PEER GROUP REVIEW COMMENTS ON WRC's SECTION 46 REVIEW DOCUMENT, NOVEMBER 2002.

Introduction

The peer review Group (PRG) was established in 2001 by the Water and Rivers Commission (WRC) on the advice of the Environmental Protection Authority (EPA), to provide an independent review to both the EPA and the WRC Board of Section 46 Review documents prepared by WRC staff and their consultants. The PRG's comments on the 2001 review document were published verbatim as an Appendix to that report. It is anticipated that a similar process will be followed on this occasion.

Process

There are two ways that WRC could have chosen to interact with the Peer Review Group, both of which are quite legitimate. One option would have been to closely involve the PRG with the Section 46 Review process, to encourage interaction with WRC's consultants, to involve the PRG in detailed analysis of the models used, and to include the PRG in field visits and assessment of potential biological implications. This approach would have enabled the PRG to participate fully and to communicate any concerns to WRC during the course of the past year. A potential concern is that the PRG would have been too closely involved to provide an adequate review.

The process chosen by WRC was to keep PRG somewhat at arm's length. Members of the PRG were invited to and attended several public fora and a workshop involving government agencies. The draft Section 46 Review document was sent to us early in November with a request for comments within one week, so late that there was no time for our comments to be considered by the WRC Board. Collectively, our contribution during the past year has been about 110 hours.

The draft document proposes major changes to the PRG's terms of reference and structure (pp. 66 and 68). The current members of the PRG were barely consulted on these proposed changes. We accept that changes may be necessary, but we believe we could have made a useful contribution to the design of any new structure, had we been asked.

The PRG will comment on this draft, as requested by WRC, but is concerned that if the issues we raise are significant, and if our comments are accepted by the EPA or the WRC Board, an opportunity will have been lost for careful consideration of our comments earlier in the review process. The PRG made its concerns known to WRC on several occasions, the latest being in writing in early October.

There is also a risk that the PRG may not be able to offer fully informed comment to the EPA and the WRC Board. The WRC's covering letter recognises this by stating that circumstances have "…not allowed the time that might be considered desirable to fully consider the report and its implications".

Review of progress relative to PRG comments in 2001

The PRG provided comments on the Section 46 Review document prepared in 2001 and thought it desirable to review what progress had been made in the context of those comments during the past year.

The PRG remains concerned that a risk analysis has not been done for the 2002-2003 summer and that there is still not a clear fall-back position or options should the weather be such as to place excessive stress on the environment. By this we mean that we would like to have seen systematic assessment of the likelihood and consequence of a number of scenarios for the coming summer.

The PRG is aware that the Government could still impose level 5 and 6 restrictions on public supplies. It is still not clear how much water these actions would save and where these savings would be made.

The potential effects of cumulative drawdown on the environment have now been addressed by Drs Froend and Dr Mattiske, who have expressed increased concern on their effect on environmental values (pp. 40, 53).

The effectiveness of WRC's campaign on modifying private use is still quite unclear.

Techniques that may allow earlier diagnosis of plant stress have still not been trialled.

Definition of areas where the consequences of water table decline may cross a threshold and the effects may become irreversible has been attempted, but data are still insufficient to allow definitive statements. Key areas may include root-mat communities, mound-spring communities, wetlands invaded by weeds, and some terrestrial areas.

In the context of equity, there is no discussion in this document about any increase in metering of private users or the results of spot checks (if any) on these users.

We commented last year on the need to demonstrate best practice methodologies in all contexts, but especially in modelling. None of the modelling described in the draft report has been documented in separate reports, or if so, no references have been provided and we have been unable to review them. Much reliance is being placed on modelling, as a tool that will help us in the future. Yet the models are being used already to influence decisions, without having been fully developed, documented and tested. The PRAMS model for example, for the which the new Vertical Flux Model (VFM) is described in Appendix 9, has to the best of our knowledge been run only without the VFM, using a very simple and undocumented algorithm to represent recharge and evapo-transpiration.

