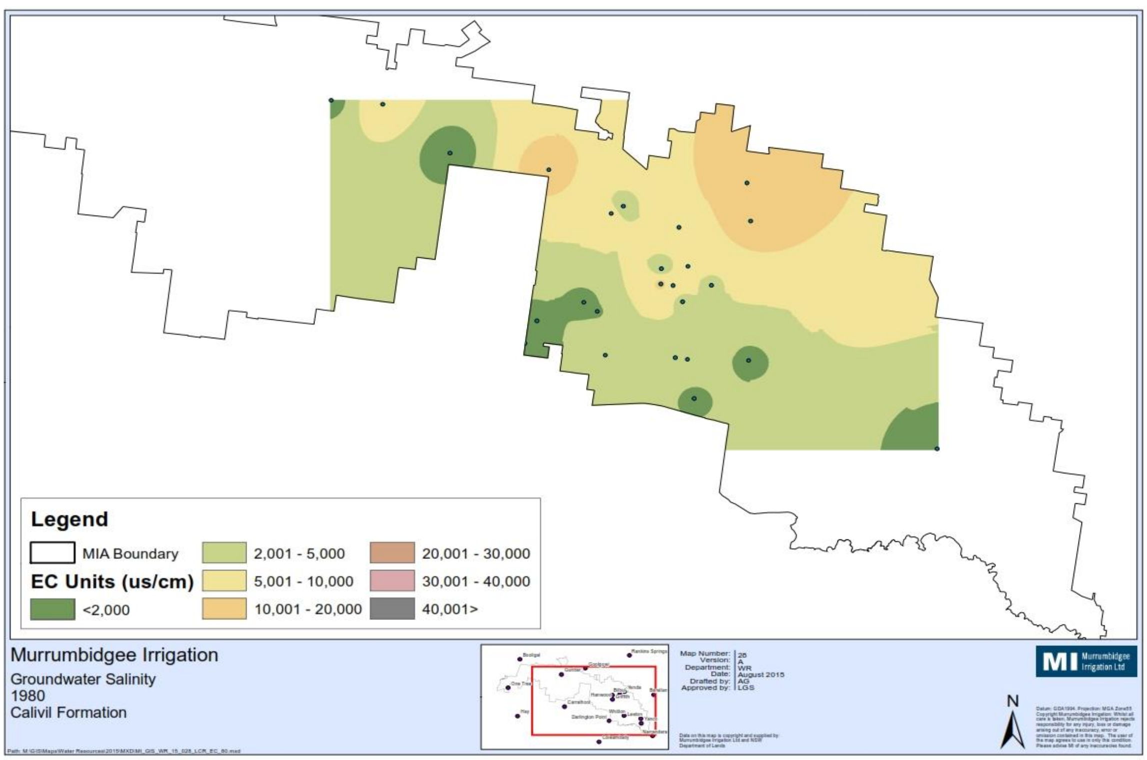


Figure 58 Groundwater salinity (µS/cm) in the Calivil Formation, September 1980

5.5 Tubewells

MI monitors the water and salt load discharged from seven tubewells within the MIA. Salinity measurements were taken in August 2016 and are only representative of water discharged at this time. The locations of monitored tubewells are shown in Figure 10.

Table 28 shows the total volumes and salt discharged from MIA tubewells for 2015/16 compared to previous years. A total volume of 1,873 ML was discharged from the tubewells, carrying 3,012 tonnes of salt into MI's drainage system. The higher salt load in 2015/16 is likely due to an increased volume pumped from the South Leeton tubewell which services an aquifer historically higher in EC. The tubewell located at Baulch's has not been operational since 2010 due to pump failure.

Table 26 Tubewell monitoring data 2015/16 compared to previous years

2015/16			2014/15		
Location	**Volume (ML)**	**Salt load (t)**	**Location**	**Volume (ML)**	**Salt load (t)**
Five Bridges	658	357	Five Bridges	777	394
Gil Gil	412	755	Gil Gil	585	1088
Yanco West	274	680	Yanco West	262	411
South Leeton	261	1,090	South Leeton	0	0
Baulch's	0	0	Baulch's	0	0
Wamoon	175	88	Wamoon	351	166
East Wamoon	93	40	East Wamoon	97	43
Total	**1,873**	**3,012**	**Total**	**2,072**	**2,102**
2013/14			**2006/07**		
Location	**Volume (ML)**	**Salt load (t)**	**Location**	**Volume (ML)**	**Salt load (t)**
Five Bridges	384	241	Five Bridges	707	489
Gil Gil	599	1315	Gil Gil	266	353
Yanco West	448	833	Yanco West	305	404
South Leeton	175	853	South Leeton	76	118
Baulch's	0	0	Baulch's	137	52
Wamoon	533	315	Wamoon	384	200
East Wamoon	81	43	East Wamoon	778	454
Total	**2,220**	**3,601**	**Total**	**2,653**	**2,070**

6 New measures to limit groundwater recharge and discharge of salt

MI continues to deliver water saving projects through automation, gravity piping and the channel lining of sections of the supply system under the Private Irrigation Infrastructure Operations Program (PIIOP). This has included works at Cudgel Creek to reduce the discharge of water and associated saltload discharged from MI's Area of Operation.

The PIIOP works has also helped reduce impacts of losses through channel seepage to groundwater systems at Lake Wyangan, Hanwood and Yenda which has included the replacement of ageing earthen channels with channel lining or gravity pipelines as well as channel automation and on-farm water saving initiatives.

7 Environmental Protection and Management

7.1 Discharge of noxious aquatic weeds

During 2015/16 irrigation year there was no known potential or actual discharge of Class 1, 2 or 3 declared noxious aquatic weeds from MI's Area of Operation.

7.2 Discharge of Blue-Green Algae

There was no known discharge of water containing blue green algae outside MI's Area of Operation in 2015/16.

ENVIRONMENTAL PROTECTION LICENCE 4651

8 Statement of Compliance

This licence authorises MI to undertake activities associated with Irrigated Agriculture. MI has fulfilled the compliance requirements as set out in EPL 4651 for 2015/16. A summary of the compliance requirements are cross referenced to this report and listed in Table 27.

Quality assurance and control procedures are in place to guarantee data integrity and to ensure that all compliance obligations are fulfilled. This includes using a NATA accredited laboratory for water sample analysis and contracting an external hydrological service provider to manage and maintain automated monitoring stations. Internal Standard Operating Procedures (SOPs) are reviewed and updated regularly.

MI is able to receive complaints from members of the public in relation to MI's activities via the business telephone number. Direction on how to make a compliant can be found on MI's website (www.mirrigation.com.au/Contact-Us).

Table 27 Environmental Protection Licence (EPL 4651) Monitoring and Reporting Requirements

Licence section	Requirement	Compliant	Report Section
Administrative Conditions	**1**	Yes	N/A
Discharges to Air and Water and Applications to Land	**2**	Yes	N/A
Limit Conditions	**3**	Yes	N/A
Operating Conditions	**4**	Yes	N/A
Maintain a Chemical Contingency Plan	O3.1	Yes	*Proposed changes sent to EPA for approval*
Maintain a Chemical Control Plan	O3.5	Yes	*Proposed changes sent to EPA for approval*
Maintain Pollution Incident Response Management Plan	Required for all EPL holders under the *Protection of Environment Operations Act 1997*	Yes	www.mirrigation.com.au/Environment/Water-Quality
Monitoring and Recording Conditions	**5**	Yes	
Monitoring Records	M1	Yes	Available upon request from EPA
Requirement to monitor concentration of pollutants discharged	M2	Yes	11. EPL Monitoring and Reporting
Testing Methods	M3	Yes	Internal documents
Recording of pollution complaints	M4	Yes	Available upon request from EPA
Telephone complaints line	M5	Yes	1. Statement of Compliance
Requirement to monitor volume or mass	M6	Yes	11. EPL Monitoring and Reporting
Other Monitoring and recording conditions	M7	Yes	10. Noxious Weed Management
Annual return documents	R1		Submitted 26/08/2016
Notification of environmental harm	R2	Yes	N/A
Written Report (of an event)	R3	Yes	N/A
Annual system performance report	R4	Yes	Full Report
Other reporting conditions	R5	Yes	Section 11

9 Noxious Weed Management

MI maintains a Chemical Control Plan in accordance with the requirements set out in EPL 4651 and has a scheduled maintenance program aimed at managing noxious weeds within the MIA. MI records details for each herbicide application in or near waters as per EPL requirements which is maintained within an internal management system.

10 EPL monitoring

Under MI's EPL 4651, five points (Figure 3) are licenced to allow water to be discharged outside MI's Area of Operation, with the condition that all flows are recorded and specified water quality parameters are measured during flow or rainfall events.

10.1 System performance

Table 30 presents total diversions into the MIA and total water discharged from the MIA for 2015/16 compared to previous years. In 2015/16, 1,620 ML was discharged, which included 541 ML that was diverted as an Environmental Water Release (EWR) on direction from Office of Environment and Heritage (OEH). The higher volume discharged during 2015/16 was also due to the high annual rainfall during the year. In 2013/14, water was released through MI's discharge points to allow channels to be drained for maintenance works, causing an increase in the total volume of water discharged from MI's Area of Operations. In 2005/06 MI's drainage reuse system was not complete, which explains the high discharge volumes recorded in this year. MI does not discharge irrigation waste water directly to ground waters in or outside the area of operations. However, based on the estimated seepage losses accounted for in the water balance on page 15, groundwater accessions in the MIA can be estimated at 20,500 ML.

