

**Environmental Management of Groundwater  
Abstraction from the Gnangara Mound  
July 2003 – June 2004  
- Annual Compliance Report**

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**Water and Rivers Commission**

**Report by the Environmental Protection Authority  
under section 48(1a) of the *Environmental Protection Act 1986***

**Environmental Protection Authority  
Perth, Western Australia  
Bulletin 1187  
August 2005**

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DoE Information Centre



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## **1. Introduction and background**

Groundwater abstraction from the Gngangara Mound is subject to environmental conditions issued by the Minister for the Environment in Statement 438 - Gngangara Mound Groundwater Resources, and Statement 496 – Groundwater Resource Allocation, East Gngangara, Shire of Swan on 6 February 1997 and 17 February 1999 respectively. The current nominated proponent for both statements is the Water and Rivers Commission (WRC).

Each of these statements can be viewed at the Department of Environment's website ([www.environment.wa.gov.au](http://www.environment.wa.gov.au)).

The EPA has delegated responsibility under section 20 of the *Environmental Protection Act* to audit compliance by the WRC with the environmental conditions and commitments applying to groundwater abstraction from the Gngangara Mound. This delegation was gazetted on 26 September 2003.

This report provides the advice of the Environmental Protection Authority (EPA) to the Minister for the Environment in relation to compliance with these environmental conditions.

The Department of Environment (DoE), on behalf of the WRC, submitted the Annual Compliance Report for Environmental Management of Groundwater Abstraction from the Gngangara Mound July 2003–June 2004 to the EPA in November 2004 (Department of Environment 2004).

An independent consultant to the EPA has reviewed the 2003/04 Annual Report. The report of the Auditor is provided in Appendix 2.

The Annual Report was updated by the DoE to address points raised in the Auditor's review of the compliance report and is available on the Commission's website ([www.environment.wa.gov.au](http://www.environment.wa.gov.au)).

## **2. Compliance with environmental conditions**

Section 48(1) of the *Environmental Protection Act 1986* provides for monitoring of implementation of a proposal for the purposes of determining whether the environmental conditions related to the proposal are being complied with. The EPA has an obligation under section 48(1a) to report non-compliance to the Minister.

The EPA has undertaken this compliance audit in two parts. The first was to appoint an independent consultant to review and report to the EPA on the WRC's Compliance Report (see Appendix 2). The WRC was then given an opportunity to respond to the Auditor's report. The response is incorporated in this report. The second part was for the EPA to consider the Auditor's report and WRC response, and to prepare this report on issues associated with the compliance audit.

## WRC 2003-04 Annual Report

The Annual Compliance Report on environmental monitoring and management of the Gngara Groundwater Mound by the Water and Rivers Commission (Department of Environment 2004) makes the following summary points.

### “Environmental water level criteria

A key element of both *endorsed proposals* was the setting of ‘Environmental Water Provisions’ (EWPs) for maintenance of environmental values on the [Gngara] Mound. These were set in the form of groundwater levels to be achieved in key wetlands, and in areas of vegetation and other ecological systems dependent on groundwater levels. A total of 41 environmental water level criteria were set for the Mound (*Statements 438 and 496*).

### Non-compliance of environmental water criteria in the reporting period

In some areas, the peak water levels recorded for the current reporting period (July 2003 - June 2004) were equal to or slightly higher than for the previous reporting period. However, the overall declining trend in regional water level continues. The localised nature of the observed water table responses is due to the geographic distribution in the rainfall and reflects the fact that the 2003 winter rainfall in the Wanneroo area was significantly higher than the previous year, although it was still less than the long term average.

For the current review period, there were a total of sixteen non-compliances of environmental water level criteria on the Mound as summarised in Table 1. This is the same number as for the previous year. Specific non-compliant sites are found in Tables 2-4.

While there still have been a considerable number of non-compliances, the majority of these (85%) are less than 0.5 metres. The maximum non-compliance was 1.3 m at Coogee Springs.

Table 1. Summary of environmental criteria compliance- Gngara Mound

Environment component	Total No. of criteria	No. of non-compliances			
		2000/01	2001/02	2002/03	2003/04
Wetlands	18	6	4	9	10
Terrestrial vegetation	23	3	4	7	6
TOTAL	41	9	8	16	16

### Environmental consequences of water level declines

The decline in water levels may have led to a loss of environmental values in some local areas of the Mound. Due to limitations in baseline information at the time of setting the original water level criteria, it is difficult to quantify the extent of loss of values that has occurred beyond that anticipated in the *endorsed proposals*. Based on monitoring and investigations during the review period, the report outlines the current health of environmental elements where declines have occurred and environmental values are being affected.

The Commission continues to actively participate in investigations and research on climate variability, such as the Indian Ocean Climate Initiative, to develop greater

understanding of likely future climatic trends to take these into consideration in its water management planning and licensing.

Discussed in some detail in this annual report, the primary factors under the Commission's control for management of groundwater levels on the Mound are regulation of public water supply (Water Corporation, Figure 1) abstraction and of private abstraction such as for horticulture, industry and irrigation of parks and recreation areas." (Department of Environment 2004)

### **Audit of Compliance Report**

In summary, the Auditor has provided the following advice and comments on the Gngangara Mound Annual Compliance Report 2003-04:

"The Report acknowledges that there has been non-compliance with the environmental water provision where minimum water levels in lakes and monitoring bores have been breached on 15 occasions in 2003/04. In addition, this Audit has identified several other instances on non-compliance or possible non-compliance of a more administrative nature.

WRC submitted a triennial compliance report for 2000-2003 in March 2004. The audit of that report generated 27 recommendations to address matters of non-compliance or insufficient information. WRC was invited to respond to the auditor's report and did so. The EPA then published its advice to the Minister on the compliance audit in EPA Bulletin 1139.

The EPA considered that many of the matters raised by the auditor could be addressed in a review of the conditions under section 46 of the Act that is already in progress. The review was initiated in 2001 and the EPA agreed to a two stage process. This review is due to be completed in 2005. In the meantime there is ongoing non-compliance with many of the environmental criteria. The present non-compliance is reported, despite the initiation of the section 46 review, because it could have been avoided had WRC addressed the matter when it first became evident, in the late 1990s.

Given the significance of the Gngangara Mound to Perth's water supplies it is crucial that the resource is, and is seen to be, sustainably managed. And given the limitations on the availability of water from the Gngangara Mound for potable supplies it is crucial that effective steps are taken toward demand management (reducing consumption), stormwater and waste water re-use, and the development of alternative supplies. For this reason, the longer-term solution to the sustainable management of the Gngangara Mound is likely to require a whole-of-government approach.

Two further examples of this need are the question of non-compliance with the EPP requirement for managing the pine forest and WRC's call for Coogee Springs and Monitoring Well JB6 to be removed as criteria sites as the vegetation values they were intended to protect have been lost as a result of other development pressures.

The present conditions fail to address the broader issue of vegetation protection. There is little point in placing significant constraints on the abstraction of water for private users and the public scheme to protect vegetation values only to have those values destroyed by decisions elsewhere in government.

There needs to be a co-ordinated whole-of-government approach to the protection of native vegetation values on the Gngangara Groundwater Mound, of which the

management of water abstraction forms a part. At the very least, WRC needs to work with other parts of the Department of Environment to ensure that its administration of the system of clearing permits under the Act works with the management of groundwater abstraction to stop the loss of native vegetation values. Perhaps consideration should be given to declaring the Mound to be an “environmentally sensitive area” in which all clearing requires a permit.” (Malcolm 2005a)

Recommendations from the Gngangara Audit

Table 1 from the Auditor’s report summarises the issues identified in this Audit and recommended actions. Note that not all recommended actions relate to actual non-compliances.

Table 1 – Issues identified in the Audit and recommended actions

No.	Issue	Recommended action
1	Lexia 94, which is listed as compliant did not breach its preferred minimum in 2003/04, but it has done so for three (i.e. more than two) of the last six years, so it remains in non-compliance.	WRC should check the compliance status of Lexia 94 and, if necessary, correct the compliance report
2	Proposed private allocation limit for Mirrabooka seems too high if there is non-compliance with total licences at only 58% of that limit.	WRC should explain why the allocation limit planned in the endorsed proposals for the Mirrabooka area is set at 9.9GL/yr when current abstractions of a little more than half that amount are associated with non-compliances in Whiteman Park.
3	Non-compliance with some environmental water criteria is partly due to FPC failure to manage the pine forest in accordance with the Gngangara Mound EPP	As recommended last year, Department should seek legal advice on this matter.
4	Last year, in Bulletin 1139, the EPA called for the metering of all private licences greater than 5,000kL per annum. It is not clear from the Report that this has been complied with.	WRC should clarify whether the metering of all private licences greater than 5,000kL per annum, as required in the 2004 audit, has been implemented
5	The draft water allocation policy referred to in Initiative 8 on page 20 of the compliance Report is a key element in protecting the environmental values of the area and is directly relevant to compliance with several of the conditions and commitments.	WRC should provide the EPA with a copy, for comment, of the draft water allocation policy for groundwater abstraction near environmentally sensitive areas
6	WRC’s new policy for private allocations does not address the question of ‘take back’ of unused allocations, as requested in last year’s audit.	WRC should develop a policy for reclaiming unused allocations in areas where the use of that unused allocation may add to the decline in environmental water level criteria that have been, or are at risk of being breached.
7	WRC has provided groundwater modeling for the Department of Planning and Infrastructure’s East Wanneroo Land Use and Water Management Strategy, but there is no mention in the Report of advice about protecting native vegetation on the Mound.	WRC should ensure, as a part of the Department of Environment, that its input to the East Wanneroo Land use and Water Management Strategy and other broad planning affecting the Gngangara Groundwater Mound represents an appropriate balance between a promotion of development that enhances recharge and the protection of the native vegetation on the Mound.
8	Responses in the compliance tables are inadequate to determine compliance with 438:P9 and P16, the Wetland Management Objectives, and 496:M2.2 and P15.2.	WRC should provide further information clearly showing how these requirements have been complied with.
9	WRC has requested that a number of conditions and commitments be cleared.	It is agreed that commitments 496:P3.1, P11, P14, P15.1 and P17.2 can now be cleared.

Shading indicates non-compliance



## WRC's Response to the Auditor's report and recommendations

The DoE provided the following comments on the report and recommendations in the auditor's report:

"There is a comment in paragraph 5 of the Summary (page 3) which states: -

"The present non-compliance is reported, despite the initiation of the section 46 review, because it could have been avoided had WRC addressed the matter when it first became evident, in the late 1990s."

This appears to be saying that there wouldn't be any non compliance with Ministerial conditions now if the WRC had taken action in the late 1990's. There are many factors which have contributed to the non compliances. Some of these such as climate and influence of the pines are outside of the control of the WRC. Indeed, the only means available to the WRC to influence groundwater levels is to control abstractions through licensing under the *Rights in Water and Irrigation Act 1914*. There is no evidence to suggest that the non compliance could have been avoided simply by reducing abstraction on the Gngangara Mound"

Table 2. – WRC response to Auditor's issues and recommended actions

Issue No	WRC Response (bold = immediate action)
1.	<b>Agreed. Lexia 94 is non compliant with the 'two out of six' rule. The compliance report will be corrected.</b>
2.	Setting allocation limits is the responsibility of the WRC. The 9.9 GL/yr is a figure for the whole of the Mirrabooka Groundwater Area (MGA). In order to spread the draw across the whole of the MGA, it is split into several sub areas, each with its own allocation limit. Modelling and monitoring of the groundwater response to abstraction indicates that considerably more water can be allocated in some sub areas without having an adverse impact on the non compliance issues in Whiteman Park because the abstraction is away from Whiteman Park.
3.	<b>Agreed. The WRC will discuss the situation with our legal department. Outcome to be incorporated in 2004-05 compliance report.</b>
4.	The WRC (in its response to the audit report) last year discussed the merits in metering private water use in Gngangara and concluded that a detailed study, including metering, of the likely impact of private abstraction on environmentally sensitive areas may be of more value and cost effective than intensive metering of all licensed users. Use of the updated PRAMS computer model is likely to be beneficial in assessing such impact. In areas where modelling suggests detrimental impact, ground truthing by select metering and surveys of private use may be required In response to this, the State Govt has committed funding for a trial program to install meters on private bores in key areas on the Gngangara Mound, where the allocation is greater than 5,000 kL per annum. However, there are insufficient funds to allow the fitting of meters to all private bores where the allocation is greater than 5,000 kL per annum. Contracts for the work have now been let and the monitoring results will be reviewed in the 2004/05 report. In addition, surveys of private water use in several sub-areas were conducted in 2004 and found use to be consistent with current allocations.
5.	A copy of this policy will be provided after comments from internal stakeholders have been finalised
6.	There is a policy on the WRC Internet (Statewide Policy No 11) which deals with the recoup of unused water allocations. It is not specifically aimed at reducing the potential for water use in areas of environmental stress but could be used in conjunction with the above policy to achieve that aim. Survey of use will establish the amount of unused allocations. If potential for environmental stress exists from the re-allocation of this water, the Department can review the sub-area allocation limit and if warranted, reduce it accordingly.
7.	Noted
8.	<b>438:P9</b> Extensive investigations are underway to determine the relative impact of climate, abstraction, pines and land uses on groundwater levels across the Mound. This will allow the impact of groundwater abstractions to be determined so that decisions can be made on the best way to minimise these impacts. These investigations are ongoing. <b>438:P16</b> • Tree deaths around production bores are unlikely to extend beyond 200m due to the shape of the groundwater drawdown cone around the bore.

	<ul style="list-style-type: none"> <li>As part of their licence conditions, the Water Corporation are required to operate the bores in accordance with an agreed operating strategy. The operating strategy contains the Ministerial conditions. Where bores are considered to have the potential to cause tree deaths, they are turned off. As stated in the report, more than 40 bores were turned off during the 2003-04 summer to avoid any impact on vegetation.</li> </ul> <p><b>Wetland Management Objectives</b> It is agreed that a whole of government approach is required to protect wetlands.</p> <p><b>496:P2.2</b> These additional commitments will be added to the compliance table and reported against in future</p> <p><b>496:P15.2</b> The status of the vegetation transect at wetland 132 is now reported in Appendix 7.</p>
9.	Noted

*Shading indicates non-compliance issue*

### **EPA's advice on compliance**

The EPA considers that the Audit reports are comprehensive and the Auditor's recommended actions are appropriate. The EPA therefore accepts the recommendations and comments of the Auditor and expects the DoE will resolve each of these issues.