The PRG's previous comments under the heading "What is missing" still stand. These matters should be included in any publicity or public document, whose production is foreshadowed in the 2002 draft. Any public document needs to recognise that the decline in water tables has occurred over a very long time period, and that during this time, both private and public use has increased very substantially. It appears to us that there is a strong implication in the current draft (p.6) that the current situation is solely due to low rainfall during 2002.

PRG Questions

The PRG is well aware of the limitations imposed on us by restricting our role to review of what is written in the draft document. We have attempted to improve the value of our input by asking the following questions for consideration by EPA, the WRC Board, WRC and its consultants.

Models

How well do the available models differentiate or distinguish between the drawdown caused by climate, pines, private use and public use?

Can drawdown for an aquifer be disaggregated such that responsibility for drawdown can be assigned to specific users or groups of users? If not, what mechanisms should be implemented to ensure equity of responsibility and to avoid the "tragedy of the commons" where the total sum of responsibilities is not addressed?

Can we calculate a sustainable level of use for the aquifers of the Swan Coastal Plain? What are these levels of sustainable use, and for what combinations of land use? Are the aquifers already significantly over-allocated? If they are over-allocated, has WRC considered mechanisms by which allocations can equitably be reduced to sustainable levels? How reliable are the models on which these calculations are based?

Which of the various models used by WRC and WC are the preferred models and why? If WRC is unsure of predictions, WRC should model a range of scenarios and use the precautionary principle in making management decisions. The fact that we are not responsible for the drought sequences does not deny our responsibility for exacerbating conditions by increased withdrawal in times of sustained groundwater decline and drought.

Has WRC developed a list of specific questions that it wishes to address using models, in order to ensure that PRAMS and other tools will be capable of answering those questions? Or is there an implicit assumption that "one size fits all", that PRAMS will be able to answer all questions and will be the most appropriate tool for answering all questions? Is there a risk that PRAMS will not be able to answer all or even some questions, and if so, what other tools are being considered to address those questions?

Allocation versus sustainable allocation

Appendix 9 indicates that PRAMS will cover an area of 10,000 km^2 and up to 3,800 m deep. The Perth Urban Water Balance Model covered an area of 3,800 km^2, and only simulated the upper aquifer, to a depth of about 100 m, with prescribed leakage to and from lower aquifers. The larger region makes all abstraction smaller relative to the volume stored in the modelled aquifers, but does not change the relationship between abstraction and real physical annual recharge or that proportion of total storage that may be mineable without serious consequences.

Abstraction of water by pumping (public, private licenses and private unlicensed) appears to have doubled in the last 15 years, and abstraction from the Leederville and Yarragadee Formations appears to have more than trebled. In 1985, total abstraction was 246 GL/y, 217 GL/y from the Superficial Formation and 29 GL/y from the Leederville and Yarragadee Formations (Perth Urban Water Balance Study). The draft report implies a total of about 558 GL/y in the current year (167 WC, 241 private licensed and we assume 150 private unlicensed). The WC will abstract of the order of 100 GL/y from the deeper aquifers in 2002-03, and there are also private users (licensed and possibly unlicensed) of the deeper water.

A volume of 558 GL represents 177 mm of water over an area of 3,800 km^2, or 20% of what was once believed to be long-term annual average rainfall (870 mm). Recharge of 30% or so

of rainfall allowed the Mounds to stabilise historically, at or near the land surface. Removing a significant proportion of recharge by abstraction will cause the Mounds to fall significantly in the coming century. The PRG is concerned that we have significantly over-allocated the available resources, and that predictions have not been made 50, 100 and 200 years hence.

Management Needs

There is a need for a risk assessment for the coming summer. What is the likelihood of a particular sequence of events occurring (ranging from mild to severe summer)? What are the likely ranges of impacts? How accurate would these predictions be? What is the likelihood of a natural recovery? Where are the highest impacts predicted to occur (in the form of maps)? How well represented are these sites elsewhere (common, rare)? How do these sites relate spatially to areas of high drawdown by private or public abstraction and pines? A historical assessment using data for affected sites may enable WRC to identify causal factors over time.