Table 28 Total water volumes (ML)

Year	Diversions	Discharged
2015/16	643,957	1,620*
2014/15	878,614	671
2013/14	832,758	2,438
2005/06	1,036,519	8,570

** Includes 541 ML for EWR*

10.2 Water Quality Monitoring

MI is also required to monitor the concentration of each chemical listed in Schedule 1 of EPL 4651 (Table 31). When concentrations reach ‘notification’ or ‘action’ trigger levels, the EPA is required to be notified. For each ‘notification’ or ‘action’ level detection, the EPA was notified and results uploaded on MI’s webpage, in accordance with EPL requirements. MI maintains a Chemical Contingency Plan that outlines the monitoring, reporting and response procedures for discharge points listed in EPL 4651.

Table 29 Chemicals to be monitored at discharge points as listed in EPL 4651

Parameters	Environmental Guidelines (μg/L)	Notification Level (μg/L)	Action Level (μg/L)
Atrazine	2	13	45
Chlorpyrifos	0.001	0.01	0.11
Diazinon	0.0006	0.01	0.2
Diuron	8	1*	5*
Endosulfan	0.01	0.03	0.2
Malathion	0.07	0.05	0.2
Metolachlor	8	0.02	0.1
Molinate	2.5	3.4	14
Simazine	10	3.2	11
Thiobencarb	1	2.8	4.6
Trifluralin	0.1	2.6	4.4

Monthly summaries for each monitoring Point are presented in Tables 32 – 36. Monitoring consisted of 24 sampling events, with 19 notification or action level detections, all of which were reported to the EPA in accordance with R5.1. The results were also made available on MI’s website in line with legislative requirements. Chemical detections were found at all sites, with the highest number of detections recorded at Monitoring Point 4, coinciding with the largest volume of water discharged. The high rainfall event in June caused the release of drainage water from farms into MI works that would normally be recycled on farm.

Throughout the 2015/16 season, MI has continued to work with landholders to better understand risk areas and reduce the potential for contaminants to enter MI works. Strategies have included monitoring programs aimed at isolating point sources and liaising with Landholders to promote risk awareness and best drainage practices.

Table 30 Monitoring results for Point 4 - LAG

Point 4 – LAG				
Month	**Discharge Volumes (ML)**	**No. of sampling events**	**No. of detections**	**Chemical detection details**
Jul-15	1.97	0	0	-
Aug-15	24.7	2	0	-
Sep-15	13.7	1	1	3/9/2015 Notification level Diuron (1.62µg/L)
Oct-15	52.1	3	2	6/10/2015 Notification level Diuron (1.12µg/L) 13/10/15 Notification level Diuron (2.17µg/L)
Nov-15	567.4 *(541 EWR)*	3	2	2/11/2015 Notification level Metolachlor (0.022 µg/L) 4/11/2015 Notification level Metolachlor (0.046 µg/L)
Dec-15	5.8	1	2	5/12/2015 Notification level Metolachlor (0.030 µg/L), Action level Thiobencarb (54.4 µg/L)
Jan-16	0	0	0	-
Feb-16	0	0	0	-
Mar-16	10.6	1	0	-
Apr-16	0.2	0	0	-
May-16	6.1	1	1	9/5/2016 Notification Diazinon (0.013 µg/L)
Jun-16	232.7	2	5	6/6/2016 Notification level Simazine (9.24 µg/L), Action level Diuron (14.1 µg/L) 20/6/2016 Notification level Metolachlor (0.027 µg/L), Action level Simazine (11.2 µg/L) & Diuron (21.2 µg/L)
Total	915.2	14	13	

Table 31 Monitoring results for Point 5 - GMSRR

Point 5 – GMSRR				
Month	**Discharge Volumes (ML)**	**No. of sampling events**	**No. of detections**	**Chemical detection details**
Jul-15	0	0	0	-
Aug-15	0	0	0	-
Sep-15	0	0	0	-
Oct-15	0	0	0	-
Nov-15	0	0	0	-
Dec-15	0	0	0	-
Jan-16	0	0	0	-
Feb-16	0	0	0	-
Mar-16	0.11	0	0	-
Apr-16	0	0	0	-
May-16	0.08	0	0	-
Jun-16	64.1	1	1	20/6/2016 Notification level Metolachlor (0.028 µg/L)
Total	64.3	1	1	

Table 32 Monitoring results for Point 6 - YMS

Point 6 – YMS				
Month	**Discharge Volumes (ML)**	**No. of sampling events**	**No. of detections**	**Chemical detection details**
Jul-15	0	0	0	-
Aug-15	0	0	0	-
Sep-15	0	0	0	-
Oct-15	0	0	0	-
Nov-15	0	0	0	-
Dec-15	0	0	0	-
Jan-16	0	0	0	-
Feb-16	0	0	0	-
Mar-16	0	0	0	-
Apr-16	0	0	0	-
May-16	0	0	0	-
Jun-16	105.2	2	3	6/6/2016 No notification/action level detected 20/6/2016 Notification level Diuron (3.20 µg/L) & Chlorpyrifos (0.019 µg/L), Action level Metolachlor (0.102 µg/L)
Total	105.2	2	3	

Table 33 Monitoring results for Point 7 - ROCUDG

Point 7 – ROCUDG				
Month	**Discharge Volumes (ML)**	**No. of sampling events**	**No. of detections**	**Chemical detection details**
Jul-15	17.4	0	0	-
Aug-15	60.7	1	0	-
Sep-15	100.7	2	0	-
Oct-15	12.3	1	0	-
Nov-15	62.4	1	1	2/11/2016 Notification level Metolachlor (0.024 µg/L)
Dec-15	1.04	0	0	-
Jan-16	0	0	0	-
Feb-16	0	0	0	-
Mar-16	0	0	0	-
Apr-16	3.7	0	0	-
May-16	0	0	0	-
Jun-16	0	0	0	-
Total	258.1	6	1	

Table 34 Monitoring results for Point 15 - MIRFLD

Point 15 – MIRFLD				
Month	**Discharge Volumes (ML)**	**No. of sampling events**	**No. of detections**	**Chemical detection details**
Jul-15	0	0	0	-
Aug-15	0	0	0	-
Sep-15	0	0	0	-
Oct-15	0	0	0	-
Nov-15	0	0	0	-
Dec-15	0	0	0	-
Jan-16	0	0	0	-
Feb-16	0	0	0	-
Mar-16	0	0	0	-
Apr-16	0	0	0	-
May-16	0	0	0	-
Jun-16	281.2	1	1	25/6/2016 Action level Metolachlor (0.216 µg/L)
Total	281.2	1	1	

Appendix 1- Piezometer condition monitoring and reporting

Site_ID	Use Y/N	Top of Pipe Above NS (m)	Natural Surface (AHD)	Depth Below Top of Pipe (m)	Total depth of Bore (m)	Easting (GDA94) Zone 55	Northing (GDA94) Zone 55	STATUS
G1171	Y	0	109.98	24.28	24.28	385883.65	6213820.14	BLOCKED
G1387	Y	0.26	121.42	14.56	14.3	405293.23	6188659.47	BLOCKED
G152	Y	0	123.31	8.53	8.53	411885.14	6198949.26	BLOCKED
G1663	Y	0.8	123.71	30.87	30.07	409010.20	6180981.36	BLOCKED
G1766	Y	0	122.19	11.10	11.1	409627.35	6193021.09	BLOCKED
G2128	Y	0	123.85	9.23	9.23	408885.23	6189760.00	BLOCKED
G2271	Y	0	119.55	11.00	11	399677.42	6190767.74	BLOCKED
G2998	Y	0	110.47	12.97	12.97	382537.11	6220009.71	BLOCKED
G3137	Y	0	104.85	34.68	34.68	365445.51	6229370.55	BLOCKED
G3223	Y	0.22	114.57	11.68	11.46	385621.08	6202052.83	BLOCKED
G388	Y	0.6	125.18	11.27	10.67	412164.80	6193280.46	BLOCKED
G523	Y	0.000	0.00	10.30	10.30	386480.00	6219270.00	BLOCKED
L1563	Y	0.16	125.21	11.81	11.65	417214.00	6191840.00	BLOCKED
L1794S	Y	0.48	132.93	7.43	6.95	435660.00	6189985.00	READ
L1813M	Y	0	132.21	11.58	11.58	434609.00	6182654.00	BLOCKED
G105	N	0.15	120.26	9.85	9.7	409308.81	6203296.30	DESTROYED
G1172D	N	0	110.69	12.60	12.6	385592.05	6211815.80	DESTROYED
G1224	N	0.45	116.04	10.39	9.94	390634.12	6199182.63	DESTROYED
G1247	N	0	124.55	10.10	10.1	410504.01	6186648.26	DESTROYED
G1391	N	0	131.88	13.00	13	427345.16	6207371.67	DESTROYED
G1613	N	0	122.97	7.40	7.4	408096.07	6192346.25	DESTROYED
G1719	N	0.000	0.00	0.00	0.00	411970.00	6195770.00	DESTROYED
G1732	N	0.4	121.05	13.57	13.17	405853.13	6201106.22	DESTROYED
G1942	N	0.4	128.66	22.00	21.6	423796.27	6187089.06	DESTROYED
G227	N	0	124.57	21.72	21.72	414747.99	6199416.11	DESTROYED
G2369	N	0	114.83	1.02	1.02	396387.84	6208949.08	DESTROYED
G2735	N	0	113.05	9.10	9.1	388307.98	6208706.53	DESTROYED
G2747	N	0.5	127.03	11.40	10.9	420605.09	6192114.17	DESTROYED
G278	N	0	120.79	34.80	34.8	405136.42	6203007.60	DESTROYED
G2787	N	0	114.34	16.00	16	391929.61	6208885.41	DESTROYED
G279	N	0	120.81	11.50	11.5	405136.43	6203006.49	DESTROYED
G2826	N	0	115.59	28.50	28.5	397528.00	6210876.92	DESTROYED
G2872	N	0	122.41	2.56	2.56	408670.67	6194776.22	DESTROYED
G2909	N	0.42	116.86	17.14	16.72	395440.77	6204038.78	DESTROYED
G296	N	0.2	127.84	6.22	6.02	420805.52	6202486.74	DESTROYED