The Auditor noted that a number of recommendations made by the EPA in last years report (EPA 2004a) had not been adequately responded to. The DoE has revised the Gngangara Mound annual compliance report 2003-04 in accordance with its response in Table 2.

In relation to Audit Issues 1, 3 and 8 where non-compliance has been identified by the Auditor, the EPA provides the following comment:

Issue 1. The EPA notes that the DoE has corrected the reported status of Lexia 94.

Issue 3. The EPA made comment about the Environmental Protection (Gngangara Crown Land) Policy last year.

Issue 8. The DoE has responded to the comments of the Auditor, such that compliance will be able to be determined.

The Annual Compliance report 2003-04 also identifies sixteen non-compliances of environmental water level criteria on the Mound.

The EPA provides some additional comment on non-compliance in this report under Other Advice.

### **3. Other Advice**

The EPA addressed a number of additional matters under Other Advice in its 2004 audit reports (EPA Bulletins 1134 and 1139) to the Minister. These included:

- On-going breaches of criteria and other environmental conditions and action taken by WRC to address these breaches
- Progress on the Section 46 initiated by the WRC in 2001
- Allocation and private licence decisions under circumstances of noncompliance;
- The Environmental Protection (Gngangara Mound Crown Land) Policy 1992.

The EPA considers that additional comment on the first three of these matters is necessary again.

#### Progress on the section 46 Review

Following a request from the WRC in 2001, the Minister for the Environment requested the EPA to inquire into the environmental conditions applying to management of the Gngangara and Jandakot groundwater mounds. Two statements are relevant to Gngangara, Statement 438 and Statement 496.

The Department of Environment (DoE), on behalf of the Water and Rivers Commission, prepared a first stage section 46 review of the environmental conditions applying to management of the Gngangara and Jandakot groundwater mounds. This Stage 1 review proposed:

- amendments to specific environmental water level criteria, including removal of some of the sites to which criteria apply;
- removal of conditions and commitments that do not apply to the WRC, or where there are inconsistencies between conditions and commitments;
- modifications to several conditions and commitments to improve the consistency of approach between the Gngangara and Jandakot Mounds; and
- consolidation of the Gngangara (Statement 438) and East Gngangara (Statement 496) conditions and commitments

Following consideration of the proposed changes, the EPA recommended to the Minister for the Environment in Bulletin 1155 (EPA 2004b) that several environmental criteria sites could be deleted and that the Gngangara statements should be consolidated and updated. The statements have yet to be changed.

The DoE has been suggesting that a groundwater management plan for the Gngangara Mound is required, and that this would provide an integrated means for improving management of land and water-related issues on the mound. As a result, the DoE has indicated that the section 46 stage 2 report is unlikely to be presented to the EPA until December 2006.

The EPA has previously expressed frustration at the long timeframe for completion of the section 46 process (EPA 2004a). In doing so, the EPA acknowledges that there are a number of complexities to deal with, but is of the view that further actions should have been taken since 2000 to either complete the section 46 to establish revised criteria or address the effect of the significant decline in groundwater levels on crucial ecological and social values. Consultant advice to the DoE has been that the level of threat to the values is becoming more critical with each passing year of low rainfall and declining groundwater levels.

The DoE's response to declining rainfall and recharge on the Gngangara and Jandakot Mounds over the past eight years has been to state that this is beyond the regulators control. While this may be a relevant point in relation to the cause of climatic variation, it is inadequate in relation to management of resultant impacts and regulatory responses that are available. The current approach to management is placing increasing and unacceptable stress on many of the ecological and social

values of the Gngangara Mound, and are clearly beyond those approved under the existing conditions. To see on-going and increasing levels of non-compliance with environmental conditions while levels of groundwater abstraction for public and private purposes remain unchanged raises questions about the DoE's response under the existing conditions. Changing abstraction rates is likely to be necessary in the short-term but a more adaptive and responsive management water allocation regime is essential in the longer-term. The sooner this is in place the better for all concerned, but will require a whole-of-government commitment to its formulation and implementation.

#### Allocation and private licence decisions under circumstances of non-compliance

One of the issues raised by the Auditor relates to the question of the take-back of unused allocations. The East Wanneroo subarea of the Wanneroo Groundwater Area is one of the areas where there are unused allocations. The EPA has previously stated that it believes that the existing allocations on the Gngangara Mound are currently unsustainable (EPA 2004b) and therefore considers that this is a matter that should be addressed by the Department of Environment. The EPA notes that Water and Rivers Statewide Policy No 11 deals with the management of unused licences water entitlements and that section 4.10 states that "circumstances may arise that require these [recouped] entitlements to be retired and not be available for redistribution (for example, prevention and mitigation of environmental impacts)" rather than redistributed to applicants (WRC 2003, p10).

In its audit report last year (EPA 2004a), the EPA recommended that the Minister requires that the sustainable limits for all groundwater abstraction from the Gngangara Mound and Jandakot Mound are reviewed and revised by the WRC as a high priority. This has yet to be done. As mentioned above, the EPA strongly reiterates that this needs to be undertaken as soon as possible.

With the increasing reliance by the Water Corporation on the Gngangara Mound for public water supplies, the EPA finds the level of public information about water levels in the groundwater mounds compared to the dams to be inadequate. The Water Corporation appropriately points out the substantial reduction in rainfall and dam inflows over the past thirty years, but there is no equivalent information about groundwater recharge or decline in the Gngangara and Jandakot Mounds. Groundwater levels is one indication of change, but another is the overall status over time of the stored volume of groundwater in the superficial aquifers of the Gngangara Mound. The DoE estimates that there has been a decline of more than 500 GL in these aquifers since 1979, equivalent to four times the storage capacity of Serpentine Dam. This needs to be addressed so that the public is informed about what is happening with the largest current source of water supply into the Integrated Water Supply System.

#### 2005 Status of Non-Compliance (as at May 2005)

As part of its response to the EPA audit reports last year, the EPA Chairman now receives regular (monthly) reports from the DoE on the current status of water level non-compliances for both the Jandakot and Gngangara Mounds. The most recent report covers up to the end of May 2005 and indicates a total of 17 non-compliances

with criteria set under environmental conditions on the Gngangara Mound. The DoE is also identifying criteria sites that at risk of non-compliance.

The following indicates sites with non-compliance over the past eight years, including 2004/05:

Gngangara Mound							
	MM16	MM16					MM16
					WM6		
						Yonderup	Yonderup
							PM7
					L McNess	L McNess	L McNess
					Egerton		
MM55B					MM55B	MM55B	MM55B
	Melaleuca	Melaleuca	Melaleuca			Melaleuca	
				WM1	WM1	WM1	WM1
MM59B			MM59B	MM59B	MM59B	MM59B	MM59B
MM53	MM53				MM53	MM53	MM53
		Jandabup			Jandabup	Jandabup	Jandabup
Lexia 94	Lexia 94		Lexia 94		Lexia 94	Lexia 94	Lexia 94
	Nowerup	Nowerup	Nowerup		Nowerup	Nowerup	Nowerup
		PM6	PM6	PM6	PM6	PM6	PM6
	Coogee Sp	Coogee Sp	Coogee Sp	Coogee Sp	Coogee Sp	Coogee Sp	Coogee Sp
Lexia 186	Lexia 186	Lexia 186	Lexia 186	Lexia 186	Lexia 186	Lexia 186	Lexia 186
JB5	JB5	JB5	JB5	JB5	JB5	JB5	JB5
Joondalup	Joondalup	Joondalup	Joondalup	Joondalup	Joondalup	Joondalup	Joondalup
Mariginiup	Mariginiup	Mariginiup	Mariginiup	Mariginiup	Mariginiup	Mariginiup	Mariginiup
1997/98	1998/99	1999/2000	2000/01	2001/02	2002/03	2003/04	2004/05 #

# Currently reported to end May 2005 by DoE as non-compliance

While the WRC will report these in its 2004-05 compliance report, they are provided here to illustrate the on-going trend in relation to the number of criteria sites where there is non-compliance.

It should be noted that the EPA has recommended to the Minister that a number of the above criteria sites should be deleted from the environmental conditions applying to the Gngangara Mound. The EPA recommended in Bulletin 1155 that Coogee Springs and Monitoring Wells JB5, PM6, and PM7 should be deleted as criteria sites.

Once these changes are made to the Gngangara Mound statements, the current number of non-compliances with criteria in 2004/05 would fall by four sites.

## 4. Conclusions

The EPA has considered the Annual Compliance Report for Environmental Management of Groundwater Abstraction from the Gngangara Mound July 2003–June 2004 and notes that there continues to be a high and unacceptable level of non-compliance with environmental conditions.

While the EPA understands that issues such as climate variability makes management of the groundwater more difficult, the response by the Department of Environment, on behalf of the Water and Rivers Commission, to comply with the existing conditions continues to be a source of frustration to the EPA. The Commission has a range of

options available to it in the longer term, including reviewing existing criteria and conditions through section 46. However, this is not adequate in the short term as non-compliance remains environmentally and legally unacceptable.

## **5. Recommendations**

The EPA submits the following recommendations to the Minister for the Environment:

1. That the Minister notes this report on compliance by the Water and Rivers Commission with environmental conditions and proponent commitments set out in Statements 438 and 496.
2. That the Minister notes that the EPA continues to find that the Water and Rivers Commission has not complied with a number of environmental conditions and proponent commitments set out in Statements 438 and 496
3. That the Minister notes that the second stage of the section 46 review is now not expected to be submitted to the EPA until late 2006.
4. That the Minister notes the EPA's increasing concern that deferring action in relation to groundwater management is placing increasing and unacceptable stress on many of the ecological and social values of the Gnamangara Groundwater Mound.
5. That Minister requires that the sustainable limits for all groundwater abstraction from the Gnamangara Mound are reviewed and revised by the WRC as a high priority.
6. The Minister requests the Department of Environment to publish prominently on its website a set of indicators on the status of groundwater of the Gnamangara Mound to indicate trends in key parameters, including recharge, levels and storage, similar to information published by the Water Corporation in relation to dams.

# **Appendix 1**

## **References**

1. Malcolm J. (2005). Audit of Compliance Report 2003-04 – Environmental Management of Groundwater Abstraction from the Gngangara Groundwater Mound
2. Department of Environment (2004). Environmental Management of Groundwater Abstraction from the Gngangara Groundwater Mound, Annual Compliance Report to the Environmental Protection Authority, July 2003 to June 2004
3. Environmental Protection Authority (2004a). Environmental Management of Groundwater Abstraction from the Gngangara Mound July 2000 – June 2003 - Triennial Report (Bulletin 1139)
4. Environmental Protection Authority (2004b). Review of Environmental Conditions on the Gngangara and Jandakot Mounds (Bulletin 1155)
5. Water and Rivers Commission (2003). Statewide Policy No 11. Management of Unused Licensed Water Entitlements.



## **Appendix 2**

**Malcolm (2005). Audit of Compliance Report 2003-04 - Environmental  
Management of Groundwater Abstraction from the Gnamptara Groundwater  
Mound, Water and Rivers Commission**

29 June 2005

**Audit of  
Compliance Report  
2003-04**

**Environmental Management of  
Groundwater Abstraction from the  
Gnangara Groundwater Mound**

**Water and Rivers Commission**

**JIM MALCOLM**  
Environmental Consultant



# Audit of Compliance Report for 2003-04

## Environmental Management of Groundwater Abstraction from the Gngangara Groundwater Mound

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## Audit of Compliance Report for 2003-04

### Environmental Management of Groundwater Abstraction from the Gnangara Groundwater Mound

#### Summary

The taking of groundwater from the Gnangara Groundwater Mound, in the northern suburbs of Perth is subject to two Ministerial approvals under Part IV of the *Environmental Protection Act 1986* (the Act). Those approvals are subject to a number of environmental management conditions. The purpose of those conditions is to ensure that the environment is protected as implementation of the proposal proceeds.

The Water and Rivers Commission<sup>1</sup> (WRC) submitted to the Environmental Protection Authority (the EPA) in December 2004 its report for 2003-04 on compliance with the conditions (the Report), and this document presents an audit of that compliance report, including an assessment of the significance of instances of non-compliance.

The Report acknowledges that there has been non-compliance with the environmental water provision where minimum water levels in lakes and monitoring bores have been breached on 15 occasions in 2003/04. In addition, this Audit has identified several other instances on non-compliance or possible non-compliance of a more administrative nature.

WRC submitted a triennial compliance report for 2000-2003 in March 2004. The audit of that report generated 27 recommendations to address matters of non-compliance or insufficient information. WRC was invited to respond to the auditor's report and did so. The EPA then published its advice to the Minister on the compliance audit in EPA Bulletin 1139.

The EPA considered that many of the matters raised by the auditor could be addressed in a review of the conditions under section 46 of the Act that is already in progress. The review was initiated in 2001 and the EPA agreed to a two stage process. This review is due to be completed in 2005. In the meantime there is ongoing non-compliance with many of the environmental criteria. The present non-compliance is reported, despite the initiation of the section 46 review, because it could have been avoided had WRC addressed the matter when it first became evident, in the late 1990s.

Given the significance of the Gnangara Mound to Perth's water supplies it is crucial that the resource is, and is seen to be, sustainably managed. And given the limitations on the availability of water from the Gnangara Mound for potable supplies it is crucial that effective steps are taken toward demand management (reducing consumption), stormwater and waste water re-use, and the development of alternative supplies. For this reason, the longer-term solution to the sustainable management of the Gnangara Mound is likely to require a whole-of-government approach.

Two further examples of this need are the question of non-compliance with the EPP requirement for managing the pine forest and WRC's call for Coogee Springs and Monitoring Well JB6 to be removed as criteria sites as the vegetation values they were intended to protect have been lost as a result of other development pressures.

The present conditions fail to address the broader issue of vegetation protection. There is little point in placing significant constraints on the abstraction of water for private users and the public scheme to protect vegetation values only to have those values destroyed by decisions elsewhere in government.

There needs to be a co-ordinated whole-of-government approach to the protection of native vegetation values on the Gnangara Groundwater Mound, of which the management of water abstraction forms a part. At the very least, WRC needs to work with other parts of the Department of Environment to ensure that its administration of the system of clearing permits under the Act works with the

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<sup>1</sup> The nominated proponent, the Water and Rivers Commission, is currently being incorporated into a new Department of Environment.



management of groundwater abstraction to stop the loss of native vegetation values. Perhaps consideration should be given to declaring the Mound to be an “environmentally sensitive area” in which all clearing requires a permit.

