



Groundwater Management “A Drought Response”

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MANAGER GROUNDWATER
&
UNREGULATED SYSTEMS



Overview

- G-MW's role in groundwater management
- Current issues
- Monitoring
- Management Plan Development Process
- Trading Rules & Interference Assessments
- Current & future demand
- Opportunities



G-MW's Role

- The Ministers Licensing Authority for groundwater, GMW issue Section 51 and Section 67 licenses
- Work closely with DSE on determining PCV figures
- Development of Groundwater Management Rules/Plans within Capped GMA's
- Process all trades both Permanent & Temporary of groundwater



Groundwater Status

- Groundwater Management Area (GMA) is a management unit
- Water Supply Protection Area (indicates stress)
- Groundwater Management Plan (developed post WSPA to manage intensive areas)
- G-MW manage to level response within plan areas



Current Issues

- Increased usage – awakening entitlement
- Reduced recharge
- Increased political/ community interest- scrutiny
- Developing markets for trade
- Adequately assessing the movement of traded water



Monitoring

- 1,500 State Observation Bores within G-MW area of operation
- Data gathered monthly & quarterly
- Data held on Statewide database
- G-MW data to inform management decisions

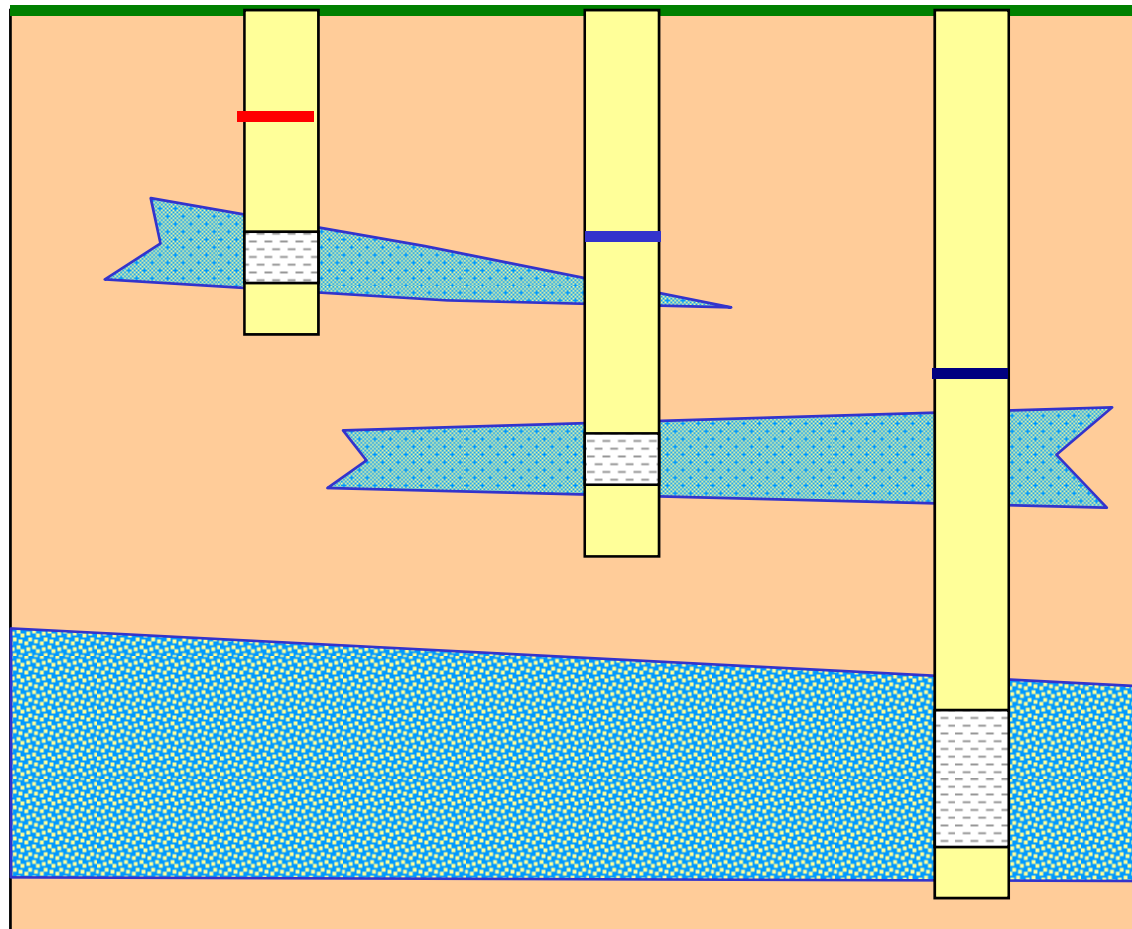


Groundwater levels

Upper Shepparton

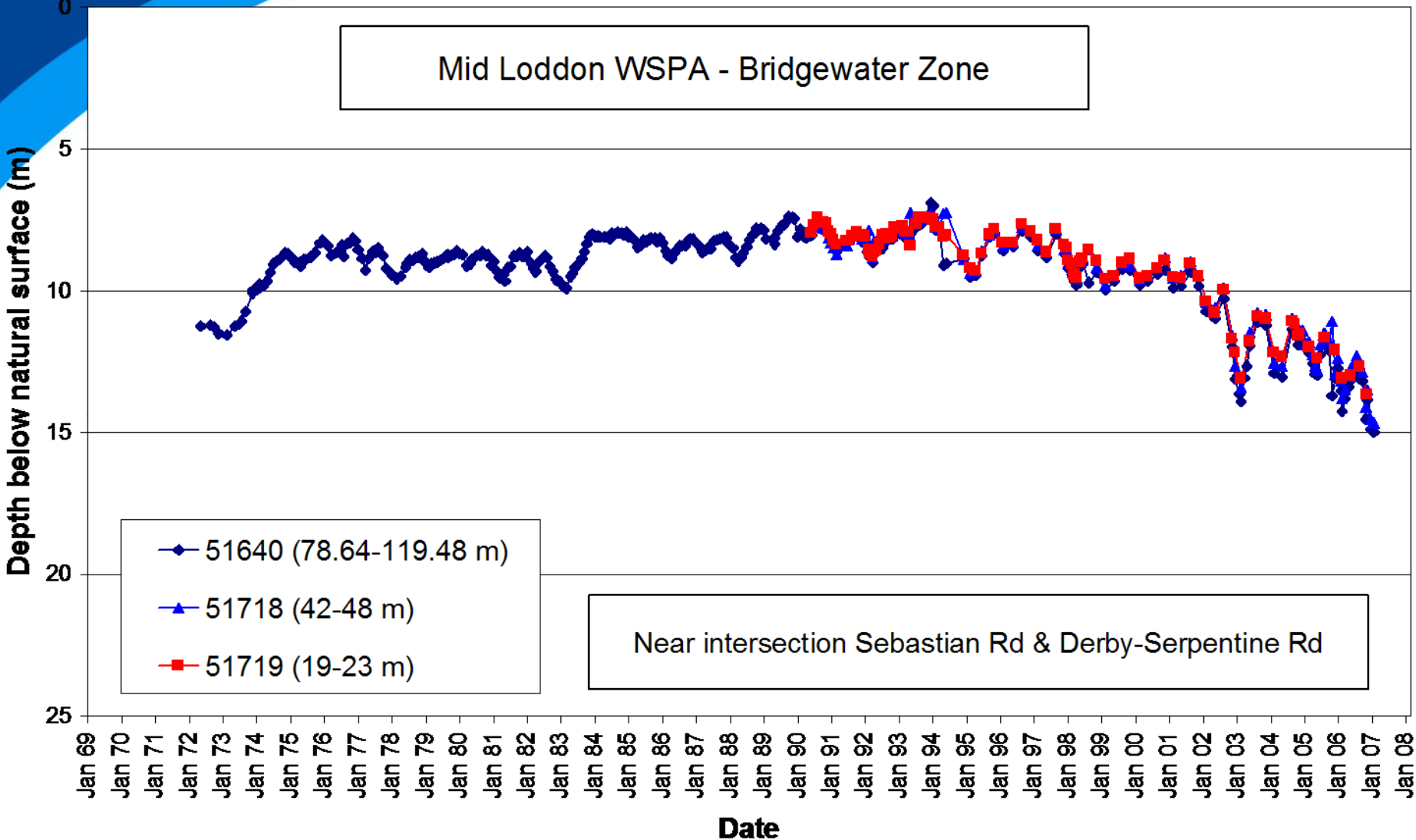
Lower Shepparton

Deep Lead





1013 groundwater levels





Groundwater Management Considerations

- Collaborative approach of Government & Community working together
- Define rules around managing the resource including
 - PCV
 - Managing intensity of pumping
 - Permanent & Temporary Trade
 - Carryover
 - Define EWR
 - Identify management regime for GDE's
 - Provide prescriptive operational rules