G3174	N	0.17	115.72	9.62	9.45	399314.80	6210024.58	DESTROYED
G318	N	0	127.23	22.70	22.7	420203.35	6205276.39	DESTROYED
G3188	N	0	117.87	6.00	6	403074.58	6203139.50	DESTROYED
G557	N	0	115.08	38.20	38.2	391219.40	6202406.89	DESTROYED
L1321S	N	0.29	128.24	11.96	11.67	421568.17	6188351.66	DESTROYED
L1327D	N	0.15	127.36	22.66	22.51	422002.00	6191382.00	DESTROYED
L1327S	N	0	127.31	11.40	11.4	422003.00	6191382.00	DESTROYED
L1398	N	0	125.85	26.12	26.12	414972.00	6187969.00	DESTROYED
L1798	N	0.28	132.62	16.10	15.82	435354.00	6187859.00	DESTROYED
L1830	N	0.65	135.07	5.91	5.26	445125.00	6179101.00	DESTROYED
L1935D	N	0.6	131.48	11.20	10.6	431313.00	6186009.00	DESTROYED
L1984	N	0	132.33	18.29	18.29	433642.00	6189726.00	DESTROYED
L2280	N	0.17	131.23	15.90	15.73	425004.00	6173837.00	DESTROYED
L301	N	0.18	135.21	6.58	6.4	439528.00	6177370.00	DESTROYED
L592	N	0	141.65	9.44	9.44	451319.00	6165740.00	DESTROYED
G1160	Y	0	110.94	6.29	6.29	386181.34	6216247.08	DRY
G2346	Y	0.35	118.49	15.00	14.65	402977.82	6199783.69	DRY
G2655	Y	0.3	0.00	15.65	15.35	394765.36	6176939.74	DRY
G2657	Y	0.5	0.00	17.90	17.4	389028.80	6179216.42	DRY
G267	Y	0.27	120.39	8.77	8.5	407917.29	6200500.20	DRY
G2676	Y	0.19	0.00	20.02	19.83	384063.31	6182453.18	DRY
G2977	Y	0.17	104.26	10.55	10.38	362748.55	6221817.05	DRY
G3133	Y	0.18	108.90	11.48	11.3	380507.07	6227474.91	DRY
G3265	Y	0.33	111.70	8.73	8.4	383826.37	6219839.40	DRY
G3358	Y	0	106.68	7.12	7.12	368849.95	6217096.98	DRY
G735	Y	0.85	0.00	13.85	13	401616.74	6186154.79	DRY
G809	Y	0.87	120.02	8.01	7.14	397999.90	6188604.58	DRY
L1764S	Y	0.4	135.67	8.45	8.05	436826.00	6174767.00	DRY
L2210B	Y	0.32	133.95	2.56	2.24	438438.00	6177767.00	DRY
L2312	Y	0.28	135.51	3.38	3.1	446406.00	6178365.00	READ
L2313	Y	0.33	135.78	3.91	3.58	446664.00	6177515.00	READ
L2648	Y	0.23	124.98	13.87	13.64	411007.00	6174488.00	READ
L2793	Y	0.37	0.00	9.38	9.01	430510.00	6166775.00	READ
L2796S	Y	0.29	0.00	9.40	9.11	436321.00	6166468.00	READ
G106	Y	0.15	126.91	15.49	15.34	417017.98	6203588.56	READ
G1073	Y	0.16	113.75	7.31	7.15	394298.19	6211086.17	READ
G1089	Y	0.6	110.12	8.92	8.32	386302.53	6217200.13	READ
G1090	Y	0	111.83	3.52	3.52	390834.21	6215653.50	READ
G1159	Y	0.45	110.96	25.04	24.59	386185.04	6216246.01	READ
G1172S	Y	0	110.48	7.05	7.05	385591.10	6211818.01	READ
G1187	Y	0.3	111.38	17.64	17.34	384616.07	6204521.54	READ

G1189D	Y	0.2	112.15	26.87	26.67	384304.21	6202199.66	READ
G1189S	Y	0.2	112.17	8.96	8.76	384305.11	6202200.78	READ
G1190	Y	0	113.13	23.15	23.15	383855.97	6198429.79	READ
G1192	Y	0.03	113.78	26.88	26.85	383645.25	6196811.18	READ
G1193	Y	0.3	115.07	22.00	21.7	388896.37	6199410.55	READ
G1194	Y	0.35	113.93	24.35	24	386528.30	6199715.92	READ
G1195	Y	0.56	0.00	12.49	11.93	391170.24	6188330.91	READ
G1196	Y	0.44	0.00	12.30	11.86	391168.35	6188335.33	READ
G1197	Y	0.76	118.08	23.32	22.56	391580.40	6191064.07	READ
G1198	Y	0.1	0.00	40.76	40.66	383000.11	6192005.04	READ
G1215	Y	0.35	115.36	20.05	19.7	398101.09	6216290.78	READ
G1216	Y	0.37	113.02	19.62	19.25	400686.15	6216988.30	READ
G1217	Y	0.08	113.77	8.44	8.36	383645.23	6196812.29	READ
G1218	Y	0.17	113.10	12.56	12.39	383857.77	6198433.14	READ
G1219	Y	0.15	119.87	18.34	18.19	395393.04	6190567.55	READ
G122	Y	0.1	126.92	6.58	6.48	417018.92	6203586.35	READ
G1220	Y	0.15	120.16	7.87	7.72	397571.23	6190234.64	READ
G1221	Y	0.05	120.38	8.61	8.56	396103.64	6190471.25	READ
G1222	Y	0.5	119.28	9.27	8.77	393739.81	6190791.72	READ
G1223	Y	0.65	116.36	9.55	8.9	391940.52	6199017.05	READ
G1244	Y	0.15	124.91	11.33	11.18	411683.35	6189376.63	READ
G1246	Y	0	124.84	20.31	20.31	411684.30	6189373.31	READ
G1248	Y	0.3	123.43	21.14	20.84	407639.75	6189790.98	READ
G1249	Y	0.3	123.46	7.72	7.42	407644.38	6189787.70	READ
G1287	Y	0.48	122.41	10.98	10.5	406740.59	6189559.10	READ
G1294	Y	0.45	122.10	12.40	11.95	406447.79	6190440.06	READ
G1296	Y	0	122.12	4.33	4.33	406388.33	6190411.74	READ
G1301	Y	0.05	124.70	7.84	7.79	411409.87	6187988.86	READ
G1319	Y	0.7	125.37	19.27	18.57	414769.00	6184929.00	READ
G132	Y	0.36	125.38	27.86	27.5	416415.73	6205279.92	READ
G1337	Y	0.2	120.43	15.76	15.56	406248.94	6195316.68	READ
G1342D	Y	0.16	127.99	7.18	7.02	419414.39	6183940.44	READ
G1342S	Y	0.3	127.99	14.53	14.23	419414.39	6183940.44	READ
G1359	Y	0.25	128.32	9.70	9.45	419611.71	6182862.42	READ
G1380	Y	0.5	120.94	10.87	10.37	406211.84	6195074.54	READ
G1381	Y	0.4	120.99	5.97	5.57	406212.72	6195078.98	READ
G1385	Y	0.58	119.76	12.53	11.95	406733.61	6198804.97	READ
G1400	Y	0.000	0.00	19.10	19.10	412089.93	6187827.80	READ
G1401	Y	0.000	0.00	15.40	15.40	412089.93	6187827.80	READ
G1402	Y	0.27	125.10	10.36	10.09	412843.37	6187183.15	READ
G1406	Y	0	125.33	18.62	18.62	414090.42	6186143.94	READ