This Audit included a detailed assessment of compliance with all the conditions and commitments applying to the environmental management of the groundwater mound. Table 1 summarises the issues identified and recommended actions. Note that not all recommended actions relate to actual non-compliances.

**Table 1 – Issues identified in the audit and recommended actions**

No.	Issue	Recommended action
1	Lexia 94, which is listed as compliant did not breach its preferred minimum in 2003/04, but it has done so for three (i.e. more than two) of the last six years, so it remains in non-compliance.	<b>WRC should check the compliance status of Lexia 94 and, if necessary, correct the compliance report</b>
2	Proposed private allocation limit for Mirrabooka seems too high if there is non-compliance with total licences at only 58% of that limit.	<b>WRC should explain why the allocation limit planned in the endorsed proposals for the Mirrabooka area is set at 9.9GL/yr when current abstractions of a little more than half that amount are associated with non-compliances in Whiteman Park.</b>
3	Non-compliance with some environmental water criteria is partly due to FPC failure to manage the pine forest in accordance with the Gnangara Mound EPP	<b>As recommended last year, Department should seek legal advice on this matter.</b>
4	Last year, in Bulletin 1139, the EPA called for the metering of all private licences greater than 5,000kL per annum. It is not clear from the Report that this has been complied with.	<b>WRC should clarify whether the metering of all private licences greater than 5,000kL per annum, as required in the 2004 audit, has been implemented</b>
5	The draft water allocation policy referred to in Initiative 8 on page 20 of the compliance Report is a key element in protecting the environmental values of the area and is directly relevant to compliance with several of the conditions and commitments.	<b>WRC should provide the EPA with a copy, for comment, of the draft water allocation policy for groundwater abstraction near environmentally sensitive areas</b>
6	WRC's new policy for private allocations does not address the question of 'take back' of unused allocations, as requested in last year's audit.	<b>WRC should develop a policy for reclaiming unused allocations in areas where the use of that unused allocation may add to the decline in environmental water level criteria that have been, or are at risk of being breached.</b>
7	WRC has provided groundwater modeling for the Department of Planning and Infrastructure's East Wanneroo Land Use and Water Management Strategy, but there is no mention in the Report of advice about protecting native vegetation on the Mound.	<b>WRC should ensure, as a part of the Department of Environment, that its input to the East Wanneroo Land use and Water Management Strategy and other broad planning affecting the Gnangara Groundwater Mound represents an appropriate balance between a promotion of development that enhances recharge and the protection of the native vegetation on the Mound.</b>
8	Responses in the compliance tables are inadequate to determine compliance with 438:P9 and P16, the Wetland Management Objectives, and 496:M2.2 and P15.2.	<b>WRC should provide further information clearly showing how these requirements have been complied with.</b>



Audit of Compliance Report for 2003-04  
Environmental Management of Groundwater Abstraction from the  
Gngangara Groundwater Mound – Water and Rivers Commission

No.	Issue	Recommended action
9	WRC has requested that a number of conditions and commitments be cleared.	It is agreed that commitments 496:P3.1, P11, P14, P15.1 and P17.2 can now be cleared.

Shading indicates actual or possible non-compliance.



## 1. Compliance with the environmental criteria

### 1.1 Non-compliances

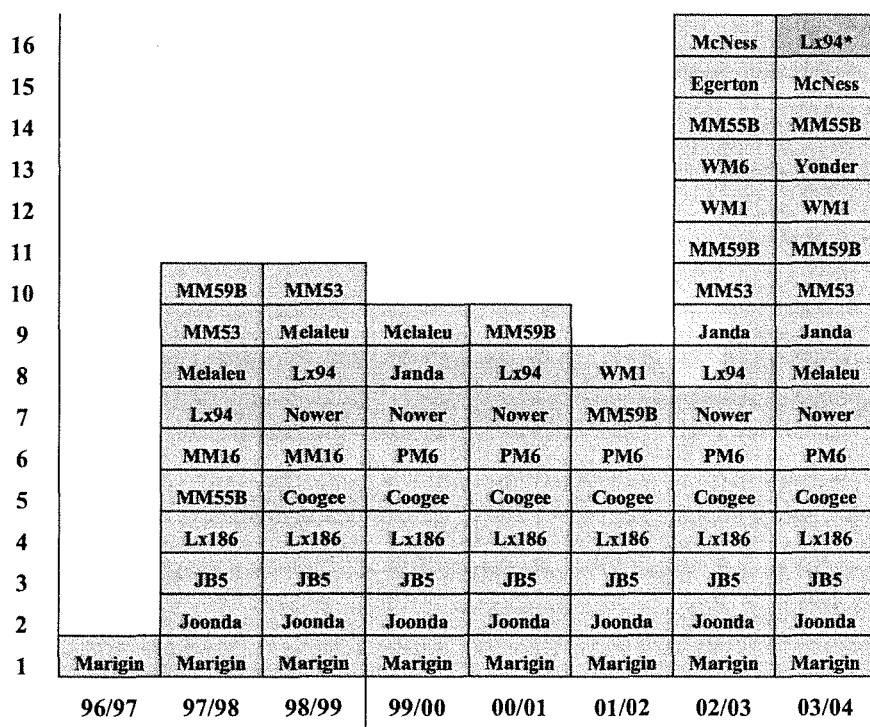
The Report advises that there were 15 non-compliances in 2003/04, one less than in 2002/03. This appears to be in error. Lexia 94, which is listed as compliant did not breach its preferred minimum in 2003/04, but it has done so for three (i.e. more than two) of the last six years, so it remains in non-compliance. The Report further advises that “water levels in Lake Wilgarup, Lake Gnangara, Pipidinny Swamp and Edgcombe Seep were below their management objective, however, none of them have statutory criteria”.

The Report states that “the majority of the water levels were in compliance with EWP [environmental water provision] criteria levels, both historically and during the reporting period”. In fact Table 2 of the Report shows that during 2003/04 EWP criteria were breached in seven of the eight Gnangara Mound wetlands for which statutory criteria have been set and the three non-statutory wetlands were also below proposed preferred minimum criteria.

Further, Table 3 of the Report shows that for the East Lexia Wetlands and Springs three of the seven wetlands were acknowledged as non-compliant and a fourth, Lexia 94, appears to be also non-compliant (see above) and Lexia 86 dried up, while monitoring did not show a breach of the absolute minimum water level. The results from monitoring bores in Table 4 of the Report are related only to absolute criteria and here just six of the 23 bores were non-compliant. Combining the compliance figures for wetlands with those for bores tends to disguise the fact that the majority of lakes, wetlands and seeps were non-compliant.

Figure 1 presents the non-compliances in bar graph form, with the individual wetlands or bores identified to show where the non-compliance has been on-going, in some cases, for six or seven years.

**Figure 1. Reported breaches of preferred and absolute minimum water levels**



\* Not listed as non-compliant, but has breached preferred minimum 3 years in last 6.



**It is recommended that WRC should check the compliance status of Lexia 94 and, if necessary, correct the compliance report.**

**Table 2 Water level non-compliances and management responses**

Location of non-compliance and WRC suggested cause	Management Response (summary)	Auditor's comments
<u>Pinjar borefield</u> – bore PM6 Rate of decline has slowed from 27cm 02/03 to 6cm 03/04 with some production bores turned off for several years..	Superficial abstraction cut from 5GL in 2000/01 to just over 2 in 03/04 (similar to 02/03). Super/Leederville/Yarragadee abst cut from 13.5GL 98/99 to 10GL 03/04 (11.3GL 02/03)	Response has achieved slower rate of decline of water levels, but insufficient to stop non-compliance.
<u>Mirrabooka borefield</u> – bores MM53, 55B & 59B Public abstraction along Gnangara Rd and in East Mirrabooka.	Superficial public abstraction cut from 14.9GL in 02/03 to 13.6GL in 03/04 (7% cut). Private allocations 5.8 GL (58% of proposed allocation limit).	Cut of 7% insufficient to stop non-compliance. Proposed alloc. limit seems too high if there is non-compliance at only 58%.
<u>Lexia 186 (and Lexia 94)</u> Climate the major driver – breaches before start-up and no major decline since.	Super. public abst. cut from planned 11GL to max of 7GL in 02/03 and 4GL in 03/04 in areas far from wetlands.	Response insufficient to stop non-compliance.
<u>Bore WM1</u> Wanneroo and Pinjar abstraction exacerbating effect of drying climate	Wanneroo Super. public abstr. cut from 11GL in 00/01 to ~9GL in 03/04, some Pinjar wells near WM1 shut down.	Response insufficient to stop non-compliance.
<u>Lake Jandabup and bore JB5</u> Rainfall and private abstraction in Wanneroo (nearest public bores turned off for 10 years).	Artificial maintenance of Lake Jandabup since 1997. Wanneroo private abst. Initiative (see below)	Artificial maintenance was insufficient to stop non-compliance.
<u>Lakes Mariginiup, Wilgarup and Joondalup</u> Reduced recharge and private abstraction in Wanneroo	Relocation of abst. a long term strategy. Other options being investigated include <ul style="list-style-type: none"> <li>• Beenyup treated wastewater</li> <li>• WaterWise on the Farm</li> <li>• Flowmeters for some</li> <li>• 18 management initiatives</li> </ul>	Action to cut private abstraction has been ineffective in stopping non-compliance. No mention of reclaiming unused allocations as a strategy.
<u>Lake Nowergup</u> Private abstraction	Vegetation suffers when artificial maintenance ceases. May be cause to set a lower level and/or phase out artif. maintenance.	Proposal to set a lower minimum water level or phase out artificial maintenance is to be addressed in s46 review.
<u>Loch McNess</u> Pumping to supplement water in Yanchep caves (lowered by climate and pines)	Long-term artificial recharge from bores down-gradient of caves by April 2005. and flowback should benefit Loch McNess..	May resolve non-compliance for 04/05 summer. No action yet on pines management contrary to EPP, raised in last audit.
<u>Coogee Springs</u> No causes suggested	Artif. maintenance from 1998-2002 (now ceased). Used as summer pasture, ecological values degraded	Cessation of maintenance and removal as a criteria site to be addressed in s46 review. Need whole-of-government action to ensure protection of vegetation values.
<u>Lake Yonderup</u> No causes suggested	Non-compliance minor (2cm), no change in healthy condition of wetland..	No specific action proposed to avoid future non-compliance.

Section 2.2.2 of the Report outlines the instances of non-compliance and the management responses initiated. These are summarised in Table 2 (above), with comments.





**It is recommended that WRC be asked to explain why the allocation limit planned in the endorsed proposals for the Mirrabooka area is set at 9.9GL/yr when current abstractions of a little more than half that amount are associated with non-compliances in Whiteman Park.**

**It is recommended that WRC be asked to address the option of reclaiming unused allocations in areas where private abstraction is contributing to non-compliances.**

## **1.2 Observations**

### *1.2.1 Rainfall data*

In the Report, the discussion of the influence of climate on groundwater levels includes references to rainfall. It presents annual rainfall data for Perth Airport and Wanneroo for 2000-01 to 2003-04 and long term and 30-year averages. This rectifies a problem with the triennial report which had no data beyond 1997. The Report notes that rainfall in 2003-04 was significantly (>100mm) greater than the previous year, but that this was not sufficient to change the overall declining water table trend.

### *1.2.2 Non-compliance with the Gnangara EPP*

The Report has again outlined the failure to manage the pine forest in accordance with the MOU as a major constraint on WRC meeting “environmental water level criteria set for the Mound while maintaining current abstraction rates, particularly in low rainfall years”.

Last year’s audit report explained that the MOU is supported by the EPP<sup>2</sup>, which spells out quite specifically how the pine forest is to be managed, namely “that the basal area of the pine plantation should not exceed an average of 11 square metres per hectare”. The enforceability of some EPPs has been called into question because their wording is too vague, but in this case the requirement is quite precise.

Last year’s audit report recommended that WRC seek legal advice on the matter and that the EPA ask the Minister, through her fellow Minister to seek compliance with the EPP. It is understood that neither action has been taken.

## **1.3 Environmental status of wetlands**

The Report advises that a wetland status report by Clark and Horwitz (2004) indicated “extreme concern” for the wetland values of a number of wetlands on the Mound related to water levels, fire threat, acidification and other matters. Table 3 is based on Clark and Horwitz Table A1 as reproduced in part 3 of Appendix 2 of the Report.

As the Table shows, there is extreme concern about all of the wetland values for at least one, and in the case of water levels nine, of the wetlands. The values most at risk were water level (9 wetlands of extreme concern), acidification and susceptibility to fire (each with 6 wetlands of extreme concern) and loss of vegetation and loss of fauna (each with four wetlands of extreme concern).

The wetlands of the highest priority for management action to address the threats to these values were Coogee Spring, Lexia 86, Lexia 186a/b, Mariginiup, Melaleuca Park and Wilgarup.

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<sup>2</sup> *Environmental Protection (Groundwater Mound Crown Land) Policy 1992* clause 9(d)



**Table 3 Wetland Status Report for Gngangara Mound wetlands (after Clark and Horwitz 2004)**

Wetland	Overall priority for action	Level of concern for wetland values						
		Water level	Eutrophication	Acidification	Suscept. to fire	Loss of veget.	Loss of fauna	Introd. species
Coogee Springs	High	Extreme	Probable	Possible	Extreme	Extreme	Probable	Extreme
Gngangara	Low	Probable	Possible	Extreme	Possible	None	Possible	None
Goolelal	Mid	Possible	Probable	None	None	None	None	Possible
Jandabup	Mid	Extreme	Possible	Extreme	Probable	Possible	Probable	Probable
Joondalup (North)	Mid	Probable	Probable	None	Possible	Possible	Possible	Possible
Joondalup (South)	Mid	Possible	Extreme	None	None	Possible	Possible	Probable
Lexia 86	High	Extreme	None	Extreme	Extreme	Extreme	Extreme	Probable
Lexia 182a/b	High	Extreme	None	Extreme	Extreme	Extreme	Extreme	Probable
McNess (North)	Mid	Probable	Probable	None	Possible	Possible	Possible	Extreme
McNess (South)	Low	Probable	Probable	None	Possible	None	Possible	Probable
Mariginuiup	High	Extreme	Probable	Extreme	Extreme	Probable	Probable	Probable
Melaleuca Park	High	Extreme	Possible	Extreme	Extreme	Possible	Extreme	Probable
Nowergup	Mid	Extreme	Probable	Possible	Probable	Probable	Possible	Possible
Pipidinny Swamp	Mid	Extreme	Probable	None	None	None	Possible	Possible
Wilgarup	High	Extreme	Possible	Possible	Extreme	Extreme	Extreme	Probable
Yonderup	Low	Probable	None	None	None	None	None	Possible
No. of Extreme concern		9	1	6	6	4	4	2

The extreme level of concern for water levels for so many of these wetlands justifies the main focus of the environmental conditions on monitoring and maintaining wetland water levels, but raises concern. The non-compliance with wetland water levels is clearly not just an administrative matter, but is a real reflection of wetland environments under extreme stress. If the environment is to be protected the non-compliance cannot be addressed simply by lowering the water level requirements or removing them altogether.