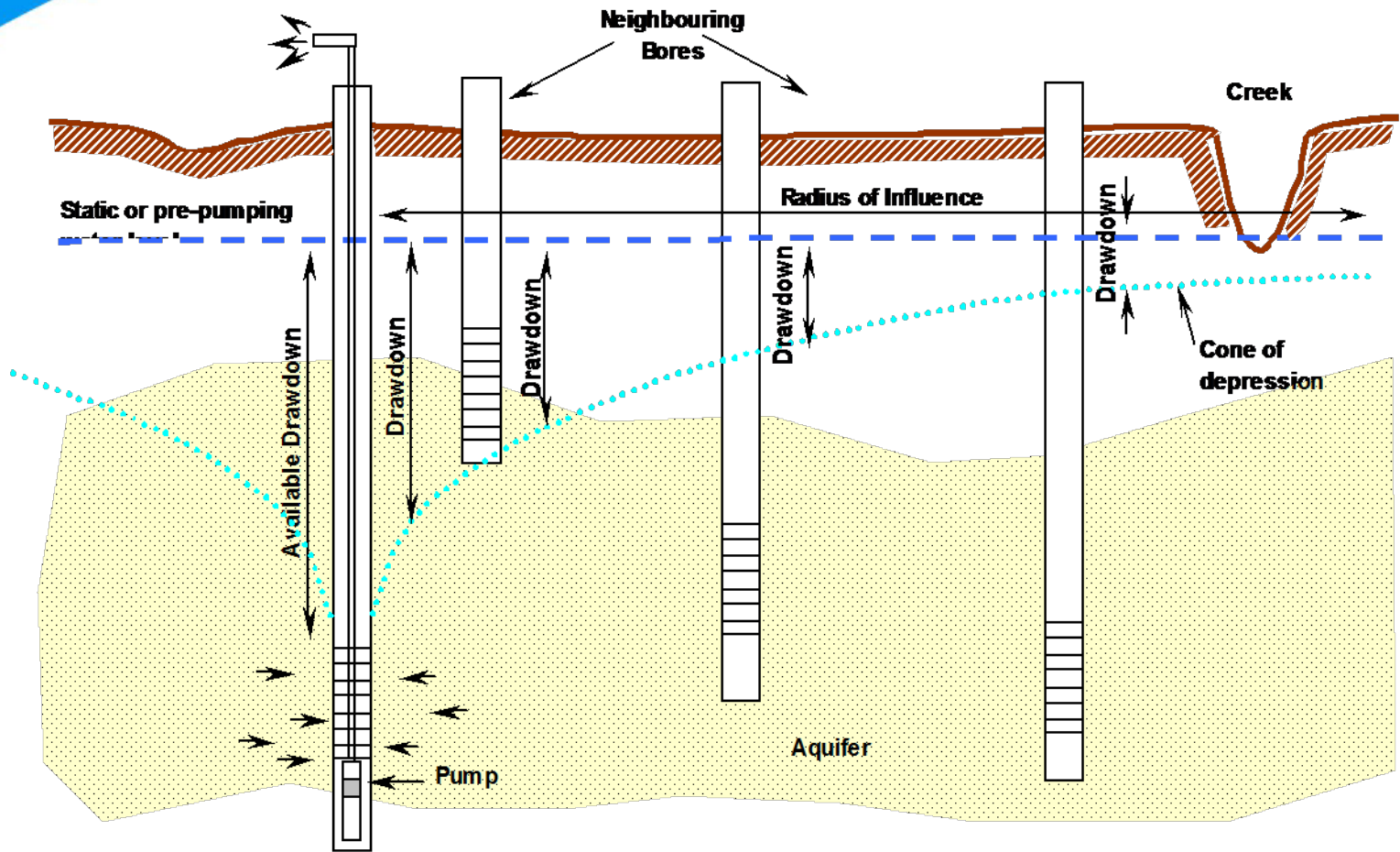
The Planning Process

- Establish Technical Working Group
- Establish Committee of representative users
- TWG Provides Committee with technical work to make management decisions
- Consult management rules with wider users
- Submit draft plan to Minister for Water



Trading Groundwater G-MW Considerations

- Both Permanent & Temporary Trade
- Increased draw-down within the aquifer
- Considerations of Section 40 Water Act 1989
- G-MW have developed interference assessment tool
- Predicts amount of available draw-down in surrounding bores





Interference Assessment Tool

- Desktop study
- Predicts available draw-down based on aquifer characteristics
- Provides robust assessment of groundwater licensing and trade



GROUNDWATER INTERFERENCE ASSESSMENT TOOL

APPLICATION DETAILS

APPLICANT	
TAX No.	