G1410	Y	0.44	126.19	7.22	6.78	416515.25	6187772.04	READ
G1416	Y	0.4	122.69	15.70	15.3	407988.48	6186308.75	READ
G1417	Y	0.1	124.18	7.52	7.42	410491.96	6189333.09	READ
G146	Y	0	125.25	24.22	24.22	415674.15	6203205.03	READ
G1560	Y	0.25	123.92	24.88	24.63	411847.70	6190166.69	READ
G1561	Y	0.2	123.90	11.55	11.35	411846.77	6190167.79	READ
G1568	Y	0	124.20	19.96	19.96	409586.45	6189658.15	READ
G1577	Y	0.1	123.31	13.22	13.12	409590.96	6195920.81	READ
G1578	Y	0.1	119.99	15.28	15.18	406609.12	6198100.61	READ
G1579	Y	0.22	120.16	9.92	9.7	407941.98	6201262.33	READ
G1591	Y	0.2	123.00	11.63	11.43	407174.15	6191051.75	READ
G1594	Y	0	122.67	9.70	9.7	408880.29	6192802.00	READ
G1595	Y	0.15	120.21	10.50	10.35	407132.40	6202087.19	READ
G1602	Y	0.45	121.86	8.44	7.99	405866.75	6192735.45	READ
G1643	Y	0	119.34	15.77	15.77	407541.48	6204732.90	READ
G1644	Y	0.2	118.89	26.27	26.07	405866.52	6204986.80	READ
G1660	Y	0.1	122.10	14.35	14.25	406587.16	6186718.43	READ
G1661	Y	0.1	123.67	21.20	21.1	409053.36	6186004.26	READ
G1662	Y	0.1	123.68	8.70	8.6	409061.64	6186003.23	READ
G1666	Y	0.5	123.64	20.68	20.18	410446.52	6185630.05	READ
G168	Y	0.07	125.10	6.10	6.03	414709.82	6197451.74	READ
G1684	Y	0.000	0.00	24.70	24.70	416432.92	6204489.38	READ
G1686	Y	0.11	125.46	12.11	12	416432.92	6204489.38	READ
G1691	Y	0.05	122.94	9.80	9.75	408716.32	6198945.44	READ
G1705	Y	0.1	123.38	11.92	11.82	409528.59	6195241.49	READ
G1738	Y	0	121.87	11.10	11.1	406764.92	6194383.62	READ
G1745	Y	0.35	119.52	12.87	12.52	406803.12	6203457.98	READ
G1746	Y	0.2	120.22	14.70	14.5	404512.72	6204065.90	READ
G1759	Y	0.1	120.76	9.43	9.33	408497.33	6199985.77	READ
G1779	Y	0.45	131.12	31.84	31.39	426273.87	6204528.85	READ
G178	Y	0.5	125.00	7.86	7.36	414091.91	6197738.84	READ
G1788	Y	0.05	118.81	2.17	2.12	404068.44	6204489.44	READ
G1789	Y	0.42	118.77	9.79	9.37	405455.43	6204769.72	READ
G1800	Y	0.66	131.12	14.41	13.75	426273.87	6204528.85	READ
G1801	Y	0	129.20	8.45	8.45	424098.37	6204960.58	READ
G1818	Y	0.1	122.73	7.32	7.22	407292.63	6196792.13	READ
G195	Y	0.37	124.57	5.55	5.18	414985.91	6194504.33	READ
G2003	Y	0	124.21	37.90	37.9	412114.38	6218660.24	READ
G2005	Y	0	112.34	21.24	21.24	406951.52	6216144.17	READ
G2006	Y	0	125.36	31.80	31.8	413195.55	6215774.78	READ
G2009	Y	0	108.95	20.80	20.8	406503.52	6214213.41	READ

G2010	Y	0.3	107.70	12.42	12.12	409972.14	6211744.34	READ
G2020	Y	0.2	123.22	25.14	24.94	410076.74	6223635.76	READ
G2026	Y	0.23	118.76	12.35	12.12	402374.77	6204764.70	READ
G203	Y	0	121.72	7.68	7.68	408554.80	6197217.13	READ
G2048	Y	0.1	115.43	12.92	12.82	393525.40	6205332.52	READ
G205	Y	0.32	122.14	8.94	8.62	409373.10	6198755.55	READ
G2052	Y	0.17	116.27	6.65	6.48	398614.08	6204993.10	READ
G2060	Y	0.05	121.22	17.44	17.39	404740.64	6192558.76	READ
G2061	Y	0.4	121.26	9.23	8.83	404736.97	6192557.61	READ
G2062	Y	0.1	118.78	9.23	9.13	394862.03	6193888.79	READ
G2065	Y	0.14	117.83	11.74	11.6	394125.22	6196107.48	READ
G2066	Y	0.1	117.70	10.82	10.72	393979.24	6195196.38	READ
G207	Y	0.27	122.44	12.19	11.92	406506.78	6197114.78	READ
G2082	Y	0.37	115.22	38.73	38.36	396247.36	6215491.95	READ
G209	Y	0.38	122.76	25.59	25.21	405804.83	6192495.27	READ
G2092	Y	0.36	114.89	25.86	25.5	411260.02	6212406.48	READ
G2095	Y	0.1	121.52	12.07	11.97	405705.39	6191784.49	READ
G210	Y	0.15	122.53	9.67	9.52	405810.33	6192496.44	READ
G2141	Y	0.3	124.05	9.42	9.12	408430.35	6189854.24	READ
G215	Y	0.32	121.63	9.56	9.24	406814.16	6199674.14	READ
G2163	Y	0.15	117.70	37.71	37.56	393977.41	6195195.25	READ
G2190	Y	0.2	116.57	6.35	6.15	394520.81	6202448.05	READ
G225	Y	0.07	123.45	18.01	17.94	414259.95	6202580.01	READ
G2264	Y	0.2	126.15	28.74	28.54	412331.99	6194466.45	READ
G2274	Y	0.4	119.50	14.35	13.95	396382.48	6191595.63	READ
G2279	Y	0.19	117.04	33.19	33	400345.57	6210179.77	READ
G2280	Y	0	121.59	17.53	17.53	406334.75	6195928.61	READ
G2283	Y	0.05	120.27	23.15	23.1	400011.62	6193197.94	READ
G2284	Y	0.15	120.29	13.49	13.34	400010.72	6193196.82	READ
G2291	Y	0	119.75	24.50	24.5	395579.31	6193793.71	READ
G2292	Y	0	119.48	11.05	11.05	395578.34	6193798.14	READ
G2294	Y	0.14	124.29	9.43	9.29	411939.00	6191345.00	READ
G2295	Y	0	119.41	23.60	23.6	397900.55	6193477.83	READ
G2296	Y	0	119.46	5.37	5.37	397898.68	6193481.14	READ
G2306	Y	0.15	122.30	17.88	17.73	405962.23	6188651.84	READ
G2307	Y	0.2	122.30	9.15	8.95	405959.49	6188649.59	READ
G2309	Y	0.17	121.45	22.52	22.35	405552.98	6188235.13	READ
G2330	Y	0.15	121.41	8.95	8.8	405556.60	6188240.72	READ
G2337	Y	0.2	122.01	16.20	16	405590.61	6190322.72	READ
G2338	Y	0.23	122.42	14.63	14.4	405595.16	6190327.21	READ
G2340	Y	0.3	114.17	25.02	24.72	385189.37	6199889.22	READ

G2341	Y	0.25	114.19	10.45	10.2	385185.68	6199890.29	READ
G2345D	Y	0.15	111.62	20.79	20.64	385058.99	6207733.38	READ
G2345S	Y	0.15	111.56	7.65	7.5	385058.95	6207736.71	READ
G2452	Y	0.5	125.88	9.30	8.8	418059.03	6196220.83	READ
G247	Y	0	128.93	3.84	3.84	421392.10	6206753.60	READ
G2482	Y	0.28	121.45	13.28	13	406228.41	6200474.53	READ
G250	Y	0.18	127.67	32.86	32.68	418928.07	6202996.48	READ
G252	Y	0.73	125.36	30.19	29.46	416441.15	6204495.00	READ
G254	Y	0.37	132.09	3.23	2.86	428719.50	6205091.18	READ
G2650	Y	0.1	127.63	23.27	23.17	417315.63	6173689.15	READ
G2653	Y	0.03	0.00	19.81	19.78	401661.66	6176109.35	READ
G2654	Y	0.15	0.00	23.91	23.76	398315.10	6176607.81	READ
G2656	Y	0.14	0.00	18.52	18.38	391060.00	6177991.63	READ
G269	Y	0.4	120.43	27.45	27.05	407870.11	6200900.09	READ
G2690	Y	0	120.46	34.70	34.7	400291.32	6195240.48	READ
G2691	Y	0.1	121.12	35.32	35.22	402927.69	6194874.58	READ
G2692	Y	0.05	121.18	13.54	13.49	402920.34	6194874.50	READ
G2693	Y	0.25	120.40	11.75	11.5	400285.74	6195245.97	READ
G2694	Y	0	122.08	28.13	28.13	404488.68	6194631.18	READ
G2695	Y	0.16	121.97	16.60	16.44	404484.96	6194635.58	READ
G2696	Y	0.14	118.43	8.99	8.85	395792.60	6197499.27	READ
G2697	Y	0	117.46	44.34	44.34	392930.55	6201167.85	READ
G2698	Y	0	117.38	15.20	15.2	392933.36	6201163.45	READ
G2703	Y	0.1	125.12	9.30	9.2	419191.88	6191354.01	READ
G273	Y	0.16	124.40	8.36	8.2	413964.44	6202093.78	READ
G2731	Y	0	113.45	9.87	9.87	388306.44	6205361.53	READ
G2734	Y	0.2	113.33	11.30	11.1	388745.83	6207429.65	READ
G2741	Y	0	112.36	7.50	7.5	387286.39	6211566.81	READ
G2748	Y	0.05	111.48	8.54	8.49	388059.59	6214242.27	READ
G2754	Y	0.22	128.78	18.41	18.19	424945.61	6189233.69	READ
G2755	Y	0.45	128.96	8.20	7.75	424946.35	6189235.91	READ
G2767	Y	0.000	0.00	20.50	20.50	417670.31	6189898.26	READ
G2768	Y	0.000	0.00	13.00	13.00	417670.31	6189898.26	READ
G2790	Y	0.15	121.06	13.30	13.15	408331.73	6194368.10	READ
G2799	Y	0.07	126.31	4.67	4.6	416269.03	6202852.18	READ
G2819	Y	0.05	114.33	22.49	22.44	396849.25	6207774.15	READ
G2820	Y	0	116.13	15.03	15.03	395669.14	6206836.14	READ
G2821	Y	0	114.71	5.16	5.16	397361.58	6207066.67	READ
G2825	Y	0.3	116.33	13.80	13.5	397377.40	6209657.55	READ
G2857	Y	0	120.28	7.40	7.4	398260.19	6197171.59	READ
G2862	Y	0.05	120.39	27.81	27.76	397432.20	6196440.53	READ