Susceptibility to fire and loss of flora and fauna cannot be properly addressed by management of water levels alone. They require a whole-of-government approach that can ensure that all relevant decisions take these wetland values into account to ensure their protection. For example, the co-operation of local government and Fire and Emergency Services Authority is essential if wetland values are to be protected from the potentially devastating effects of fire.

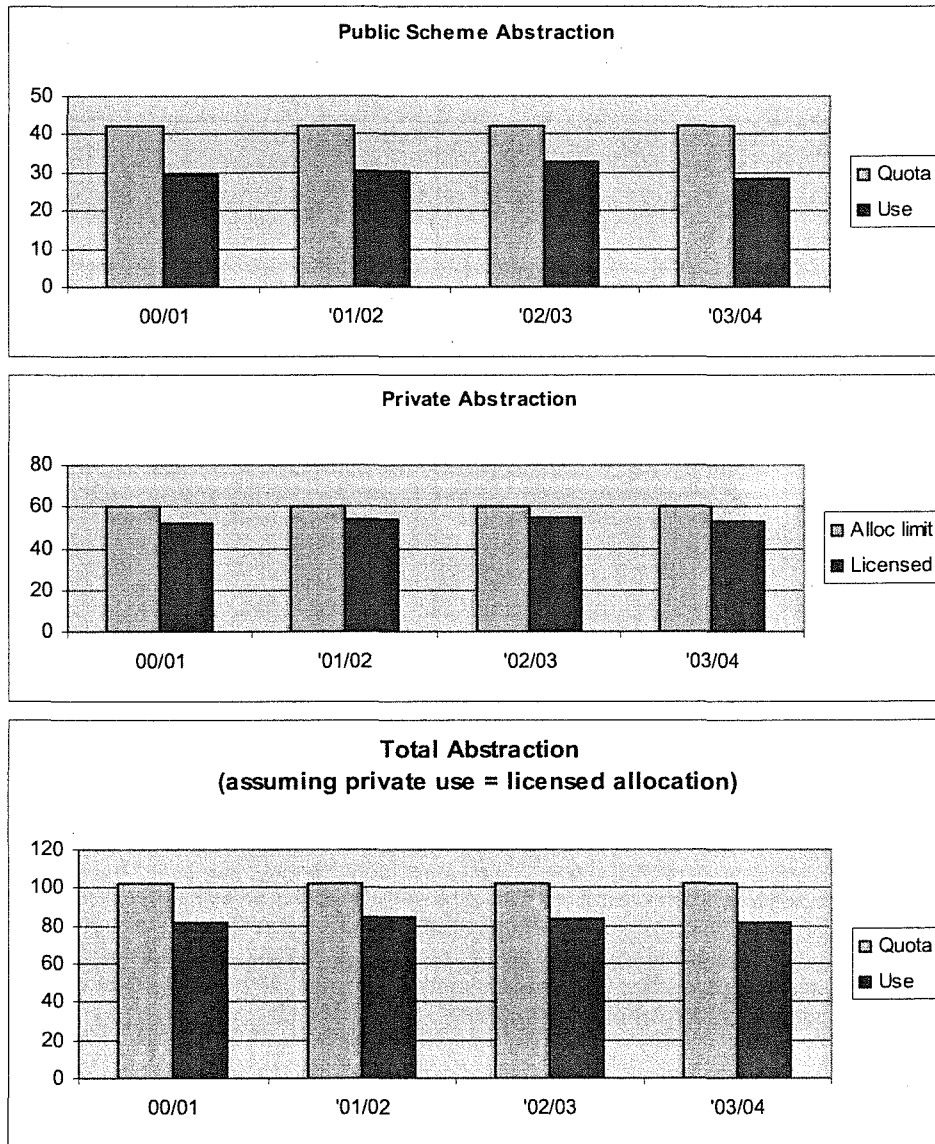
The establishment of the mechanisms for this whole-of-government approach to the protection of wetland values on the Mound is beyond the scope of this audit, but without it the work of Clark and Horwitz suggests there may soon be few wetland values to protect.



## 2. Water Allocation and Water Use

One of the management responses to non-compliance has been to reduce abstraction from the public scheme and licensed allocations from private users. Figure 2 shows the public and private quotas, allocations and licences since 2000/01.

**Figure 2 – Quotas, allocations and licences for abstraction from the Gngangara Groundwater Mound**



### 2.1 Public abstraction

During the reporting year abstraction for the public scheme from the superficial aquifer of the Gngangara Mound was reduced from the previous year in Mirrabooka, Wanneroo and Lexia wellfields and remained the same in Pinjar wellfield, the overall reduction being 4.6Gigalitres, or 11% - a significant reduction on the previous year, though only 4% below 2000/01.



Table 6 of the Report advises that scheme abstraction from Mirrabooka in 2002/03 was incorrectly reported as 11.2GL instead of 14.9GL. The entry is corrected, but the total for that year in the table remains unchanged at 29.1GL instead of being increased to 32.8GL.

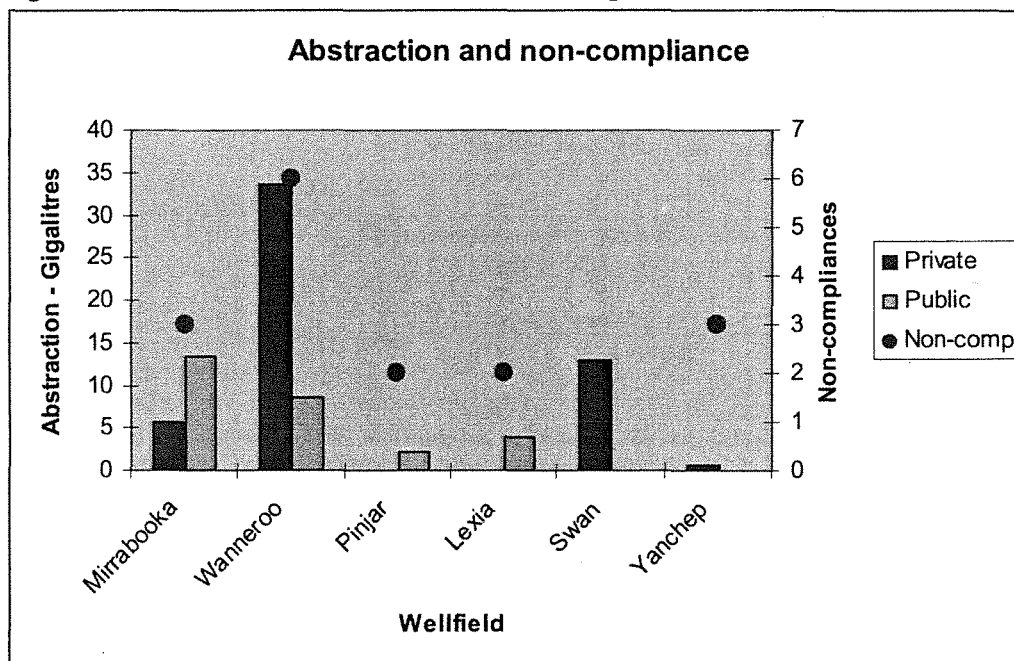
The reduction in public abstraction from the superficial aquifer was partly compensated for by an increase in abstraction from the confined Leederville and Yarragadee aquifers. The Report does not specify the quantum of the increase or the origin of the extra water, but it does note the “limited potential impact on groundwater dependent ecosystems” from this abstraction. The matter is addressed in a recently commenced ‘Healthy Country’ CSIRO research program.

From Figure 2, below it is clear that the scope for rectifying non-compliances by further reducing public scheme abstraction is limited, and dependent upon the wellfield concerned. In Mirrabooka, for example, public abstraction makes up 70 per cent of total abstraction. Public scheme abstraction from Mirrabooka was reduced in 2003/04 but is still 26 per cent above the level of two years ago.

In Pinjar and Lexia the Report suggests there is no licensed private abstraction so a reduction in public abstraction is the prime management option to address the non-compliance, however, both have been already subject to significant reductions in recent years. The present approach of abstraction modeling studies and a review of ecological water requirements in the context of the section 46 review is probably the most appropriate response to the present situation.

In Wanneroo, public scheme abstraction is dwarfed by private abstraction, largely for horticulture, and there has already been a significant reduction in public scheme abstraction. The focus in Wanneroo is rightly on reducing private abstraction, as discussed below.

**Figure 3 – Abstraction and water-level non-compliance**



## 2.2 Private abstraction

Under commitment 438:P8 WRC is to “Manage all groundwater allocation and use with the aim of meeting” the environmental objectives. An impediment to effective management of private groundwater use is that WRC does not presently monitor or report actual private water usage. Last year, in Bulletin 1139, the EPA called for the metering of all private licences greater than 5,000kL per annum, with implementation in sensitive areas as a priority.



WRC reports the “Commencement of a measurement of use (i.e. metering) program in sensitive areas of the Wanneroo Groundwater Area” but it is not clear that wider policy of metering all private licences greater than 5,000kL per annum has been adopted.

**It is recommended that WRC clarify whether the metering of all private licences greater than 5,000kL per annum, as required in the 2004 audit, has been implemented.**

The Report lists eight initiatives related to the management of private groundwater abstraction. They are presented in Table 4, below, with auditor’s comments.

**Table 4 - Private abstraction management initiatives**

	<b>Initiative</b>	<b>Auditor’s comments</b>
1	A review of the licensing database was conducted to identify and locate individual users with the objective of determining allocations in “hot spots” such as the Carabooda subarea.	What were the results of the review? What actions were taken with the identified individual users or “hot spots”?
2	More frequent on-farm inspections and audit of licensed ‘use’ was conducted in stressed subareas (eg. Carabooda) of the Wanneroo Groundwater Area.	What did the inspections and audit of licensed “use” reveal?
3	Greater scrutiny of new groundwater licence applications in proximity to environmentally sensitive areas. In some cases a 200 metre buffer to development is applied around sensitive areas and applicants within the area may be required to supply additional information in the form of hydrogeological reports and nutrient improvement management plans.	EPA last year endorsed the auditor’s call for new rules for new licences (see recommendation 6 in Table 1 above). Have those new rules been developed? How does the “greater scrutiny” relate to those new rules?
4	The Commission has implemented a program with the Department of Agriculture, called <i>Water Wise on the Farm</i> , involving irrigators to promote greater efficiency of water use for horticulture in environmentally sensitive parts of the Wanneroo Groundwater Area.	OK
5	Engagement of the Wanneroo Groundwater Advisory Committee to endorse and support the proposed “WaterWise on the Farm” program with the identified target group in northern Carabooda.	OK
6	Commencement of a measurement of use (ie. metering) programs in sensitive areas of the Wanneroo Groundwater Area. Benefits will include enhanced management of the groundwater resources by the Commission at a regional scale from knowledge of actual groundwater ‘use’ as well as improved on-farm water resource management by the irrigator.	EPA called last year for metering of all licences of 5,000kL or more per annum. What is the volume cut-off for this program, and why is it limited to ‘sensitive areas’? (see recommendation 5 in Table 1)
7	Preliminary review of potential for utilising treated wastewater to recharge groundwater aquifers in the Wanneroo area.	Given the potential environmental benefits if discharge can be turned into recharge this should be expedited.
8	Development of (draft) water allocation policy applying to limitations for groundwater abstraction near the environmentally sensitive areas.	EPA should be given a copy of this policy

The draft water allocation policy referred to in Initiative 8 of the above table is a key element in protecting the environmental values of the area and is directly relevant to compliance with several of the conditions and commitments. The EPA should see and review this draft policy.

**It is recommended that WRC provide the EPA with a copy, for comment, of the draft water allocation policy for groundwater abstraction near environmentally areas.**



### **2.3 Management of abstraction**

The triennial report for 2000-03 outlined rules WRC uses in making decisions about licences for private abstraction from the Gnangara Groundwater Mound:

- new domestic bores and increased domestic abstraction are unconstrained (unlicensed);
- small licences (500 – 1500kl) will be issued where mains water supplies are not available, regardless of whether or not the subarea is already fully allocated;
- the issuing of new or increased allocations for larger licences may be refused if the subarea is already fully allocated (e.g parts of Wanneroo); and
- where private abstractions may be significantly impacting on water level criteria licensees were invited, in 2001 to voluntarily forfeit the unused portion of their allocations.

As last year's audit observed, these rules make it is easier to increase, and almost impossible to decrease private abstractions, when compared with the public scheme. They are inequitable (different rules for public and private schemes) and give private abstraction priority ahead of environmental water provisions. In Bulletin 1139 the EPA endorsed the auditor's call for these rules to be changed.

While not referring to this call by the EPA, the Report advises a new policy position adopted by WRC in June 2004 in the following terms:

To minimise additional impacts on groundwater dependent ecosystems as a result of groundwater abstraction, the Commission has developed the following policy position:

*The Water and Rivers Commission will not approve applications to take additional water from the Gnangara Mound, including those for the grant, variation or transfer of a licence, that may add to the decline in environmental water level criteria that have been, or are at risk of being breached.*

The Commission adopted this position in June 2004. A policy is being developed to deal with the issue. In the interim, the community will be informed of the policy position.

The Commission is also developing a map to guide allocation decisions, which details high risk areas to the environment. This map will guide the Commission in deciding whether to allow more abstraction in certain areas. Generally the Commission will not allow additional groundwater to be taken from the high risk areas and will encourage trades that move allocations from the high risk areas to lower risk areas.

This new policy position is significantly stronger than the former rules and may, with appropriate implementation address some of the concerns with those rules. It does not, however, address the question of reclaiming unused allocations specifically referred to in last year's audit.

That audit observed that the process of "taking back" unused allocations must be consultative and, possibly involve compensation, but that it does not have to be limited to voluntary forfeiture. WRC has argued against 'take back' on the grounds that the unused allocation is effectively available for the environment anyway and that to move to take it back may trigger an over-watering response.