ASSESSMENT RECORD

DMW Project Officer:	Brendan Cozzens
Approved By:	
Date:	20/9/2008
DOC#:	2342923

APPLICANT LICENSED BORE DETAILS

Bore ID	Eastng	Northing	Depth (m)	Screen from (m)	Screen to (m)	Screened lithology	Pump depth setting (m)	Standing water level (m)	Bore radius (m)	License Number	License entitlement (ML)	License max daily extraction rate (ML/d)	Proposed season usage (ML)	Input data reliability rating
138733	236781	5862038	55			Basalt	53	8	0.15	8003161	30	1.5	100	High
														NA
														NA

AQUIFER DETAILS

WSPA / GMA	Formation	Aquifer type	Transmissivity m ² /s	Storativity
Spring Hill	Island	unconfined	100	0.006

PUMPING VOLUME

Transfer volume (ML)	Total entitlement
100	130

SPRING HILL RESTRICTION

Allocation % of entitlement	Extraction Volume (ML)	Risk assessment
80%	100	Required

SURROUNDING BORE DETAILS

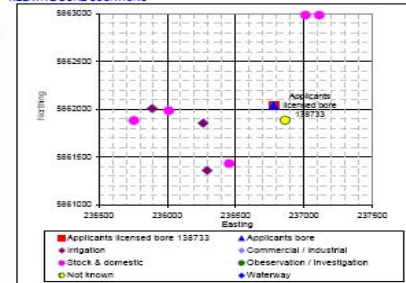
BORE ID	Eastng	Northing	Depth (m)	Screen from (m)	Screen to (m)	Screened lithology	Pump depth setting (m)	Standing water level (m)	Use code	Use	Include in analysis	Input data reliability rating
52484	236891	5862007	38	6	24.3	BASA	32	15	BT DM D3 IR	Irrigation	Yes	High
52631	236293	5861368	43				73	15		Irrigation	Yes	Moderate
138773	236778	5862039	56			BASA	64	8	IR	Applicants bore	No, applicants bore	Moderate
52492	236863	586188a	162			BASA	160	17	NKN	Not known	Yes	Moderate
52631	236263	5861854	108			NOT	106	15	IR	Irrigation	NA	Moderate
52635	236464	5861429	12				5	5	ST	Stock & domestic	No, poor hydraulic connect	Moderate
52486	236013	5861984	46			NOT	44	10	BT DM	Stock & domestic	Yes	Moderate
52475	237013.11	5862984.3	34	22	34	NOT	32	9	DM	Stock & domestic	Yes	Moderate
52614	237113.11	5862984.3	71			BASA	69	20	BT DM	Stock & domestic	Yes	Moderate
52484	236788	5861881	24.3	6	24.3	BASA	20	20	BT DM D3 IR	Stock & domestic	NA	NA
											NA	NA
											NA	NA
											NA	NA
											NA	NA
											NA	NA

RESULTS

Drawdown and % of available drawdown for pumping for 14 days and continuously until at entitlement extracted.

Bore	Distance (m) from bore 138733	Available drawdown (m)	Drawdown (m)	% available drawdown	Pumping for 14 days Drawdown (m)	% available drawdown	Pumping for 66.33333333333333 days Drawdown (m)	% available drawdown
138733	0	48.0	23	50%	24.6	55%		
52484	891	17.0	0	3%	2.0	12%		
52631	837	58.0	1	1%	2.1	4%		
138773	3							
52492	174	143.0	4	3%	6.1	4%		
52631	580							
52635	691							
52486	770	34.0	1	2%	2.3	7%		
52475	874	23.0	0	2%	1.8	8%		
52614	1008	39.0	0	1%	1.7	4%		
52484	1038							

RELATIVE BORE LOCATIONS



RISK ASSESSMENT

% reduction in available draw down	Data Reliability		
	Poor	Moderate	Good
0%	High	Low	Low
5%	High	Medium	Low
10%	High	Medium	Medium
15%	High	High	Medium
20%	High	High	High

The greatest drawdown for neighbouring bores based on 14 days continuous pumping is estimated to be:

Site	% reduction drawdown
52484	3%

Data reliability	Risk of interference
Moderate	Low

The greatest drawdown for neighbouring bores based on continuous pumping until entitlement pumped is:

Site	% reduction drawdown
52484	12%

Data reliability	Risk of interference
Moderate	Medium

RECOMMENDATION

Approve transfer application with condition that maximum extraction over a 28 day period must not exceed 21 ML. This will allow for up to 14 days pumping and 14 days recovery.