G2863	Y	0.1	119.83	11.89	11.79	397426.57	6196450.45	READ
G2864	Y	0.1	118.22	13.36	13.26	395825.17	6196475.97	READ
G2868	Y	0.1	121.55	10.03	9.93	407933.21	6195249.17	READ
G2885	Y	0	105.63	23.36	23.36	373039.50	6228388.84	READ
G2892	Y	0.37	104.05	21.81	21.44	369162.81	6228820.56	READ
G2893	Y	0.05	105.16	7.75	7.7	363204.83	6225328.69	READ
G2901	Y	0.34	101.31	8.41	8.07	355079.03	6231256.87	READ
G2905	Y	0	99.39	7.75	7.75	349143.42	6229963.70	READ
G293	Y	0.37	127.59	9.00	8.63	418951.09	6202994.47	READ
G2953	Y	0.23	106.82	16.37	16.14	371950.92	6224687.40	READ
G2976	Y	0.1	104.31	8.86	8.76	363543.57	6227742.71	READ
G2981	Y	0.1	102.11	6.90	6.8	356481.23	6230060.38	READ
G2995	Y	0.2	114.34	9.18	8.98	385657.88	6201225.89	READ
G301	Y	0.37	133.37	28.49	28.12	430510.83	6203443.47	READ
G3010	Y	0	107.70	9.00	9	373947.36	6221169.58	READ
G3018	Y	0.1	106.11	12.64	12.54	368697.40	6223272.82	READ
G304	Y	0.6	121.07	22.78	22.18	405345.48	6189304.36	READ
G305	Y	0.3	121.12	12.10	11.8	405348.20	6189307.71	READ
G306	Y	0	122.27	23.55	23.55	405159.86	6187771.99	READ
G3060	Y	0.19	107.72	14.41	14.22	369231.76	6220067.06	READ
G3062	Y	0.1	107.90	7.45	7.35	373392.19	6217266.86	READ
G3063	Y	0	108.42	13.47	13.47	373025.60	6215198.92	READ
G3065D	Y	0.15	105.61	26.90	26.75	370304.03	6216628.02	READ
G3065S	Y	0.25	105.61	17.38	17.13	370304.03	6216628.02	READ
G3066	Y	0.32	105.91	8.94	8.62	368178.57	6211866.76	READ
G307	Y	0	125.01	20.90	20.9	413515.00	6191570.00	READ
G309	Y	0.19	125.12	25.42	25.23	415103.00	6191331.00	READ
G311	Y	0.21	122.06	23.69	23.48	404479.46	6194633.31	READ
G3119	Y	0.33	113.31	9.88	9.55	390433.40	6211306.87	READ
G3126	Y	0.36	111.90	11.36	11	390328.74	6210489.38	READ
G3131	Y	0.15	102.89	34.64	34.49	358848.48	6229918.61	READ
G3132	Y	0.27	105.79	26.92	26.65	373372.89	6230780.13	READ
G3134	Y	0.39	108.45	19.63	19.24	383584.44	6221507.79	READ
G3138	Y	0.15	106.29	23.53	23.38	369522.18	6233806.63	READ
G3180	Y	0.15	97.54	9.70	9.55	336071.79	6228227.06	READ
G3260	Y	0.25	106.81	37.86	37.61	374066.72	6222725.05	READ
G3261	Y	0	110.88	19.70	19.7	377963.00	6227400.19	READ
G3266	Y	0	112.09	26.24	26.24	377294.70	6222245.29	READ
G327	Y	0.2	132.38	8.22	8.02	429225.36	6208425.14	READ
G3285	Y	0.05	116.29	15.58	15.53	393327.46	6203961.69	READ
G3287	Y	0.17	104.23	24.36	24.19	362749.44	6221819.28	READ

G3288	Y	0.15	103.79	33.55	33.4	361796.64	6214484.68	READ
G3301	Y	0	104.57	26.76	26.76	364196.84	6219372.37	READ
G3322	Y	0.25	104.25	24.71	24.46	360095.45	6205095.49	READ
G3327	Y	0.3	107.00	21.67	21.37	375738.90	6220840.71	READ
G3337	Y	0.17	99.56	21.70	21.53	346908.83	6226974.87	READ
G3366	Y	0.15	104.55	26.50	26.35	365125.77	6214013.99	READ
G3367	Y	0	106.16	15.65	15.65	370258.03	6211728.26	READ
G3369	Y	0.22	121.04	26.04	25.82	412216.62	6217385.88	READ
G3370	Y	0	117.88	23.00	23	410324.73	6219775.60	READ
G3371	Y	0	115.38	21.67	21.67	409322.86	6217745.44	READ
G3376	Y	0.1	103.78	23.46	23.36	360875.91	6207531.87	READ
G3379	Y	0.16	105.76	21.38	21.22	367504.32	6206773.90	READ
G3392	Y	0.33	95.17	25.53	25.2	326892.45	6231521.03	READ
G343	Y	0.1	130.86	13.10	13	425371.17	6204163.50	READ
G352	Y	0.12	132.82	9.05	8.93	429871.68	6208181.60	READ
G370	Y	0.58	120.39	23.32	22.74	402645.53	6192838.77	READ
G371	Y	0.25	121.39	24.85	24.6	402111.60	6189411.76	READ
G373	Y	0.12	123.58	16.00	15.88	409477.35	6184255.66	READ
G374	Y	0.3	120.94	28.73	28.43	405186.88	6199485.86	READ
G381	Y	0	119.57	9.86	9.86	406328.78	6204231.76	READ
G384	Y	0.1	124.94	8.79	8.69	412880.52	6196570.93	READ
G407	Y	0.27	120.96	13.42	13.15	401352.16	6195093.17	READ
G431	Y	0.37	115.60	10.30	9.93	396509.77	6205582.26	READ
G432	Y	0.1	116.44	29.49	29.39	393386.29	6204291.75	READ
G441	Y	0.1	121.78	21.20	21.1	401924.16	6188014.60	READ
G443	Y	0.22	0.00	25.54	25.32	404865.67	6185454.41	READ
G451	Y	0.5	122.68	29.06	28.56	407990.32	6186307.66	READ
G458	Y	0.1	118.24	37.16	37.06	404540.66	6207283.44	READ
G459	Y	0.55	118.96	30.30	29.75	406883.61	6206283.42	READ
G461	Y	0.1	118.90	8.77	8.67	405107.83	6204556.60	READ
G462	Y	0.02	119.69	4.04	4.02	407356.95	6203941.46	READ
G469	Y	0.28	117.12	21.59	21.31	401085.58	6204905.32	READ
G470	Y	0.45	115.92	18.30	17.85	398058.62	6205368.58	READ
G471	Y	0.23	115.95	28.79	28.56	394993.86	6205807.15	READ
G487	Y	0.15	117.74	8.85	8.7	398191.76	6202017.39	READ
G494	Y	0	117.72	8.60	8.6	398406.55	6203591.24	READ
G500	Y	0.44	124.90	17.79	17.35	414191.00	6184506.00	READ
G508	Y	0.1	124.66	9.22	9.12	416976.87	6192953.99	READ
G511	Y	0.33	115.53	26.48	26.15	398331.42	6208646.53	READ
G515	Y	1.2	112.62	32.45	31.25	388906.44	6206155.01	READ
G521	Y	0.25	111.79	16.13	15.88	388688.65	6219167.33	READ