Where the environment is already stressed, as evidenced by actual or likely breaches of criteria, any unused allocations are needed by the environment and not part of the surplus available for allocation to private users. To continue to allow a licensee to believe additional water is available, when in fact it isn't, because the environment needs it, sends the wrong message to private users about the abundance of water and the priority of the environment. The issue of over-watering is an important one which WRC is seeking to address through the water-wise program and licence enforcement.

**It is recommended that WRC develop a policy for reclaiming unused allocations in areas where the use of that unused allocation may add to the decline in environmental water level criteria that have been, or are at risk of being breached.**

The Report notes that the rate of urbanization in the Wanneroo area has been slower than expected, and that this has meant anticipated increases in groundwater recharge levels have been lower than expected. It notes the release by the Department of Planning and Infrastructure for public comment of the draft



East Wanneroo Land Use and Water Management Strategy for which WRC provided groundwater modeling.

Much of the focus of the environmental conditions for the Gnangara Groundwater Mound is the protection of native vegetation, and one of the significant threats to that vegetation is land uses incompatible with protection and maintenance of the vegetation. Especially since its de facto incorporation into the Department of Environment, with specific responsibilities for the regulation of the clearing of native vegetation, WRC in its advice to other agencies needs to ensure a balance between the promotion of development that enhances recharge and the protection of native vegetation on the Mound.

**It is recommended that WRC ensures, as a part of the Department of Environment that its input to the East Wanneroo Land use and Water Management Strategy and other broad planning affecting the Gnangara Groundwater Mound represents an appropriate balance between a promotion of development that enhances recharge and the protection of the native vegetation on the Mound.**



### 3. Meeting the environmental conditions and commitments

The purpose of the Compliance Report is to demonstrate publicly that the proponent has complied with the environmental conditions and commitments. The key part of the Report that does this is the Compliance Audit Table, a detailed table listing all the conditions and commitments and briefly stating how they have been complied with.

Appendix 1 presents the proponent's Compliance Audit Table (from Appendix 1 of the Compliance Report), with some comments on the adequacy of the responses and the degree of compliance. A summary of those items with non-compliance, inadequate information or other queries or recommended actions is provided in Table 5. Some of the key items are highlighted in the text following the table.

**Table 5 - Instances of non-compliance in the compliance tables**

NOTE: Text in *bold italic* represents Auditor's comments relating to non-compliance or recommended action. Text in *italic* relates to non-compliance which is being addressed in the s46 review.

#### A. MINISTERIAL CONDITIONS for STATEMENT NO. 438

Code	Abbreviated Description	Auditor's comments
438: M-1	Fulfil commitments	<i>Non-compliant. The commitments have not all been fulfilled.</i>
438: M3-1	Allocation of water to public and private users and operation of the groundwater schemes shall comply with EWPs.	<i>Non-compliant Response has not addressed the fact that in some areas with non-compliance area allocations are still in excess of current abstraction. Agree the need to measure use.</i>
438: M4-1	The integrity of all groundwater dependent ecosystems, located on the Gngangara Mound, which are likely to be impacted by groundwater abstraction, shall be protected.	<i>Non-compliant. Where EPA and WRC disagree on the interpretation of a condition, the Minister for the Environment resolves the matter (see condition 496:M5.3).</i>
438: M5-1	Basis of decisions re- management of water resources of Gngangara Mound & maintenance of ecological systems shall be based on the concept of sustainable yield of resources..	<i>Non-compliant. Intent of management is sustainable yield, but non-compliances show it is not yet being achieved.</i>

#### B. PROPONENT COMMITMENTS for STATEMENT NO. 438

Code	Description	Auditor's comments
438: P3	Select a range of indicator species at transects to determine an acceptable rate of change in vegetation composition. Also calculate similarity indices when monitoring.	<i>Non-compliant with specific requirements, but intent of commitment is being achieved.</i>
438: P9	Facilitate and undertake strategic research to minimise the impacts of groundwater abstraction	<i>Possible non-compliance. Inadequate response. It is still not clear from the information provided, including Appendix 3 of the Report, how the investigations address minimizing the impacts of groundwater abstraction.</i>





Code	Description	Auditor's comments
438: P16	Limit potential for tree deaths around production wells to 100m (average climate) or 200m (extreme climate). Make this a condition of Water Corporation licence.	<i>Possible non-compliance. Inadequate response. Need to answer 1) was potential for tree deaths limited to 100/200m radius? and 2) is this part of Water Corporation licence conditions?</i>
438: P19	Should EWPs not be met by November 1, artificial supplementation shall be used until the EWP is reached.	<i>Non-compliant. Being addressed through s46 review.</i>
438: P20	Only allow drops below the preferred level to occur in low rainfall years to mimic natural regimes (2/6 years).	<i>Non-compliant. Lexia 94 has been below preferred level for three of last six years, so is also non-compliant.</i>
438: P25	Wetland vegetation will be mapped every two years from large scale aerial photography for Lakes Jandabup, Mariginiup, Nowergup, and Loch McNess.	<i>Non-compliant. Not cleared by EPA. Being addressed through s46 review.</i>
438: P26	Water quality will be monitored annually in November at all wetlands for which EWPs have been set.	<i>Non-compliant. Being addressed through s46 review.</i>
438: P27	Wetland habitats will be mapped along two regional transects in November, using large scale aerial photography, every year for the first three years, then every three years.	<i>Non-compliant. Being addressed through s46 review.</i>
438: P29	Indicator species will be monitored at established terrestrial vegetation transects when transects are monitored in spring.	<i>Non-compliant. Being addressed through s46 review.</i>
438: P30	A Similarity Index for each terrestrial vegetation transect at each monitoring period will be calculated with the aim of summarising spatial and temporal changes in vegetation composition.	<i>Non-compliant. Being addressed through s46 review.</i>
438: P32	Aquatic fauna will be monitored within those cave streams containing root mats once per year in November.	<i>Non-compliant. Being addressed through s46 review.</i>



**C. WETLAND MANAGEMENT OBJECTIVES for STATEMENT 438.**

Wetland	Water Regime Management Objectives	Auditor's comments (These Objectives are part of the EWP and must be complied with)
438: Lake Jandabup	<ul style="list-style-type: none"> <li>• No expansion in the area of sedge vegetation, but maintenance of existing areas.</li> <li>• Maintenance of the current extent of wading bird habitat.</li> <li>• Maintenance, and if possible, expansion of the M raphiophylla and E rudis fringing woodlands.</li> <li>• Removal of mosquito-fish from the Lake.</li> <li>• Maintenance of the high species richness of aquatic macroinvertebrates and macrophytes.</li> </ul>	<p><i>Probable non-compliance.</i> <i>Inadequate response here and in Appendix 2. Compliance with each of the dot points should be separately addressed.</i></p>
438: Lake Gngangara	<ul style="list-style-type: none"> <li>• To improve water quality through increased water levels, as a means of enhancing both environmental and social values of the Lake.</li> </ul>	<p><i>Non-compliant. Report Table 2 indicates no increase in water levels.</i></p>
438: Lake Mariginui p	<ul style="list-style-type: none"> <li>• To maintain the current area of sedge vegetation to within +/- 10%.</li> <li>• To maintain the current area of wading bird habitat.</li> <li>• To maintain invertebrate diversity through some lake- bed drying in summer.</li> <li>• To maintain, and if possible, enhance, fringing woodland vegetation.</li> </ul>	<p><i>Probable non-compliance.</i> <i>Inadequate response here and in Appendix 2. Compliance with each of the dot points should be separately addressed.</i></p>
438: Lake Joondalup	<ul style="list-style-type: none"> <li>• To conserve existing wetland vegetation, including sedge beds, fringing woodlands, and aquatic macrophytes.</li> <li>• To maintain and if possible enhance the aquatic fauna of the Lake.</li> <li>• To support the full range of habitats for avian fauna found at Lake Joondalup to help ensure its continued value as a major water- bird habitat within the Regions. This includes areas of deep and shallow water, and exposed banks in late summer.</li> <li>• To ensure the landscape amenity value of the Lake is maintained, except under low rainfall climatic conditions.</li> </ul>	<p><i>Probable compliance.</i> <i>Inadequate response here and in Appendix 2. Compliance with each of the dot points should be separately addressed.</i></p>



**D. MINISTERIAL CONDITIONS for STATEMENT NO. 496**

Code	Description	Auditor's comments
496: M1.1	Fulfil the commitments published in EPA Bulletin 904 (Appendix 2) as attached to the Ministers statement 496.	<i>Non-compliant Action noted, but insufficient to ensure compliance.</i>
496: M2.1	Implement the consolidated environmental management commitments documented in schedule 2 of the Minister's statement.	<i>Non-compliant. Being addressed through s46 review.</i>
496: M2.2	Implement the subsequent environmental management commitments which are made as part of the fulfilment of conditions and procedures in the Minister's statement.	<i>Non-compliant. Response inadequate. These additional commitments should be added to the compliance table and reported against.</i>

**E. PROPONENT COMMITMENTS for STATEMENT 496.**

Code	Description	Auditor's comments
496: P1.1	Manage public and private groundwater abstraction to meet objectives and EWPs as summarised in Table A and B which appear in the attachment to Statement 496.	<i>Non-compliant Action noted, but insufficient to ensure compliance.</i>
496: P3.1	Investigate stratigraphy and water regimes in the Lexia wetlands, EPP wetland 173 in Melaleuca Park and Melaleuca Park dampland 78.	Agree, this commitment can now be cleared.
496: P11	Require the Water Corporation to Phase in production bores closest to phreatophytic vegetation.	Agree, this commitment can now be cleared.
496: P14	Map vegetation communities on the Gnangara Mound.	Agree, this commitment can now be cleared.
496: P15.1	Monitor water levels and establish a vegetation transect in wetland 132. - Pre-Operation	This commitment related to 'Pre-operation' and can now be cleared.
496: P15.2	Monitor water levels and establish a vegetation transect in wetland 132. - Operation	<i>Possible non-compliance. Inadequate response. Wetland 132 not listed in tables as being monitored.</i>
496: P17.2	Prepare dieback management procedures. - Pre-Operation	This commitment related to 'Pre-operation' and can now be cleared.

**3.1 Non-compliance on the evidence presented**

The audit of the tables identified 9 instances of non-compliance with the requirements of the relevant condition or commitment<sup>3</sup>, 8 where there is non-compliance that is being addressed by the Section 46 review, 5 of probable or possible non-compliance, where there was insufficient or inadequate information to confirm the status, and 5 where the condition is recommended to be cleared or amended. These assessments are based on the information presented in the Report.

All the instances of non-compliance are addressed elsewhere, either above or in Appendix 1, and are not commented on further here.

<sup>3</sup> Actually the conditions are subdivided into "auditable elements". For example, condition 438:M5 has two auditable elements. One was probably non-compliant and the other was non-compliant. The numbers 438 and 496 refer to the statement numbers of the environmental approvals. M refers to a Ministerial condition and P to a commitment by the proponent.



#### **4. Significance of the compliance results**

Compliance with the Ministerial conditions is a statutory requirement and failure to comply is a Tier 1 offence under the Environmental Protection Act 1986. Consequently, a failure to comply with any of the conditions is a significant matter. However, the purpose of the conditions is to protect the environment. How significant are the identified non-compliances in their effect on the environment?

In general, the environmental water provisions are expressed as minimum water levels that are not to be breached, or breached no more than two years in six. This in itself does not amount to an environmental impact except in the sense of visual amenity, when a lake dries. To determine the environmental impact of the lowered water levels the status of vegetation and fauna is monitored.

The status of the wetland values has been comprehensively addressed by Clark and Horwitz 2004 and their conclusions are summarized in Table 3. From their conclusions about the level of concern for the various environmental values associated with the wetlands of the Gnangara Mound it is clear that the non-compliance is not just an administrative matter, but an indicator of a portion of the environment under severe stress.

Action has been initiated on a number of fronts to address the non-compliance and the environmental problems to which it points. This report is not intended to undervalue that action, but in the interests of accountable auditing non-compliance has been reported as such despite the fact that steps are being taken to address it.



**Appendix 1 – Compliance Audit Table - with Auditor's Comments**



**Appendix 1.**

**Table 1(a)**

**Compliance Audit Table- Gngangara  
Ministerial Statement No. 438- Environmental conditions Gngangara Mound Groundwater Resources**

NOTE: Code in *bold italics* represents potential non-compliance of Ministerial Conditions

**A. MINISTERIAL CONDITIONS for STATEMENT NO. 438 (APPLICABLE FROM 1997).**

<b>Code</b>	<b>Description</b>	<b>Compliance Assessment (2003- 04)</b>	<b>Auditor comment</b>
438: M-1	Fulfill the commitments published in EPA Bulletin 817 (Appendix 3) as revised in November 1996 and attached to the Minister's statement 438.	Of the total number of 27 <b>statutory</b> environmental water level criteria published in Statement 438- 14 have been fulfilled for the 2003-04 reporting period. This is one more compliance than for the 2002-03 period. This has been achieved in an climate different to that which was considered when originally setting these criteria levels. Climate is believed to be the dominant causal factor in non-compliance of water level criteria. Public water supply abstraction in the current reporting period from the shallow aquifer declined by 4.6 Gigalitres while private allocation declined by 1.3 Gigalitres in the Wanneroo Groundwater Area.	Non-compliant. The commitments have not all been fulfilled.
438: M-2 M2-1	The implementation of the endorsed proposal shall conform in substance to that set out in any designs, specifications, plans or other technical material submitted by the proponent to the EPA.	Not applicable at this time- no submission of material by proponent.	OK
M2-2	Seek approval for modifications to the endorsed proposal.	Conditions cleared by the EPA Bulletin 1139 May 2004.	