In areas where a substantial impact is expected, we should ask: What is the possibility of natural regeneration? Will this be by seed or other means? Is there an apparent threat to regeneration, e.g. invasion by weeds? Should areas likely to be severely affected by weeds be sprayed or slashed before next winter? Should any affected areas be burnt to provide a receptive seed bed or not? Management strategies should be devised in advance to mitigate the range of expected impacts.

Specific Comments by the PRG on the Draft 2002 Section 46 Review Document

Stand Alone

PRG took the 2002 document to be a stand-alone document. If this needs to be read in conjunction with the 2001 report, this needs to be stated.

Cumulative effects

The potential effects of cumulative drawdown on the environment have now been addressed by Dr s Froend and Dr Mattiske, both of whom have expressed an increased concern on their effect on environmental values. It is clear our understanding in this area needs to be improved (pp.40, 53).

CALM submission

The PRG supports the review by CALM, which addresses many of the concerns identified by the PRG.

Quality of the draft report

Many of the documents required for preparation of this report are apparently not yet available. It was apparently necessary to rely on preliminary notes or personal communications (e.g. p.27, no report cited for information from Dr Phil Ladd on wetland vegetation on the Jandakot mound, p.30, preliminary notes by Dr Libby Mattiske included in Appendix 3).

It has been difficult to assess some statements, since the draft report suffers from a lack of quantification and occasionally from contradictory statements. Terms such as “negligible” and “not significant” are used without substantiation or data/facts to support them. Table 11

would benefit from quantification of levels of significance, perhaps by referral to Table 15, which does provide some indication of significance.

An example of a difficult section is that relating to Lexia, on p.31. There is drying, there is no significant impact, this result is due to drier climate, not related to groundwater levels, yet these are interlinked, There is low pH due to an acidification event (due presumably to lower water levels?). There is no substantiating evidence for any of this, nor reference to any report.

There is no discussion of climatic effects in Executive Summary (cf. p.28).

More discussion on threats to mound springs is required. There are inconsistencies re CALM p.6 and pp.25-26.

Many of the areas that have serious environmental concerns are not related to Water Corporation bores. This is not always made clear.

Occasional possible typos reduce comprehension of document, e.g. pp.25 and 31, references to Loomes et al. (2001). There is no Loomes et al. (2001) in the bibliography. The reference could be their 2002 report, but on p.31 the document states that 2001 and 2000 vegetation surveys were compared which suggests the 2001 date is correct. Is this then the Loomes and Froend (2001) document? If so, where are the recent data on vegetation surveys?

Lack of understanding of causal factors

There is still no attempt to determine the relative importance of causal factors (contribution by WC, private use, pines etc.) in areas of environmental stress. Mapping areas of stress and relating these to proximity and impact of water use spatially would be valuable.

Indications of lack of sustainability of groundwater mound

There are suggestion throughout the report that low groundwater levels are attributable to low rainfalls during 2002 winter (e.g. Section 1.3 on p.2), yet there is mounting evidence in the report that cumulative effects of abstraction are beginning to show.

There are indications of increased vegetation stress (pp.25-27) and breached water levels (10 out of 12 predicted, plus 2 not predicted, p.24) have occurred despite a reduction in the allocated groundwater abstraction by WC (154 rather than 162 GL p.16) and a summer with no heatwaves (p.14).

Groundwater levels at PM6 continue to decline with no indication of any winter recharge despite reduction of superficial aquifer use by Water Corporation in this area (pp.24, 29).

There is evidence that damage to wetland systems may now be irreversible, e.g.: Failure of maintenance of water levels at Coogee Springs despite supplementation (p.22). Predicted vegetation health at Lake Nowergup suggests severe stress despite supplementation (p.52). Lake Jandabup now requires maintenance of summer water to reduce risk of acidification/allow sufficient time to complete macro invertebrate life cycles because water levels drop too quickly once supplementation is stopped (presumably due to low water table beneath lake) (p.47).