G522	Y	0.26	111.55	23.26	23	386595.33	6219441.77	READ
G527	Y	0.36	113.86	18.57	18.21	393488.41	6216132.03	READ
G532	Y	0.43	0.00	26.32	25.89	404283.86	6181212.97	READ
G534	Y	0.38	113.38	31.42	31.04	392942.92	6211275.97	READ
G535	Y	0.53	113.43	14.03	13.5	392940.17	6211274.83	READ
G537	Y	0.51	112.15	26.21	25.7	390552.80	6212441.73	READ
G543	Y	0.1	112.52	13.90	13.8	395221.50	6217740.77	READ
G544	Y	0.45	114.05	31.93	31.48	394700.56	6213891.02	READ
G555	Y	0.2	114.22	7.74	7.54	389509.63	6204191.32	READ
G561	Y	0.1	118.44	29.20	29.1	399381.25	6198714.23	READ
G620	Y	0.23	116.94	10.57	10.34	392516.78	6197944.57	READ
G628	Y	0.31	0.00	41.33	41.02	403904.29	6178236.77	READ
G651	Y	0.33	115.03	16.48	16.15	411236.30	6213259.06	READ
G657	Y	0	122.30	28.50	28.5	412571.88	6213480.08	READ
G670	Y	0.1	116.46	34.07	33.97	401128.84	6206997.40	READ
G672	Y	0.34	115.16	25.74	25.4	399395.03	6213192.81	READ
G674	Y	0.6	106.14	18.41	17.81	407694.59	6212739.15	READ
G677	Y	0.4	122.73	35.22	34.82	403398.37	6212618.27	READ
G679	Y	0.5	113.27	11.93	11.43	400829.72	6212994.05	READ
G689	Y	0.3	123.84	8.74	8.44	412873.69	6198485.00	READ
G696	Y	0.3	122.26	9.42	9.12	409912.60	6197942.32	READ
G697	Y	0.18	122.16	9.65	9.47	409961.91	6198265.52	READ
G710	Y	0.6	111.47	24.24	23.64	386893.29	6221728.91	READ
G718	Y	0.3	0.00	11.33	11.03	401801.49	6187275.79	READ
G738	Y	0.55	0.00	10.53	9.98	401776.46	6186513.60	READ
G752	Y	0.15	110.37	14.60	14.45	386401.98	6217817.97	READ
G766	Y	0	111.75	5.74	5.74	385010.84	6206030.33	READ
G793	Y	0.15	117.40	44.45	44.3	403848.92	6202475.42	READ
G800	Y	0.25	126.52	13.85	13.6	418252.84	6205394.85	READ
G813	Y	0.55	116.52	7.89	7.34	394496.35	6200946.10	READ
G819	Y	0	117.31	5.52	5.52	394677.90	6200920.42	READ
L1056	Y	0.35	135.71	13.24	12.89	439989.00	6178593.00	READ
L1159	Y	0.76	135.55	8.24	7.48	445382.00	6180810.00	READ
L120	Y	0.26	133.77	10.58	10.32	441944.00	6184630.00	READ
L1237	Y	0.22	133.80	13.61	13.39	441737.00	6183191.00	READ
L1305	Y	0.18	127.48	22.41	22.23	419534.00	6186452.00	READ
L1326D	Y	0.24	127.83	21.35	21.11	421789.00	6190113.00	READ
L1326S	Y	0.4	127.83	22.49	22.09	421789.00	6190113.00	READ
L1413D	Y	0.19	126.43	11.36	11.17	419505.00	6192203.00	READ
L1413S	Y	0.32	126.43	6.81	6.49	419505.00	6192203.00	READ
L1419D	Y	0.36	132.41	22.22	21.86	429985.00	6181294.00	READ

L1419S	Y	0.61	132.47	5.71	5.1	429983.00	6181295.00	READ
L1446	Y	0.7	128.47	21.80	21.1	424377.00	6185860.00	READ
L1448	Y	0.25	128.26	15.15	14.9	423923.00	6188062.00	READ
L1460D	Y	0.37	128.00	19.84	19.47	424396.00	6190742.00	READ
L1460S	Y	0.45	128.00	13.83	13.38	424396.00	6190742.00	READ
L1529	Y	0.39	133.62	11.94	11.55	443846.00	6184186.00	READ
L1531D	Y	0.4	128.91	20.60	20.2	423620.00	6180987.00	READ
L1531S	Y	0.07	128.90	10.22	10.15	423620.00	6180988.00	READ
L1532	Y	0.07	129.40	20.25	20.18	422151.00	6181677.00	READ
L1533D	Y	0.11	129.93	20.35	20.24	424859.00	6183504.00	READ
L1533S	Y	0.19	130.33	21.37	21.18	424861.00	6183501.00	READ
L1534D	Y	0.43	129.55	10.55	10.12	425014.00	6184704.00	READ
L1534S	Y	0.6	129.55	13.94	13.34	425014.00	6184702.00	READ
L1535D	Y	0.16	129.50	2.56	2.4	423686.00	6182719.00	READ
L1535S	Y	0.23	129.58	7.91	7.68	423687.00	6182720.00	READ
L1536D	Y	0.28	129.13	23.05	22.77	422354.00	6184163.00	READ
L1536S	Y	0.44	129.11	13.35	12.91	422354.00	6184164.00	READ
L1537	Y	0.52	135.23	15.04	14.52	444043.00	6179588.00	READ
L1551	Y	0.15	133.76	13.00	12.85	443892.00	6182762.00	READ
L1560	Y	0.63	133.85	7.25	6.62	442864.00	6182659.00	READ
L1560TW	Y	0	133.86	2.42	2.42	442866.54	6182659.00	READ
L1565	Y	0.16	125.59	24.16	24	417312.00	6190767.00	READ
L1602	Y	0.19	139.39	11.05	10.86	445840.00	6169356.00	READ
L1603	Y	0.37	133.06	13.32	12.95	434363.00	6188683.00	READ
L1612	Y	0	137.39	6.45	6.45	442387.00	6193049.00	READ
L1628	Y	0.38	134.05	9.78	9.4	441749.00	6181801.00	READ
L1640	Y	0.25	132.81	8.59	8.34	431201.00	6180438.00	READ
L1642	Y	0.03	135.82	7.65	7.62	438457.00	6175870.00	READ
L1646	Y	0.22	135.72	13.12	12.9	441065.00	6171272.00	READ
L1654	Y	0.35	133.05	15.57	15.22	439222.00	6185445.00	READ
L1662	Y	0.65	133.64	17.11	16.46	439033.00	6183583.00	READ
L1709D	Y	0.11	133.61	13.56	13.45	438075.00	6183059.00	READ
L1709S	Y	0.24	133.57	5.85	5.61	438075.00	6183060.00	READ
L1728	Y	0.38	134.49	16.88	16.5	441857.00	6180653.00	READ
L1729D	Y	0.25	135.30	18.85	18.6	441288.00	6179948.00	READ
L1729S	Y	0.23	135.29	7.59	7.36	441292.00	6179949.00	READ
L1732D	Y	0.63	133.52	10.23	9.6	438790.00	6187947.00	READ
L1732S	Y	0.16	133.57	5.46	5.3	438791.00	6187947.00	READ
L1738	Y	0.4	133.53	13.55	13.15	438578.00	6186653.00	READ
L1739D	Y	0.51	133.51	18.11	17.6	438420.00	6185316.00	READ
L1739M	Y	1	133.50	16.81	15.81	438420.00	6185318.00	READ

L1739S	Y	0.43	133.51	10.17	9.74	438419.00	6185319.00	READ
L1748D	Y	0.41	130.65	13.43	13.02	428446.00	6179466.00	READ
L1748S	Y	0.67	130.67	8.19	7.52	428448.00	6179466.00	READ
L1751	Y	0.25	134.47	24.49	24.24	437898.00	6181831.00	READ
L1753	Y	0.48	135.02	15.63	15.15	437584.00	6179682.00	READ
L1764D	Y	0.63	135.67	14.90	14.27	436827.00	6174767.00	READ
L1764M	Y	0.65	135.66	13.41	12.76	436825.00	6174768.00	READ
L1767	Y	-0.51	134.75	19.54	20.05	436346.00	6170668.00	READ
L1768D	Y	0.22	135.45	9.40	9.18	437069.00	6176155.00	READ
L1768S	Y	0.06	135.44	13.23	13.17	437070.00	6176155.00	READ
L1779D	Y	0.47	119.58	20.27	19.8	403175.94	6196469.74	READ
L1779S	Y	0.57	128.34	13.06	12.49	420714.00	6185533.00	READ
L1784	Y	0	135.73	17.23	17.23	443143.00	6178073.00	READ
L1788	Y	0.08	138.03	12.16	12.08	443000.00	6172507.00	READ
L1792	Y	0.34	132.74	11.06	10.72	435524.00	6189031.00	READ
L1794D	Y	0.21	132.94	13.23	13.02	435661.00	6189992.00	READ
L1800	Y	0.34	132.23	13.54	13.2	435248.00	6187126.00	READ
L1805	Y	0.31	132.03	6.89	6.58	435011.00	6185472.00	READ
L1808	Y	0.34	132.17	8.16	7.82	434846.00	6184349.00	READ
L1810D	Y	0.28	132.19	22.99	22.71	434742.00	6183596.00	READ
L1810S	Y	0.1	132.28	10.95	10.85	434739.00	6183596.00	READ
L1813D	Y	0.31	132.19	24.15	23.84	434609.00	6182653.00	READ
L1813S	Y	0.17	132.13	5.09	4.92	434610.00	6182652.00	READ
L1818	Y	0.22	132.91	17.96	17.74	434363.00	6180972.00	READ
L1826D	Y	0.57	133.10	7.02	6.45	433910.00	6177684.00	READ
L1826S	Y	0.39	133.09	4.89	4.5	433911.00	6177685.00	READ
L1854D	Y	0.55	134.56	6.79	6.24	432237.00	6172929.00	READ
L1854S	Y	0.3	134.51	7.22	6.92	432232.00	6172932.00	READ
L1861D	Y	0.26	133.64	17.56	17.3	431908.00	6170836.00	READ
L1861S	Y	0.45	133.50	6.64	6.19	431905.00	6170831.00	READ
L1866	Y	0.03	131.14	8.25	8.22	428170.00	6181470.00	READ
L1876	Y	0.27	132.96	15.27	15	436114.00	6184968.00	READ
L1881	Y	0.95	132.76	8.33	7.38	436032.00	6186816.00	READ
L1883	Y	0.3	133.32	15.50	15.2	437733.00	6186708.00	READ
L1890	Y	0	133.32	4.87	4.87	435130.00	6180518.00	READ
L1892	Y	0.16	134.23	6.46	6.3	435858.00	6179689.00	READ
L1897	Y	0.03	133.79	8.88	8.85	435904.00	6178059.00	READ
L1899	Y	0.21	134.07	16.45	16.24	434854.00	6177407.00	READ
L1902D	Y	0.74	134.23	16.38	15.64	434049.00	6176014.00	READ
L1902S	Y	0.38	134.05	5.32	4.94	434051.00	6176016.00	READ
L1905D	Y	0.42	134.76	22.84	22.42	435140.00	6175502.00	READ