Code	Description	Compliance Assessment (2003- 04)	Auditor comment
438: M3-1	The allocation of water to public and private users and the operation of Pinjar Stages 1,2,3, Wanneroo and Mirrabooka groundwater schemes shall comply with EWPs.	<p>The EPA audit compliance assessment (1 April 2004) of WRC 2000- 03 Triennial Report stated that the WRC needed to address reductions in groundwater allocations to meet EWPs in a drying climate.</p> <p>The WRC response to EPA Audit, is that where EWPs are already set by WRC , these have priority over abstractions. WRC is currently developing a Sub-regional groundwater management plan for the Gngangara Mound that will include EWPs for the Mound. In areas where EWPs are not met, the Plan will specify procedures to be followed to achieve EWPs.</p> <p>WRC has already taken back unused allocations and given the water to the environment.</p> <p>It should also be noted that abstractions are not just approved on the basis of an allocation limit. Where key values are at risk, site-specific impact assessments are carried out to ensure acceptability of the abstraction. For example, near Lake Mariginiup, trades into certain localised areas can only occur if the taking of water from that area is environmentally acceptable. This is regardless of the fact that the allocation limit will not be exceeded.</p> <p>It is also important to measure actual use to see whether it is use or allocations that need to be reduced first. Hence the recent introduction of a metering program in high-risk areas of the Wanneroo Groundwater Area (refer Table 9).</p>	<p><i>Non-compliant</i>  <i>Response has not addressed the fact that in some areas with non-compliance area allocations are still in excess of current abstraction. Agree the need to measure use.</i></p>
438: M4-1	The integrity of all groundwater dependent ecosystems, located on the Gngangara Mound, which are likely to be impacted by groundwater abstraction, shall be protected.	<p>The EPA audit compliance assessment (1 April 2004) of WRC 2000- 03 Triennial Report stated that the WRC needed to demonstrate the integrity of all groundwater dependent ecosystems (GDE).</p> <p>The WRC response to EPA Audit, is that this conditions presents problems for both parties as it is not possible for either party to determine unambiguously whether non-compliance has occurred. The EPA audit compliance assessment (1 April 2004) comments state that moderate, significant or severe declines in mean vegetation health constitute a probable non-compliance. The condition is unclear in that integrity is not defined nor is its scope or the GDEs likely to be impacted by abstraction.</p> <p>WRC has demonstrated that negative impacts on GDEs have occurred and, in some cases, this is primarily due to factors other than groundwater abstraction. These factors are a significant reason for initiating the s46 review and reviewing environmental values. Results will be included in the Stage 1 and 2 reports and, where feasible, these reports will propose more auditable and relevant conditions.</p>	<p><i>Non-compliant. Where EPA and WRC disagree on the interpretation of a condition, the Minister for the Environment resolves the matter.</i></p>

Code	Description	Compliance Assessment (2003- 04)	Auditor comment
438: M5-1	The basis of decisions regarding the management of the water resources of the Gngangara Mound and maintenance of ecological systems shall be based on the concept of sustainable yield of resources in accordance with the objectives of the State Water Conservation Strategy.	<p>EPA audit compliance assessment (1 April 2004) of WRC 2000- 03 Triennial Report regards the State Water Strategy as the successor of the incomplete Draft Water Conservation Strategy.</p> <p>The WRC manages water resources on the Gngangara Mound by the sustainable yield concept which recognises maintenance of ecological systems. Each year the condition of the shallow aquifer is assessed in regards to the extent of winter recharge and production quotas for public wellfield abstraction adjusted accordingly. During the reporting period 2003-04, groundwater allocation for wellfield abstraction has declined (Table 6) reflecting reduced recharge from below average rainfall. Groundwater allocation for private use has not increased in most subareas and has decreased in others.</p> <p>The WRC has instigated a number of programs to improve management of private abstraction where there is potential to impact detrimentally on the maintenance of ecological systems.</p> <ul style="list-style-type: none"> <li>• Metering</li> <li>• WaterWise on the Farm</li> <li>• Policy</li> <li>• Licensing</li> </ul>	Non-compliant. Intent of management is sustainable yield, but non-compliances show it is not yet being achieved.
438: M5-2	The basis for management decisions and the criteria specified for conservation of the environment and of the groundwater resource of the Gngangara Mound shall be subject to regular review.	EPA audit compliance assessment (1 April 2004) of WRC 2000- 03 Triennial Report stated item as non-compliant. However, WRC has argued (WRC response to EPA Audit, Attachment 8) that management decisions are reviewed regularly as part of process of annual review of public water supply production quotas for the summer period. This includes an analysis of impact of public extraction on groundwater levels and associated ecosystems. In addition, an adaptive management response is taken with the condition of GDE's being regularly assessed and the frequency of monitoring increased if levels are close to or below criteria levels.	OK Extra information shows compliance.



Code	Description	Compliance Assessment (2003- 04)	Auditor comment
438: M6-1	Continue the current approach of widely publishing the limits on groundwater availability for the Gngangara Mound.	<p>EPA audit compliance assessment (1 April 2004) of WRC 2000- 03 Triennial Report stated that the WRC was not achieving the intent of the condition in reporting data at committee meetings. However, WRC argues that (WRC response to EPA Audit, Attachment 8) :</p> <p>All current and potential licensed users of groundwater are well aware of the constraints on supply as the publication of limits has targeted these groups. Groundwater availability is published on the WRC website ??? . The performance of the mound is the subject of regular press releases across the State. Consultative groups receive regular briefings (Gngangara Groundwater Advisory Group, Wanneroo Groundwater Advisory Committee, Gngangara Advisory Group , Gngangara Community Consultative Committee, Gngangara Coordinating Committee, Conservation Council of WA , the Water Taskforce and the Premier's Cabinet Sub-committee on Water. WRC is also conducting an extensive publicity campaign as part of its private use metering program that will include regular feedback on metering results in the context of the health of the Mound to water users and the community.</p> <p>Changing community attitudes requires more than publishing this information. For this to occur the context and consequence of water abstraction needs to be understood by the community. WRC considers the most significant factors influencing community attitudes are the sprinkler restrictions of public scheme users (that personally affect 1.6 million people) and local government and the release of the State Water Strategy in February 2003. WRC will continue with its current publication/consultation activities and directs its main efforts to implementation of and education about the State Water Strategy, private use metering and the WaterWise on the Farm program.</p>	OK Extra information shows compliance.
438: M6-2	Update the Figures published according to the requirements of 6-1	Refer to criteria M6-1.	OK
438: M7-1	Actively encourage further reduction in public water demand through its Water Conservation Strategy.	<p>EPA audit compliance assessment (1 April 2004) of WRC 2000- 03 Triennial Report stated that the State Water Strategy could be reasonably seen as the successor of the incomplete Draft Water Conservation Strategy.</p> <p>Dependent on the available resources, the WRC has actively pursued many of the 29 tasks that it is the lead agency for. Progress on some of these tasks are reported in the One Year Progress Report of the State Water Strategy (April 2004)</p>	OK
438: M8-1	Refer proposals to allocate water for subsequent public supply schemes on the Gngangara Mound to the EPA (eg, Yeal, Barragoon, Muchea Schemes).	Not applicable at this time.	OK

Code	Description	Compliance Assessment (2003- 04)	Auditor comment
438: M9-1 (also refer to 438:P9)	Undertake the following areas of specific research and monitoring: 1) Clarify the relationship between groundwater level and wetland water quality, 2) improve the understanding of the conservation value of wetlands on the Gngangara Mound, especially for those for which information on their value is limited.	Reports(available upon request) have been recently completed for (1) 'Groundwater and wetland water level relationships' (Rockwater 2004) and (2) 'Study of Ecological Water Requirements on the Gngangara and Jandakot Mounds- Task 1: Identification and re-evaluation of ecological values' (Edith Cowan University, September 2004).  The EPA audit compliance assessment (1 April 2004) of WRC 2000- 03 Triennial Report stated that this condition could be cleared once the studies are complete. This work has been completed and a report needs to be submitted to the EPA summarising the work and requesting clearance of the condition.	OK.
438: M10-1	Submit a brief annual report and more detailed triennial reports on the environmental monitoring and management of the Gngangara Mound.	Compliance as per submission of this report.	OK
438: M11-1	Seek approval for transfer of ownership, control or management of this project.	Not applicable at this time.	OK
438: M12-1	Submit reports detailing performance and compliance with the conditions set in the Ministerial statement and attachments.	Conditions cleared by the EPA Bulletin 1139 May 2004.	

**B. PROPONENT COMMITMENTS for STATEMENT NO. 438**

Code	Description	Compliance Assessment (2003- 04)	Auditor's comment
438: P1	Request the Water Corporation to establish further monitoring bores for monthly monitoring and more frequently if required within a 200m radius of production bores located in phreatophytic vegetation.	28/10/97 Condition cleared by DEP Environmental Audit Branch.	
438: P2	Establish additional monitoring wells in those areas where suitable wells do not exist to monitor groundwater levels under phreatophytic vegetation.	28/10/97 Condition cleared by DEP Environmental Audit Branch.	

Code	Description	Compliance Assessment (2003- 04)	Auditor's comment
438: P3	Select a range of indicator species at transects to determine an acceptable rate of change in vegetation composition. Also calculate similarity indices when monitoring.	EPA audit compliance assessment (1 April 2004) of WRC 2000- 03 Triennial Report states this commitment as non-compliant. It also requested the WRC to further demonstrate present form of vegetation monitoring is adequate. The WRC response to EPA Audit, is that present wetland vegetation monitoring involves annual sampling of permanent transects and includes assessments of tree health, species cover and abundance, and calculations of weediness and regeneration indices. The results of each round of monitoring are compared with the results of previous years, revealing trends in vegetation composition, condition and health. To date, although there is a reasonable understanding of which species are more sensitive to water level changes, specific indicator species have not been selected and similarity indices are not calculated. While that approach has some merit, there is also a danger in such a 'reductionist approach' to monitoring, where one or two species and their relationship to a number or index is focused on rather than general system trends. The biological monitoring programme is currently being reviewed by Edith Cowan University, and recommendations of this review will be available by September 2004. A change in the approach to monitoring, incorporating detailed species lists and measurements of composition and abundance will require a considerable increase in current funding.	<i>Non-compliant with specific requirements, but intent of commitment is being achieved.</i>
438: P4	Require the Water Corporation to prepare an environmental operations plan to provide specific detail on environmental management of groundwater schemes in the study area. To include detailed management prescriptions for wellfield operators and water resource managers.	Despite clearance, EPA audit compliance assessment (1 April 2004) of WRC 2000- 03 Triennial Report recommended consideration of review of environmental operations plan in light of changes with new projects and a lack of success of past practices in avoiding non-compliance with water level minima.  Recommendation under consideration by the Commission.	OK WRC should advise EPA on a timeline for this consideration.

Code	Description	Compliance Assessment (2003- 04)	Auditor's comment
438: P5	Prepare a water resources allocation and management plan for the Yeal area to identify groundwater allocations (before development of Yeal scheme).	Not applicable at this time.	OK
438: P6	Prepare a Water Resources Allocation and Management Plan for the Lexia area (East Gngara area) to identify groundwater allocations prior to the development of the Lexia Scheme To include detailed groundwater modelling to optimise groundwater availability while minimising environmental impacts.	28/02/00 Condition completed as now assessed under Statement 496 (comment from DEP Evaluation Audit Branch audit table)	
438: P7	Develop a Memorandum of Understanding on pine management regimes with CALM	<p>Despite clearance, EPA audit compliance assessment (1 April 2004) of WRC 2000- 03 Triennial Report noted that although MOU had been developed, it was not being implemented. The EPA April 2004 audit recommended- "that the proponent seek legal advice on this matter, and that the EPA recommend that the Minister write to the Minister for Agriculture, Forests and Fisheries advising of Forest Products Commission's failure to comply with obligations under the EPP 1992 clause 9(d).</p> <p>Although Ministerial involvement has not yet occurred as recommended above, high level discussions continue between agencies to improve management objectives.</p>	The requirement in the MOU is the same as that to which FPC is legally bound under the EPP. This legal onus, confirmed by legal advice, should be used to strengthen WRC's position in the "high level discussions".
438: P8	Manage all groundwater allocation and use with the aim of meeting the objectives in EPA Bulletin 817, tables 15 and 16.	18/10/99 No longer relevant as covered by 438: M3.1 (DEP Environmental Audit Branch audit table comment).	

Code	Description	Compliance Assessment (2003- 04)	Auditor's comment
438: P9	Facilitate and undertake strategic research to minimise the impacts of groundwater abstraction	<p>EPA audit compliance assessment (1 April 2004) of WRC 2000- 03 Triennial Report recommended that studies should more directly address the environment as currently they appear to be mainly focused on understanding the impacts of groundwater abstraction rather than minimising those impacts. WRC research was assessed as only partly complying with this commitment.</p> <p>The WRC response to EPA Audit, is that: Studies have been initiated. An extensive research program has been developed with CSIRO and the Water Corporation as full partners in an MOU and with CALM, FPC, DPI, Agriculture Department and DPC as associate members. This program is spending in excess of \$2m per annum gaining greater understanding of factors affecting groundwater levels on the Mound and how they may be best managed to minimise impacts.</p>	It is still not clear from the information provided, including Appendix 3 of the Report, how the investigations address minimizing the impacts of groundwater abstraction.
438: P10	Continue to provide advice to City of Wanneroo, Ministry of Planning, CALM and other relevant agencies on the impact of landuse on groundwater resources.	<p>The EPA audit compliance assessment (1 April 2004) of WRC 2000- 03 Triennial Report recommended that the WRC elaborate on the degree of advice provided on land- use/ groundwater resource impacts, eg. is this advice provided on specific applications for rezoning, subdivision or development approval.</p> <p>The WRC provides specific advice on the impacts of land use proposals referred to it by decision making authorities. For example, between 1 July 2003 and 30 June 2004 the WRC / DoE considered 51 proposals within the City of Wanneroo. Proposals referred included, 22 subdivision proposals, 9 rezonings, and 30 development applications. The advice provided relates to general environmental management considerations including management of groundwater resources.</p> <p>In addition to the continuation of activities listed in the WRC 2000-03 Triennial report over the 2003-04 year, the WRC has also made a significant contribution to the production of the draft East Wanneroo Land and Water Use Strategy. The contribution has mainly involved computer modelling of various land- use scenarios and assessing potential impacts on groundwater resources.</p>	OK The additional information is clear quantitative evidence of compliance.
438: P11	Continue to develop catchment strategies to minimise change in hydrological regime within the caves of Yanchep National Park. Monitor water levels and cave fauna.	The Commission has been very active over the review period in the trial supplementation of the Yanchep caves and in securing an alternative water source (bores) to Loch McNess.	OK

Code	Description	Compliance Assessment (2003- 04)	Auditor's comment
438: P12	Prepare strategic drainage plans for the study area including options for the management of high water levels in Lake Joondalup, Goollelal, Mariginiup and Jandabup.	Not applicable at this time.	OK
438: P13	In consultation with other relevant agencies, the Water and Rivers Commission, will within six months of receiving environmental approvals, reconvene and provide ongoing executive support for an inter – agency technical advisory group for water resources planning and management issues on the Gngangara Mound. This will be done in the context of recommendations of the Select Committee on Metropolitan Development and Groundwater Supplies.	As stated in the WRC 2000-03 Triennial report, the WRC has continued to provide ongoing executive support in 2003-04 for a number of relevant technical advisory groups concerned with the Gngangara Mound.	OK
438: P14	Continue to chair and provide support for the Consultative Committee as an ongoing forum for information exchange and advice.	As stated in the WRC 2000-03 Triennial report, the WRC has continued to provide ongoing executive support to the Gngangara Coordinating Committee in 2003-04. The Gngangara Coordinating Committee has met several times from July 2003 to June 2004.	OK