Widespread evidence of terrestrialisation of wetlands - weed invasion, decline in aquatic species etc. (pp.25-27).

Management of the resource

Section 4.2.2, p.17. There have been remarkable increases in the so-called "allocation limits" in the Gingin and Perth management areas of the Gnangara Mound, with the total allocation limit jumping from 166.1 GL/y in 2000-01 to 410.2 GL/y in 2001-02 (cf. Table 6 and Appendix 1). Actual allocation has remained close to 60% and in real terms jumped from 100.7 to 228.6 GL/y in the same year. No explanation has been provided.

Section 4.3.2, p.19. Successful initiatives in public education are indicated by support by the community for water restrictions. Also to be applauded is the restriction on private domestic bores during daylight hours.

Section 4.3.2, p.20 and Appendix 5. Effectiveness of attempts to modify private use of groundwater is not specifically covered but from material presented does not appear to be high: for example, only 20 replies to 280 letters, no indication of feedback from site visits, 10 out 200 landowners attending group meeting, 13 out of 200 attending free workshop on water use efficiency. While it is understood that this is a difficult issue, equity demands that visible evidence of more sustainable practices in the private sector is required. The attempt to address equity issues is noted (6.3.1 pg 41-42)

Section 8 pp.56-59. Investment in source development by WC to 2002 has been primarily groundwater driven. Moves to new initiatives to expand surface water sources, improved oaquifer storage and wastewater reuse are encouraging.

Section 6.3. Reasons for "hastening" the issuing of licences should be clarified. Why are new licences being issued under the current climate and how does improving speed of licensing ameliorate groundwater use? It is understood that this will release more personnel on the ground, but a moratorium on licence issue would be just as effective in this regard.

Section 6.4, p.43. Similar difficulties are raised in regard to another significant user of water - the pine plantations. There does not appear to be an existing mechanism to ensure sustainability in this sector either. Agreed thinning under the MOU has not taken place and the proposed timing for removal of pines for the LVL plant is not compatible with best practice for groundwater sustainability.

Stage 2

Section 12, p.65. We strongly agree with the two dot points that explain why management of groundwater needs to be undertaken in the context of the whole aquifer system, without undue attention being paid to the relatively arbitrary boundaries that have been chosen over the years for various management areas. This broader approach also implies a need for close collaboration between all government agencies whose responsibilities relate to the Swan Coastal Plain.

Section 12.2, p.66. If WRC, CALM and WC are on the new "project steering group", shouldn't there also be representation/input by private users? The project steering group is not shown on p.68.

Section 12.1, p.66. A panel rather than an interactive group is the WRC's preferred model for peer review. However discussions between members highlights issues and allows a more holistic approach than consideration solely of specific items of expertise where important matters may "fall between the cracks."

Section 12.3.3, p.71. Stochastic versus deterministic approach – PRG is concerned that a stochastic approach may lead to approval of breaches in times of drought rather than looking at long term issues - as is factored in by a deterministic approach. Any stochastic approach must consider a strategy that includes sustainability in times of drought.

There are many projects in Stage 2 that are still unscoped - we should have made much more progress by now.

Conclusion

The PRG's review suggests to us that, although there has been progress in some areas, in other areas there is little of substance that has changed over the past twelve months. We are concerned that the broad-ranging Stage 2 review has not yet been fully scoped and wonder when detailed work on Stage 2 will actually commence in earnest.

The PRG is of the opinion that the current WRC draft document may not provide EPA or the WRC Board with the data and confidence that they will require in order to make informed decisions and give sound advice to Government on a safe level of abstraction from these aquifers for the coming summer.

The PRG recognises that additional data may be available within government agencies that would answer a number of the questions we have raised and may then allow an informed decision to be made.