Issues - Challenges

- Declining Surface water availability
- Increased interest in groundwater development
- Competing interests (urban/ irrigation)
- Declining rainfall = Declining recharge
- Managing Irrigation & Domestic & Stock
- Managing Urban Supply and Emergency Drought Supply Bores

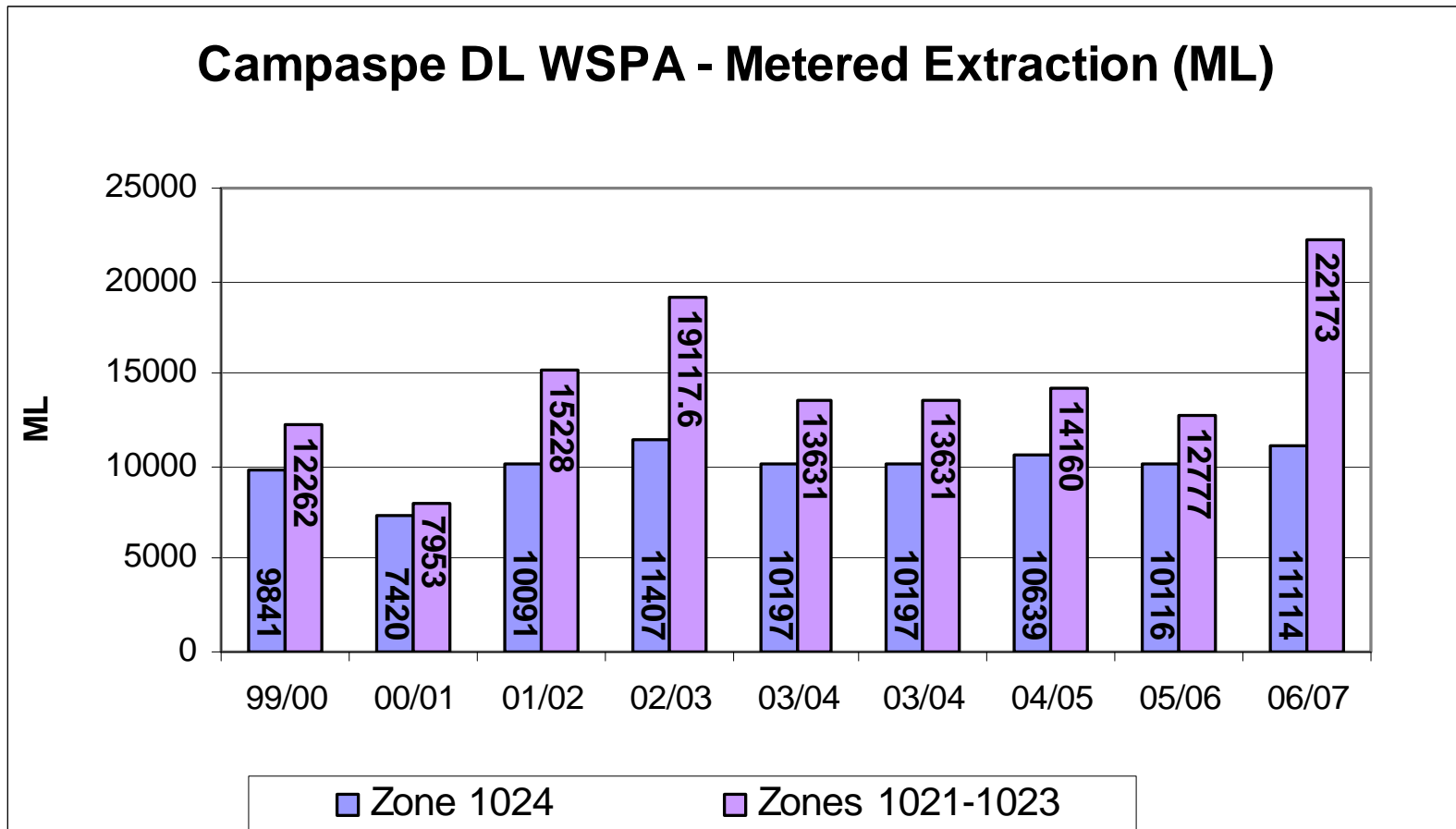


Demand

- Increased dramatically over the last decade
- Strong Correlation with low surface water
- Demand highest in drought periods
- Augmentation of Urban Supplies
- Strong need for Management plans outlining water sharing arrangements