L1905S	Y	0.24	134.74	9.50	9.26	435140.00	6175499.00	READ
L1913	Y	0.26	130.38	6.94	6.68	429435.00	6186928.00	READ
L1915	Y	0.38	132.84	16.88	16.5	433516.00	6187955.00	READ
L1924D	Y	0.31	132.34	20.48	20.17	431802.00	6189657.00	READ
L1924S	Y	0.36	132.09	4.23	3.87	431805.00	6189654.00	READ
L1927	Y	0.37	131.05	14.59	14.22	431660.00	6188646.00	READ
L1930D	Y	0.52	131.43	24.71	24.19	431511.00	6187618.00	READ
L1930S	Y	0.48	131.24	15.23	14.75	431513.00	6187621.00	READ
L1933D	Y	0.32	132.05	25.94	25.62	431409.00	6186625.00	READ
L1933S	Y	0.38	132.00	7.58	7.2	431417.00	6186628.00	READ
L1935S	Y	0.6	131.49	6.92	6.32	431314.00	6186009.00	READ
L1941	Y	0.26	131.54	20.92	20.66	431020.00	6183951.00	READ
L1943	Y	0.38	127.82	21.56	21.18	423042.00	6190583.00	READ
L1946D	Y	0.26	131.76	23.28	23.02	430805.00	6182435.00	READ
L1946S	Y	0.48	131.86	11.48	11	430807.00	6182437.00	READ
L1947	Y	0.16	131.86	13.41	13.25	430697.00	6181688.00	READ
L1953	Y	0.25	128.14	12.75	12.5	419679.00	6184917.00	READ
L1955	Y	0.2	134.93	17.84	17.64	434987.00	6170761.00	READ
L1958M	Y	0.09	127.81	24.80	24.71	418348.50	6185063.74	READ
L1962D	Y	0.28	131.81	20.58	20.3	429670.00	6178978.00	READ
L1962S	Y	0.28	131.78	7.30	7.02	429670.00	6178976.00	READ
L1963D	Y	0.18	131.52	20.44	20.26	429407.00	6178289.00	READ
L1963S	Y	0.39	131.49	11.75	11.36	429406.00	6178287.00	READ
L1964	Y	0.1	126.36	10.79	10.69	417025.00	6189279.00	READ
L1966	Y	0.45	132.00	13.70	13.25	429012.00	6177436.00	READ
L1970	Y	0.08	131.99	14.33	14.25	428133.00	6176305.00	READ
L1971	Y	0.2	126.61	14.09	13.89	420041.00	6189865.00	READ
L1974	Y	0.07	132.21	14.27	14.2	427933.00	6174877.00	READ
L1976	Y	0.16	128.73	15.28	15.12	421493.00	6183749.00	READ
L1977	Y	0.38	129.07	12.76	12.38	421506.45	6182642.14	READ
L1977M	Y	0.36	132.16	17.19	16.83	427796.00	6173744.00	READ
L1980	Y	0.26	132.34	7.50	7.24	427613.00	6172580.00	READ
L1982D	Y	0.66	132.48	23.31	22.65	427509.00	6171809.00	READ
L1982S	Y	0.21	131.52	5.76	5.55	427501.00	6171806.00	READ
L1991D	Y	0.22	131.18	13.04	12.82	432201.00	6185517.00	READ
L1991S	Y	0.36	131.17	6.09	5.73	432200.00	6185517.00	READ
L1997	Y	0.051	131.69	11.40	11.35	432409.00	6183843.00	READ
L1999	Y	0.42	131.76	13.38	12.96	433396.00	6183113.00	READ
L2002	Y	0.52	131.21	13.76	13.24	432156.00	6182180.00	READ
L2008D	Y	0.15	132.38	3.65	3.5	438242.00	6184271.00	READ
L2008S	Y	0.16	132.40	10.47	10.31	438246.00	6184276.00	READ

L2009	Y	0.18	130.30	23.59	23.41	429100.00	6189914.00	READ
L2015D	Y	0.2	130.77	19.96	19.76	428848.00	6188126.00	READ
L2015S	Y	0.3	130.76	14.37	14.07	428847.00	6188119.00	READ
L2024D	Y	0.54	129.93	13.11	12.57	429154.00	6184750.00	READ
L2024S	Y	0.29	130.23	12.35	12.06	429161.00	6184757.00	READ
L2029D	Y	0.12	131.36	20.32	20.2	428927.00	6183173.00	READ
L2029S	Y	0.16	131.10	11.18	11.02	428930.00	6183172.00	READ
L2044D	Y	0.31	132.63	20.18	19.87	429543.00	6180591.00	READ
L2044S	Y	0.2	132.63	9.00	8.8	429543.00	6180592.00	READ
L2047D	Y	0.17	132.10	13.37	13.2	435124.00	6186223.00	READ
L2047S	Y	0.42	132.37	5.40	4.98	435126.00	6186224.00	READ
L2052D	Y	0.18	130.62	7.36	7.18	427194.00	6180096.00	READ
L2052S	Y	0.16	130.61	19.60	19.44	427192.00	6180097.00	READ
L2057	Y	0.03	130.56	10.49	10.46	427326.00	6182563.00	READ
L2066	Y	0.26	131.84	7.88	7.62	431594.00	6181241.00	READ
L2069	Y	0.29	133.24	22.65	22.36	432627.00	6178707.00	READ
L2075D	Y	0.27	134.06	20.79	20.52	437272.00	6177708.00	READ
L2075S	Y	0.42	134.06	7.90	7.48	437272.00	6177708.00	READ
L2089D	Y	0.38	133.00	21.41	21.03	431550.00	6178372.00	READ
L2089S	Y	0.54	133.00	10.26	9.72	431551.00	6178371.00	READ
L2090	Y	0.26	133.22	22.84	22.58	431994.00	6177578.00	READ
L2108D	Y	0.25	129.78	23.96	23.71	426017.00	6181033.00	READ
L2108S	Y	0.28	129.78	7.93	7.65	426017.00	6181033.00	READ
L2117D	Y	0.24	129.96	23.16	22.92	425340.00	6181538.00	READ
L2117S	Y	0.24	129.96	11.93	11.69	425340.00	6181539.00	READ
L2121	Y	0.26	129.08	21.81	21.55	425647.00	6183659.00	READ
L2124D	Y	0.25	128.95	24.56	24.31	425777.00	6184616.00	READ
L2124S	Y	0.21	128.95	9.07	8.86	425776.00	6184615.00	READ
L2126	Y	0.19	128.47	19.69	19.5	425853.00	6185235.00	READ
L2128D	Y	0.27	129.19	21.59	21.32	425982.00	6186034.00	READ
L2128S	Y	0.23	129.19	7.84	7.61	425982.00	6186033.00	READ
L2131D	Y	0.22	129.39	22.53	22.31	426225.00	6187716.00	READ
L2131S	Y	0.17	129.40	13.23	13.06	426232.00	6187720.00	READ
L2135	Y	0.25	129.46	28.11	27.86	426520.00	6189767.00	READ
L2139D	Y	0.31	128.85	24.30	23.99	426848.00	6191926.00	READ
L2139S	Y	0.39	128.94	11.23	10.84	426854.00	6191920.00	READ
L2158	Y	0.27	134.33	10.28	10.01	444279.00	6181379.00	READ
L2163	Y	0.24	134.72	16.74	16.5	442992.00	6180494.00	READ
L2166	Y	0.34	133.87	11.85	11.51	442145.00	6185746.00	READ
L2184D	Y	0.27	132.90	21.57	21.3	432289.00	6179881.00	READ
L2184S	Y	0.37	132.90	11.72	11.35	432289.00	6179881.00	READ