Code	Description	Compliance Assessment (2003- 04)	Auditor's comment
438: P15	The Water and Rivers Commission will continue to report every three years to the Department of Environmental Protection on the management of groundwater within the Study area of the Gngara Mound. This will include information on the operation of groundwater schemes and private groundwater use, and environmental impacts. In those years when a triennial report is submitted, the Water and Rivers Commission will report to the Department of Environmental Protection on compliance with environmental conditions.	The EPA audit compliance assessment (1 April 2004) of WRC 2000- 03 Triennial Report recommended that this condition could be cleared if elements specifying report content were incorporated in condition M10-1. The audit also stated that this condition could be changed as part of the S46 review.	OK, so when condition is changed through s46 review, this commitment will be cleared or deleted.
438: P16	Limit potential for tree deaths around production wells to 100m radius for normal (average) climate conditions and within 200m in extreme conditions. This should be part of Water Corporation license conditions.	Compliance justification listed in the WRC 2000-03 Triennial report is also relevant for the 2003-04 period.  The Commission has managed abstraction to limit potential tree deaths. The number of Water Corporation production wells turned off to avoid impact on vegetation and wetland water levels over the 2003-04 summer totaled more than 40. Scheme abstraction was 4.6 GL less than for the previous reporting period.	
438: P17	Upgrade the artificial maintenance facility for Lake Nowergup to provide more rapid recharge when it becomes necessary to meet EWPs.	The Ministerial EWP absolute minimum criteria level for Lake Nowergup is 16.8mAHD. The Section 46 2003 Progress Report proposed a summer minimum of 15.9 m AHD for Lake Nowergup. There was compliance with the 15.9 m AHD regime in 2003-04. The maintenance regime was changed due to the fact that the existing regime provided inadequate protection for the fringing vegetation, causing a significant collapse in autumn 2002. The proposed regime, which the Commission managed in 2002/03 (to 16mAHD) and 2003/04 has succeeded in preventing further decline and has enabled some recovery of the affected vegetation.	Appendix 2
438: P18	Establish an artificial maintenance facility for Coogee Springs when necessary to meet EWPs	Conditions cleared by the EPA Bulletin 1139 May 2004.  Refer to 438: P19.	

Code	Description	Compliance Assessment (2003- 04)	Auditor's comment
438: P19	Should EWPs not be met by November 1, artificial supplementation shall be used until the EWP is reached.	<p>The EPA audit compliance assessment (1 April 2004) of WRC 2000- 03 Triennial Report recommended that any modification of the objective to satisfy EWP criteria (eg. Coogee Springs) by November 1 should be made as a written request to the Minister.</p> <p>Artificial maintenance has not occurred at Coogee Springs in 2003-04 as Lake Coogee has lost its environmental values due to clearing and grazing in the area. This has been communicated to the EPA through formal reports on several occasions, both before and after the pumping was switched off. WRC intends to ask the EPA to remove this condition as part of the Stage 1 s46 report.</p>	
438: P20	Only allow drops below the preferred level (table 16, bulletin 817) to occur in low rainfall years to mimic natural regimes (rate of 2/6 years).	Non-compliance of water level criteria have occurred more than twice in six years within Lakes Joondalup, Mariginiup, Nowergup, Coogee Springs, and Lexia 186a. Lake Gngangara was not non-compliant as for previous years however Lexia 186 was a new non-compliance.	Tables 2-4
438: P21	A review shall take place of the EWPs (table 16, bulletin 817) at least every six years to allow for adaptive management. It will incorporate public involvement.	<p>The WRC is progressing the s46 review of the Gngangara Mound that includes EWPs. The Draft Stage 1 report has received public comment. The WRC will incorporate these comments and submit the Stage 1 report for EPA assessment in late 2004.</p> <p>The EPA audit compliance assessment (1 April 2004) of WRC 2000- 03 Triennial Report recommended that the WRC expedite the s46 review process and set interim measures to address on-going non-compliance. The WRC response to EPA Audit, is that the s46 review has previously agreed timeframes with the EPA to submit the Stage 1 report in 2004 and the Stage 2 report in 2005. The review could be expedited further than it has already but the scientific information would not be as comprehensive. The amendment to conditions proposed in the reports would then require another round of amendment a few months later in response to the additional information. The WRC proposes to abide by the current timelines.</p>	
438: P22	The Water and Rivers Commission will, after receiving environmental approvals, implement and undertake the following monitoring programme, to the satisfaction of the EPA:	The EPA audit compliance assessment (1 April 2004) of WRC 2000- 03 Triennial Report stated that the condition was only cleared 'in-part'. It is unclear, however, what part of the condition is still 'in-force'. WRC recommends that this condition be assessed as part of the s46 review.	
438: P23	Groundwater level monitoring across the established monitoring network, at a frequency of 1 or 3 months, depending on the wells.	All monitoring wells and wetlands that have Environmental Water Provision criteria are monitored on a monthly basis (hydrographs available upon request). Other wells are either monitored monthly, quarterly or biannually. Aquaterra Consulting has recently completed a review of the Commission's groundwater monitoring network in the Perth region, and implications of this report are still being assessed.	Records available upon request



Code	Description	Compliance Assessment (2003- 04)	Auditor's comment
438: P24	Vegetation transects will be established at all wetlands for which EWPs have been set, except Lake Gngara, Pipidinny Swamp, and Coogee Springs. A minimum of one transect will be established for each wetland. Monitoring will be undertaken yearly, in November, for the first three years, to be reviewed in the first triennial report.	Permanent transects have been set up from the edge of the wetland to upland 40m at Lakes: Joondalup, Jandabup, Mariginiup, Nowergup, Yonderup, Wilgarup, Goollelal, Lexia 86, Lexia 186, Lexia 94, EPP 173, Dampland 78, Loch McNess. They were sampled annually in September 2000 – 02. As part of the Water Corporation's Lexia wetland mitigation strategy, vegetation transects have been established by the Corporation at wetlands 104, 132, 156, 158 and 164. The vegetation at these wetlands has been visually assessed by Edith Cowan University ecologists monthly, or fortnightly in summer over the 2003-04 period. The Commission is provided with the results of these assessments. The Water Corporation has obtained agreement from the Commission to alter the monitoring programme in line with the annual programme currently in place for wetlands monitored by the Commission.	Appendix 2
438: P25	Wetland vegetation will be mapped every two years from large scale aerial photography for Lakes Jandabup, Mariginiup, Nowergup, and Loch McNess.	Conditions cleared by the EPA Bulletin 1139 May 2004.	
438: P26	Water quality will be monitored annually in November at all wetlands for which EWPs have been set.	<p>The EPA audit compliance assessment (1 April 2004) of WRC 2000- 03 Triennial Report stated that the WRC must demonstrate that the commitment should be changed if water quality analysis are done at different times to November. It is not clear if sampling of Lexia interim' criteria' wetlands are required</p> <p>The WRC response to EPA Audit, is that monitoring undertaken where water levels at their highest or fauna presence likely in order to assess recovery. Changes to monitoring times occurred following consultant's recommendation for more appropriate monitoring times. WRC proposes condition is changed and consultant's recommendations will be forwarded to EPA to support this (Section 46 stage 1 report, late 2004).</p> <p>The monitoring of some Lexia wetlands (in particular Lexia 94) is not undertaken by the WRC as there is no permanent or ephemeral water present on site to monitor. WRC proposes amending condition to reflect this. Consultants conducting the monitoring also recommend changes to monitoring programs at Lexia sites as some are unsuitable for detecting long term trends. WRC proposes condition is changed and consultant's recommendations will be forwarded to EPA to support this.</p>	Section 3; Appendix 2.
438: P27	Wetland habitats will be mapped along two regional transects in November, using large scale aerial photography, every year for the first three years, then every three years.	The EPA audit compliance assessment (1 April 2004) of WRC 2000- 03 Triennial Report recommends that the commitment could be changed (ie. greater flexibility in sampling time) as part of the s46 review.	

Code	Description	Compliance Assessment (2003- 04)	Auditor's comment
438: P28	Established terrestrial vegetation transects will continue to be monitored in spring, with at least 6 transects monitored every three years.	Phreatophytic, terrestrial vegetation is monitored triennially. The last survey was conducted in 2001/02.  There has been a general shift in vegetation composition from moisture dependent species towards xeriphytic species, which are better adapted to drought conditions. If dry conditions continue, the extent of the impact on the lower and mid slopes in the Pinjar area will increase, as these areas are already very stressed. Their long term recovery potential is of concern	Appendix 2
438: P29	Indicator species will be monitored at established terrestrial vegetation transects when transects are monitored in spring. Parameters that will be assessed for each indicator species are age (size), class distribution, vigour and recruitment.	Refer to Commitment 438:P3.	Appendix 2
438: P30	A Similarity Index for each terrestrial vegetation transect at each monitoring period will be calculated with the aim of summarising spatial and temporal changes in vegetation composition.	Refer to Commitment 438:P3.	
438: P31	Continuous water level monitoring in three caves in Yanchep National Park will continue, with further cave monitoring established in suitable caves.	Water levels within 6 cave streams have been monitored since 1993. Loggers have been installed in 3 caves to enable continuous monitoring. CALM artificially maintains water levels in the Tuart root mat habitats located inside the caves. Water levels in lined concrete sumps located in Crystal Cave are also being artificially maintained to protect small populations of rare isopods (Knott and Storey, 2002).  Cave stream water levels are generally representative of the surrounding groundwater table. Declining levels are due mainly to low rainfalls, and possibly dense pine plantation upstream, reducing groundwater discharge (Water and Rivers Commission, 1999).	Records available upon request

Code	Description	Compliance Assessment (2003- 04)	Auditor's comment
438: P32	Aquatic fauna will be monitored within those cave streams containing root mats once per year in November.	<p>The EPA audit compliance assessment (1 April 2004) of WRC 2000- 03 Triennial Report recommends that the commitment could be changed (ie. greater flexibility in sampling time) as part of the s46 review.</p> <p>The caves sampled in September 2003 were Boomerang Cave (YN99), Cabaret Cave (YN31), Carpark Cave (YN18), Water Cave (YN11), Cave YN61, Jackhammer Cave (YN438), Cave on Lot 51 (YN555) and Orpheus Cave (YN256). Twilight Cave (YN194) should have been sampled but it was unsafe to enter and Gilgie Cave (YN27) was dry so it was not sampled (water cave was sampled instead).</p>	Appendix 2.
438: P33	Water levels in wells for which EWPs have been established will be monitored every month.	Water levels at these sites are monitored monthly- hydrographs available upon request (or refer last years Triennial report).	
438: 34	Water levels in piezometer transects in the Yanchep area will be monitored every month.	<p>Water levels at these sites are monitored monthly.</p> <p>These results are available upon request.</p>	
438: P35	The impact of confined aquifer abstraction on unconfined aquifer water levels will be monitored. If significant impacts are observed the Water and Rivers Commission will discuss the observed impacts with the EPA.	<p>The EPA audit compliance assessment (1 April 2004) of WRC 2000- 03 Triennial Report recommends the WRC require the Water Corporation to monitor the impact.</p> <p>The WRC response to EPA Audit, is that regional monitoring of the levels in the Yarragadee confined aquifer is carried out by WRC and monitoring of the Yarragadee aquifer production bores is carried out by the Water Corporation (WC). In areas where studies have indicated that pumping from the Yarragadee aquifer is having an adverse impact on levels in the Superficial aquifer, additional monitoring of the Superficial aquifer is carried out by the WRC. In 2003, as part of the drought relief strategy, the WC constructed three additional production bores (one each at Scarborough Gwelup and Carine) to abstract an additional 15 GL/year from the Yarragadee aquifer. Monitoring information was submitted to WRC in April 2004 and the WRC is in the process of negotiating a monitoring strategy for these three bores with the WC.</p> <p>More information on this can be provided to the EPA if required.</p>	
438: P36	Water levels will continue to be monitored once per month in 28 wetlands within the study area.	<p>Water levels at these sites are monitored monthly.</p> <p>These results are available upon request.</p>	Records available upon request.

Code	Description	Compliance Assessment (2003- 04)	Auditor's comment
438: P37	Water level monitoring in 13 wetlands for which EWPs have been set will occur more frequently than once per month, when necessary, to determine compliance with set levels.	Monthly water levels monitoring is currently considered adequate at these sites.  These results are available upon request.	
438: P38	Aquatic fauna will be monitored at the 13 wetlands for which EWPs have been set twice per year (but only when open water is present), in November and March.	Seventeen (17) wetlands were monitored for macroinvertebrates and water quality once in spring (Round 16, R16) and once in summer/autumn (Round 17, R17), for the ninth year in succession.  These results are available upon request.	Appendix 2
438: P39	The Water and Rivers Commission will, on receiving environmental approvals, prepare monitoring protocols for aquatic invertebrate monitoring within the wetlands, to the satisfaction of the EPA.	Macroinvertebrate monitoring protocols were established between researchers to maintain consistency with monitoring on both the Jandakot and Gnangara Mounds. Consistency in approach is currently employed with monitoring conducted over the nine consecutive years of macroinvertebrate monitoring.	Appendix 2

**C. WETLAND MANAGEMENT OBJECTIVES for STATEMENT 438.**

Wetland	Water Regime Management Objectives	Performance Indicators	Compliance Assessment (2003- 04)	Auditor Comment
438: Lake Jandabup	<ul style="list-style-type: none"> <li>• No expansion in the area of sedge vegetation, but maintenance of existing areas.</li> <li>• Maintenance of the current extent of wading bird habitat.</li> <li>• Maintenance, and if possible, expansion of the <i>M raphiophylla</i> and <i>E rudis</i> fringing woodlands.</li> <li>• Removal of mosquito-fish from the Lake.</li> <li>• Maintenance of the high species richness of aquatic macroinvertebrates and macrophytes.</li> </ul>	The existing extent of sedge and wading habitats within the Lake will be maintained (within +/- 10%), and should not change by more than 5% in any 2 year monitoring period.	Water levels and acidification threat considered extreme concern (Clark and Horwitz Rep no. 2004-07). All other attributes of probable to possible concern.	Appendix 2- Table A1.
438: Lake Gngangara	To improve water quality through increased water levels, as a means of enhancing both environmental and social values of the Lake.	The pH of the Lake should increase. The extent of any expected increase is unknown.	Extreme concern for possible acidification. Other attributes of possible to no immediate concern except for water levels being probable concern.	Appendix 2- Table A1.
438: Lake Mariginiup	<p>To maintain the current area of sedge vegetation to within +/- 10%.</p> <p>To maintain the current area of wading bird habitat.</p> <p>To maintain invertebrate diversity through some lake-bed drying in summer.</p> <p>To maintain, and if possible, enhance, fringing woodland vegetation.</p>	The existing sedge area to be maintained to within +/- 10%, and should not change by more than 5% in any 2 year monitoring period.	Extreme concern for water level, acidification potential, fire susceptibility, and probable concern for all other attributes.	Appendix 2- Table A1.
438: Lake Joondalup	<ul style="list-style-type: none"> <li>• To conserve existing wetland vegetation, including sedge beds, fringing woodlands, and aquatic macrophytes.</li> <li>• To maintain and if possible enhance the aquatic fauna of the Lake.</li> <li>• To support the full range of habitats for avian fauna found at Lake Joondalup to help ensure its continued value as a major water- bird habitat within the Regions. This includes areas of deep and shallow water, and exposed banks in late summer.</li> <li>• To ensure the landscape amenity value of the Lake is maintained, except under low rainfall climatic conditions.</li> </ul>	(none)	Extreme concern for eutrophication (L. Joondalup south). Water levels and eutrophication probable concern in L. Joondalup north and introduced species in L. Joondalup south. All other attributes of possible to no immediate concern.	Appendix 2- Table A1.