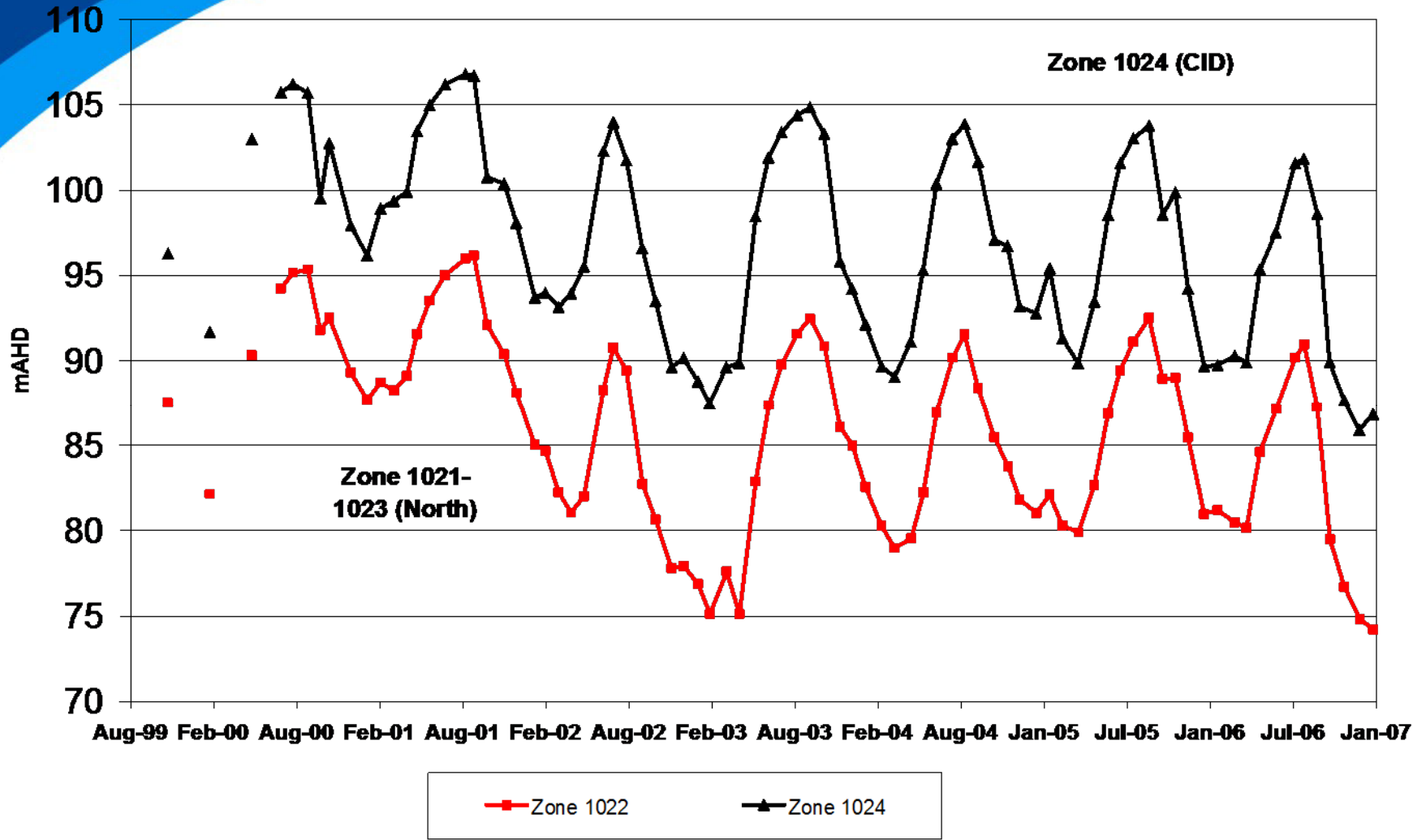


Entitlement 46251 ML Usage





Average Level Hydrographs for the Campaspe WSPA Zones





Opportunities

- Increased awareness in Groundwater Management
- Whole of Catchment approach
- Conjunctive Management
- Adaptive Management Rules



Conclusion

- G-MW have responded to drought
- Worked with community & Government to implement Management Plans
- Introduced trade to increase options
- Utilise monitoring to inform management decisions



Acknowledgements

- Cossens, B. G-MW
- Jones, G. GHD