L2185	Y	0.3	135.30	15.45	15.15	439282.00	6181038.00	READ
L2186	Y	0.31	134.10	14.47	14.16	440462.00	6182105.00	READ
L2191	Y	0.26	136.19	24.01	23.75	439401.00	6176167.00	READ
L2210A	Y	0.12	134.05	11.54	11.42	438438.00	6177768.00	READ
L2210TW	Y	0.2	133.95	11.42	11.22	438438.00	6177767.00	READ
L2241D	Y	0.18	138.71	6.19	6.01	446431.00	6171936.00	READ
L2241S	Y	0.33	138.70	8.20	7.87	446430.00	6171936.00	READ
L2243	Y	0.22	140.13	13.22	13	446910.00	6170128.00	READ
L2245	Y	0	137.70	6.04	6.04	446254.00	6174776.00	READ
L2250	Y	0.12	136.63	14.74	14.62	441992.00	6174417.00	READ
L2251	Y	0.06	141.34	14.30	14.24	447367.00	6167012.00	READ
L2258D	Y	0.22	135.78	11.17	10.95	443306.00	6174591.00	READ
L2258S	Y	0.3	135.78	5.08	4.78	443306.00	6174591.00	READ
L2261	Y	0.26	131.42	15.47	15.21	429884.00	6178023.00	READ
L2275D	Y	0.21	133.18	62.16	61.95	436459.00	6182421.00	READ
L2275M	Y	0.4	133.19	24.70	24.3	436459.00	6182420.00	READ
L2275S	Y	0.32	133.19	14.89	14.57	436459.00	6182420.00	READ
L2278D	Y	0.31	136.46	28.30	27.99	440558.00	6178172.00	READ
L2278S	Y	0.32	136.41	11.73	11.41	440564.00	6178173.00	READ
L2279	Y	0.37	134.33	10.79	10.42	445017.00	6183113.00	READ
L2287D	Y	0.36	133.95	23.82	23.46	439622.00	6186502.00	READ
L2287S	Y	0.22	133.95	17.40	17.18	439622.00	6186502.00	READ
L2299D	Y	0.18	133.22	3.35	3.17	440714.00	6186377.00	READ
L2299S	Y	0.18	133.14	7.68	7.5	440711.27	6186420.00	READ
L2302D	Y	0.25	137.01	22.19	21.94	442262.00	6176403.00	READ
L2302S	Y	0.32	137.03	7.20	6.88	442263.00	6176402.00	READ
L2314D	Y	0.25	136.99	19.84	19.59	443361.00	6174989.00	READ
L2314M	Y	0.32	136.99	13.74	13.42	443362.00	6174990.00	READ
L2314S	Y	0.41	136.99	7.36	6.95	443362.00	6174990.00	READ
L2317D	Y	0.31	137.34	15.27	14.96	445359.00	6173998.00	READ
L2317S	Y	0.3	137.33	7.10	6.8	445357.00	6174000.00	READ
L2328	Y	0	137.33	9.00	9	442137.00	6177032.00	READ
L2329D	Y	0.23	136.62	25.19	24.96	441441.00	6177124.00	READ
L2329S	Y	0.19	136.62	10.90	10.71	441441.00	6177124.00	READ
L2334D	Y	0.26	135.73	27.50	27.24	439529.00	6179590.00	READ
L2334S	Y	0.25	135.74	10.00	9.75	439529.00	6179589.00	READ
L2340	Y	0.17	133.76	5.03	4.86	439223.00	6178688.00	READ
L2347D	Y	0.21	135.43	9.50	9.29	442063.00	6178840.00	READ
L2347S	Y	0.29	135.43	14.25	13.96	442064.00	6178839.00	READ
L2357D	Y	0.1	137.04	17.16	17.06	443732.00	6177489.00	READ
L2357S	Y	0.11	137.14	9.30	9.19	443733.00	6177490.00	READ

L2364	Y	0.37	135.08	11.69	11.32	444694.00	6178298.00	READ
L2371	Y	0.29	137.85	17.02	16.73	443651.00	6169669.00	READ
L2391	Y	0.34	138.28	8.24	7.9	445359.00	6172029.00	READ
L2408	Y	0.3	138.62	13.38	13.08	444532.00	6172284.00	READ
L2437D	Y	0.44	137.90	18.52	18.08	444902.00	6174022.00	READ
L2437S	Y	0.25	137.87	12.37	12.12	444902.00	6174023.00	READ
L2442	Y	0.02	134.31	8.67	8.65	435204.00	6179118.00	READ
L2443	Y	0.44	132.32	5.76	5.32	433553.00	6179330.00	READ
L2444	Y	0.25	134.12	11.27	11.02	436403.00	6179049.00	READ
L2452D	Y	0.2	130.86	11.92	11.72	430015.00	6188582.00	READ
L2452S	Y	0.3	131.14	14.62	14.32	430020.00	6188576.00	READ
L2453	Y	0.09	130.23	8.31	8.22	427950.00	6188874.00	READ
L2467D	Y	0.23	131.91	24.73	24.5	432585.00	6186735.00	READ
L2467S	Y	0.26	131.95	9.91	9.65	432585.00	6186729.00	READ
L2468	Y	0.2	130.91	14.89	14.69	430429.00	6186788.00	READ
L2469	Y	0.25	134.72	11.87	11.62	445502.00	6182044.00	READ
L2479	Y	0.25	138.52	6.87	6.62	446272.00	6173832.00	READ
L2481	Y	0.1	131.54	17.02	16.92	433852.00	6187074.00	READ
L2482D	Y	0.28	131.90	16.36	16.08	434451.90	6187002.32	READ
L249	Y	0	142.69	16.76	16.76	453333.00	6161051.00	READ
L2498	Y	0.36	129.48	12.50	12.14	428186.00	6184593.00	READ
L2499	Y	0.3	129.93	12.50	12.2	427870.00	6187154.00	READ
L251	Y	0	141.47	10.05	10.05	451003.00	6163123.00	READ
L2584	Y	0.38	131.82	10.70	10.32	433375.00	6185350.00	READ
L2588	Y	0.37	131.91	12.02	11.65	434035.00	6185255.00	READ
L259	Y	0.38	133.54	10.78	10.4	430116.00	6175981.00	READ
L2602	Y	0.53	136.31	20.64	20.11	439546.00	6173495.00	READ
L2646	Y	0.22	134.79	20.22	20	436407.00	6171914.00	READ
L2657	Y	0.23	133.69	18.71	18.48	432669.00	6175731.00	READ
L2679D	Y	0.19	132.69	20.55	20.36	434151.00	6179166.00	READ
L2679S	Y	0.1	132.60	7.72	7.62	434154.00	6179166.00	READ
L2690	Y	0.35	131.50	20.92	20.57	428323.00	6178794.00	READ
L2705	Y	0.54	126.80	14.35	13.81	419454.99	6190177.79	READ
L2717	Y	0.19	125.08	14.28	14.09	416969.00	6191525.00	READ
L2762	Y	0.13	130.69	18.86	18.73	423459.56	6172845.19	READ
L2788	Y	0.14	139.70	13.30	13.16	445559.00	6167174.00	READ
L2791	Y	0.17	130.73	22.06	21.89	425707.00	6168005.00	READ
L2794	Y	0.47	0.00	9.50	9.03	427194.00	6165242.00	READ
L2795	Y	0.29	0.00	20.80	20.51	433346.00	6166286.00	READ
L2796D	Y	0.26	0.00	20.31	20.05	436321.00	6166465.00	READ
L2797	Y	0.29	0.00	22.87	22.58	439295.00	6166677.00	READ

L2798	Y	0.23	0.00	16.36	16.13	441918.00	6166546.00	READ
L2799	Y	0.37	137.97	21.78	21.41	443424.00	6164260.00	READ
L2800S	Y	0.33	0.00	14.14	13.81	443926.00	6161526.00	READ
L2802	Y	0.29	0.00	23.23	22.94	440020.00	6162061.00	READ
L2851	Y	0.46	131.46	18.32	17.86	420298.00	6169854.00	READ
L2852	Y	0	128.95	11.96	11.96	423854.00	6175696.00	READ
L2853	Y	0.42	130.20	16.28	15.86	424105.00	6177463.00	READ
L2856	Y	0.18	129.04	14.34	14.16	424402.00	6179941.00	READ
L2865	Y	0.3	135.35	3.23	2.93	439410.00	6192323.00	READ
L2875	Y	0.33	131.12	16.80	16.47	427135.00	6181429.00	READ
L2922	Y	0.2	138.05	12.58	12.38	446333.00	6172679.00	READ
L2983	Y	0.33	136.56	19.24	18.91	439868.00	6170011.00	READ
L2994	Y	0.31	133.98	19.91	19.6	430268.00	6170338.00	READ
L3040	Y	0.33	138.81	4.65	4.32	442808.00	6195833.00	READ
L3042	Y	0.3	138.45	5.22	4.92	441825.00	6195202.00	READ
L3044	Y	0.26	138.14	24.06	23.8	440124.00	6197376.00	READ
L3050	Y	0.23	137.56	12.76	12.53	439859.00	6195530.00	READ
L3079	Y	0.16	138.09	13.21	13.05	439999.00	6196518.00	READ
L3082	Y	0.25	136.87	7.20	6.95	439672.00	6194437.00	READ
L3084	Y	0.25	137.10	5.27	5.02	439705.00	6194701.00	READ
L3085	Y	0.34	136.02	7.32	6.98	439496.00	6193258.00	READ
L3126	Y	0.38	134.23	9.48	9.1	440486.00	6187791.00	READ
L3127	Y	0.28	135.23	10.47	10.19	442354.00	6187532.00	READ
L3128	Y	0.18	135.15	9.98	9.8	442300.00	6188924.00	READ
L3130	Y	0.41	133.73	8.98	8.57	438970.00	6189416.00	READ
L3131	Y	0.45	133.73	10.56	10.11	437444.00	6189597.00	READ
L3132	Y	0.4	134.77	7.81	7.41	439189.00	6190704.00	READ
L3133	Y	0.27	135.50	10.64	10.37	440834.00	6190482.00	READ
L3135	Y	0.4	136.01	9.10	8.7	440770.00	6191864.00	READ
L3136	Y	0.4	136.03	10.40	10	438410.00	6193349.00	READ
L580	Y	0.05	131.42	6.63	6.58	425501.00	6170615.00	READ
L595	Y	0.43	140.51	9.13	8.70	449273.00	6166550.00	READ