Appendix 1(b)

Compliance Audit Table- East Gngara Shire of Swan  
Ministerial Statement No. 496- Environmental conditions Gngara Mound Groundwater Resources

A. MINISTERIAL CONDITIONS for STATEMENT NO. 496 (APPLICABLE FROM 1999).

<b>Code</b>	<b>Description</b>	<b>Compliance Assessment (2003- 04)</b>	<b>Report Reference</b>
496: M1.1	Fulfill the commitments published in EPA Bulletin 904 (Appendix 2) as attached to the Ministers statement 496.	Of the total number of 20 (including interim) environmental water level criteria published in Statement 496- 15 have met criteria levels in the current reporting period 2003-04. This has been achieved in an climate different to that which was considered when originally setting these criteria levels. Climate is believed to be the dominant causal factor in non-compliance of water level criteria. Public water supply abstraction in the current reporting period from the shallow aquifer declined by 4.6 Gigalitres while private allocation declined by 1.3 Gigalitres.	Executive Summary, Tables 2-4.
496: M1.2	Changes to any aspects of the proposal as documented in schedule 1 of the statement that the Minister determines is substantial, shall be referred to the EPA.	Not relevant at this time.	
496: M1.3	Changes to any aspects of the proposal as documented in schedule 1 of the statement that the Minister determines is non-substantial, can be effected.	Not relevant at this time.	
496: M2.1	Implement the consolidated environmental management commitments documented in schedule 2 of the Minister's statement.	The EPA audit compliance assessment (1 April 2004) of WRC 2000-03 Triennial Report recommends that this condition be addressed under Section 46 review.	
496: M2.2	Implement the subsequent environmental management commitments which are made as part of the fulfillment of conditions and procedures in the Minister's statement.	Commitments made to fulfill the conditions and procedures in the Ministers statement are implemented as part of the operating strategy of the Water Corporation.	

Code	Description	Compliance Assessment (2003- 04)	Report Reference
496: M3.1	The proponent nominated by the Minister for the Environment under section 38(6) or (7) is responsible for implementation of the proposal until such time as the nomination for that proponent is revoked under section 38(7) of the EPA Act and another person is nominated in respect of that proposal.	Not relevant at this time.	
496: M3.2	Any request for change in proponent shall be accompanied by a copy of the Minister's Statement endorsed with an undertaking by the proposed replacement proponent to carry out the proposal in accordance with the conditions and procedures set out in the statement.	Not relevant at this time.	
496: M3.3	Notify the DEP of any change of proponent, contact name and address within 30 days of such change.	Not relevant at this time.	
496: M4.1	Provide evidence to the Minister before 17 February 2004 that the proposal has been substantially commenced.	The EPA audit compliance assessment (1 April 2004) of WRC 2000-03 Triennial Report agreed that the condition can be cleared.	
496: M4.2	If the proposal has not been substantially commenced before 17 February 2004, the approval to implement the proposal as granted in this statement shall lapse and be void.	The EPA audit compliance assessment (1 April 2004) of WRC 2000-03 Triennial Report agreed that the condition can be cleared.	
496: M4.3	Make an application to the Min for Environment for any extension of approval for the substantial commencement of the proposal beyond 17 February 2004 at least 6 months before 17 February 2004.	The EPA audit compliance assessment (1 April 2004) of WRC 2000-03 Triennial Report agreed that the condition can be cleared.	
496: M4.4	If it demonstrated that the parameters of the proposal have not changed significantly, then the Minister may grant an extension not exceeding 5 years for the substantial commencement of the proposal.	The EPA audit compliance assessment (1 April 2004) of WRC 2000-03 Triennial Report agreed that the condition can be cleared.	
496: M5.1	Submit periodic Performance and Compliance Reports, in accordance with an audit program.	Submitted jointly with Statement 438.  Refer to Condition 438: M10-1.	

Code	Description	Compliance Assessment (2003- 04)	Report Reference
496: M5.2	Unless otherwise specified, the DEP is responsible for assessing compliance with the conditions, procedures and commitments contained in this Statement and for issuing formal clearances.	The EPA audit compliance assessment (1 April 2004) of WRC 2000-03 Triennial Report recommended that this be amended under the Section 46 report.	
496: M5.3	The Minister will determine the matter where compliance with any condition, procedure or commitment is in dispute.	Acknowledged.	

**B. PROPONENT COMMITMENTS for STATEMENT 496.**

Code	Description	Compliance Assessment (2003- 04)	Report Reference
496: P1.1	Manage public and private groundwater abstraction to meet objectives and Environmental Water Provisions (EWPs) as summarised in Table A and B which appear in the attachment to Statement 496.	Public water (scheme) abstraction was 4.6 GL less from the superficial aquifer than for previous reporting period and private water allocation was 1.3 GL less.  A number of water management initiatives are on-going (eg. Water Wise on the Farm) and some new initiatives have begun in the current reporting period (eg. metering of use).	Section 4.3.
496: P1.2	Review interim EWRs in the first triennial report to the EPA and update as appropriate.	Work to revise the EWRs was initiated during 2002 with completion expected in late 2004 as a component of the current Section 46 review of environmental conditions.	Welker 2002a, Strategen 2003
496: P2	Submit annual and triennial reports on the management and monitoring of the East Gngangara Mound.	9/05/01 Condition no longer relevant as superseded by 496: M5.1 (comment in DEP Environmental Audit Branch audit table)	
496: P3.1	Investigate stratigraphy and water regimes in the Lexia wetlands, EPP wetland 173 in Melaleuca Park and Melaleuca Park dampland 78.	Rockwater reported on groundwater wetland relationships on the Gngangara and Jandakot Mounds in July and September 2003 including the Lexia wetlands, EPP wetland 173 in Melaleuca Park and Melaleuca Park dampland 78 to determine possibility of perching. Perching of EPP wetland 173 and dampland 78 is indicated, with possible perching of Lexia 94 swamp.	Rockwater 2003.



Code	Description	Compliance Assessment (2003- 04)	Report Reference
		Report is available upon request.  With the completion of this investigation and production of the Rockwater (2003) report, the Commission seeks clearance of condition 496:P3.1.	
496: P3.2	Determine EWPs following the investigation undertaken in P3.1	Draft report completed and out for public review and comment- " <i>Section 46 Review of Environmental Conditions on Management of the Gnangara and Jandakot Mounds- Stage 1 proposal for changes to conditions</i> "(Strategen August 2004). Final report expected to be submitted to the EPA in late 2004.	Strategen August 2004
496: P4	Provide support to research projects and conduct research and investigations into the EWRs of wetlands, vegetation and seepage areas as defined in Section 16.5 of the PER.	Draft report completed and out for public review and comment- " <i>Section 46 Review of Environmental Conditions on Management of the Gnangara and Jandakot Mounds- Stage 1 proposal for changes to conditions</i> "(Strategen August 2004). Final report expected to be submitted to the EPA in late 2004.	Strategen August 2004
496: P5	Review and update EWPs and water allocation if necessary by feedback from the monitoring program.	Draft report completed and out for public review and comment- " <i>Section 46 Review of Environmental Conditions on Management of the Gnangara and Jandakot Mounds- Stage 1 proposal for changes to conditions</i> "(Strategen August 2004). Final report expected to be submitted to the EPA in late 2004.	Strategen August 2004
496: P6	Undertake a monitoring program.	A monitoring program was conducted during the reporting period.	Section 3; Appendix 2.
496: P7	Develop a MOU with CALM which includes pine harvesting in State forest 65 (SF65) over 20 years and the Gnangara Park establishment.	MOU developed. The lack of management of the pines in accordance with the MOU is an on-going issue.  Refer to Triennial Report discussion.	Section 2.3.2.
496: P8	Provide advice on impacts of landuse on groundwater resources to relevant agencies.	The WRC provides specific advice on the impacts of land use proposals referred to it by decision making authorities. For example, between 1 July 2003 and 30 June 2004 the WRC / DoE considered 51 proposals within the City of Wanneroo. Proposals referred included, 22 subdivision proposals, 9 rezonings, and 30 development applications. The advice provided relates to general environmental management considerations including management of groundwater resources.  In addition to the continuation of activities listed in the WRC 2000-03 Triennial report over the 2003-04 year, the WRC has also made a significant contribution to the production of the draft East Wanneroo Land and Water Use Strategy. The contribution has mainly involved computer modelling of various land- use scenarios and assessing potential impacts on groundwater resources.	
496: P9	Determine EWPs for new appropriately located bores in the vegetation corridor.	All EWRs and EWPs on the Gnangara Mound are under review as agreed to by the Minister and the EPA in 2001. As part of this review under Section 46 of the Environmental Protection Act, Edith Cowan University has been	Welker 2001.

Code	Description	Compliance Assessment (2003- 04)	Report Reference
		contracted to review the ecological values and ecological water requirements for GDEs on the Gngangara Mound (more information on the scope of this study is contained in the responses to M9-1 and P9 of Statement 438 (Gngangara Mound Groundwater Resources). This includes the vegetation corridor near the Lexia borefield. This review is due to be completed by the end of 2004.	
496: P10	Chair and provide support for a Consultative Committee as a forum for information exchange.	The Gngangara Community Consultative Committee has met in October 2003 and again in July 2004. The Natural Resources Management Officer for the WRC Swan Goldfields Agricultural Region (Welshpool) is the Executive Officer of the Gngangara Community Consultative Committee.	Agendas/ Minutes available upon request.
496: P11	Require the Water Corporation to Phase in production bores closest to phreatophytic vegetation.	The Lexia Scheme is closely monitored and has not operated to full capacity due to potential environmental impacts (ie. some bores turned off). Due to reduced abstraction and the closure of bores near environmentally sensitive areas, the impact on phreatophytic vegetation has been accounted for. The Commission seeks clearance of this condition 496:P11.	
496: P12.1	Require the Water Corporation to develop a wetlands mitigation strategy for any loss of value in wetlands 132, 156, 158, 164 and 104. The mitigation strategy will; identify actions to minimize loss of values, prior to development; monitor wetlands to determine whether loss of values has occurred, on an ongoing basis; and compensate for any loss of values in the event of adverse impacts becoming apparent.	Commission has requested the Water Corporation to submit a wetlands mitigation strategy. Report is still under development by the Corporation and the Commission expects to receive it in early 2005.	
496: P12.2	Require the Water Corporation to implement the mitigation strategy required of P12.1.	Implementation will follow review of wetland mitigation report and modification of licence conditions as necessary.	
496: P13.1	Require the Water Corporation to prepare an operations plan (with environmental commitments to meet EWPs) for the Lexia and East Mirrabooka groundwater scheme.	10/02/00 Condition cleared by DEP Environmental Audit Branch.	
496: 13.2	Require the Water Corporation to submit yearly production plans as part of the operating strategy.	Yearly production plans are submitted by the Water Corporation during negotiations in November each year to determine the amount that can be abstracted from the Gngangara Mound without breaching EWPs.	
496: P14	Map vegetation communities on the Gngangara Mound.	The three-year vegetation mapping project has recently been completed. The study was conducted by Mattiske Consulting and a final report and ArcView information has been submitted to the WRC, DEP, CALM and the Water Corporation.	Mattiske Consulting (2003), <i>Flora and vegetation studies – Gngangara Mound Stages 1, 2 and 3 (Report and Appendices)</i>

Code	Description	Compliance Assessment (2003- 04)	Report Reference
		<p>A copy of the report is available upon request.</p> <p>The completion of this project, the Commission seeks clearance of Condition 496:P14.</p>	
496: P15.1	Monitor water levels and establish a vegetation transect in wetland 132. - Pre-Operation	On- going. Vegetation transects established (refer discussion Triennial Report).	Appendix 2.
496: P15.2	Monitor water levels and establish a vegetation transect in wetland 132. - Operation	As for P15.1	Appendix 2.
496: P16	Liaise with the Swan Valley Nyungah Community regarding the proposal.	Situation still under negotiation.	
496: P17.1	Undertake a dieback survey.	A dieback survey was conducted in September 2003. A survey is conducted every 3 years (commitment made in East Gngara Water Provisions Plan (WRC, 1997). The 2003 report has recommending that sections of the survey be done each year rather than all at one time.	Appendix 2.
496: P17.2	Prepare dieback management procedures. - Pre-Operation	Water and Rivers Commission monitoring personnel have a standard policy of keeping vehicles clean between trips. Dieback quarantine areas are managed by CALM and have unique levels of restrictions associated with it. Due to sandy nature of the Gngara Mound in general, the transmission of dieback from soil adhering to vehicle tyres and shoes of people walking through dieback areas is of lower risk than in clayey areas such as in the Darling Range. The Water and Rivers Commission is not aware of special requirements for the Gngara Mound area.	
496: P17.3	Implement the dieback management procedures as required in P17.2 – Operation	Refer to 496: P17.2	