

Auditor-General of Queensland

Report to Parliament No. 8 for 2007 South East Queensland — Towards a Short-Term Water Balance

Executive Summary



1. Executive Summary

1.1 Audit overview

The current water crisis affecting South East Queensland (SEQ) has received a great deal of public interest over the last two years.

This performance management systems audit (PMSA) examined the systems used by the Queensland Water Commission (QWC) to manage, measure and report to the Queensland Government and public on dealing with this water crisis.

Planning for a sustainable water supply can be divided into two timeframes:

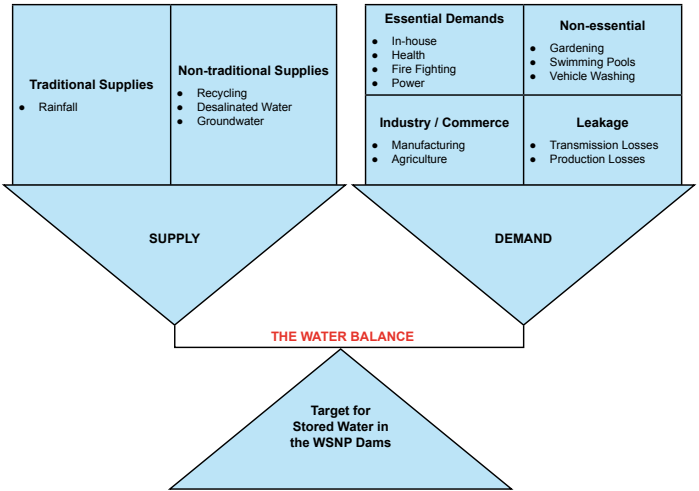
- the SEQ emergency drought planning (short-term), with a timeframe to December 2009
- longer term planning dealing with water provision for Queensland with a timeframe to 2050.

The scope of this audit was limited to the emergency drought planning phase. The audit examined the systems used by the QWC to measure and report to the Queensland Government and the public on progress toward achieving a short-term water balance by December 2009.

The term 'water balance' used by the QWC and throughout this report, refers to the flow of water in and out of the Wivenhoe, Somerset and North Pine (WSNP) dams. It considers the projected demand for water in the Region¹, projected inflows to the dams from rainfall, alternate water supplies as they come on-line, as well as the combined storage level of the three dams. The water levels will be 'balanced' if and when the release of water and evaporation from the dams equals the inflows to the storage resulting from rainfall. Water supply volume from alternate sources generally will bypass the dams and go direct to the water distribution system, however equivalent reductions will occur in the amount of water released from the WSNP dams.

¹ The short term water balance is applicable to the area supplied by the WSNP. For the purpose of this audit, the area supplied by these dams is referred to as the 'Region'. The Region comprises the 11 Local Governments subject to Level 5 water restrictions as detailed in Section 3.3 of this report.

Figure 1.1 — Simplified illustration of the water balance



1.2 Audit opinion

The Queensland Government has responded to the water crisis through a drought management strategy. This has included regulatory changes, creating the QWC and investment in infrastructure to increase storage capacity and provide alternate water supplies.

Since the QWC was created in July 2006, there has been a 19.5 per cent reduction in water demand through the introduction of water restrictions. SEQ experienced above average rainfall in August 2007, which has increased water levels in the dams. However, in the absence of a return to long-term average rainfall generated inflows, the water balance will be reliant on the forecasted yield from the alternate sources of water being achieved by the estimated completion dates. Although some extra water supply has already come from alternate means, the projects listed in the *Water Amendment Regulation (No. 6) 2006* as alternate sources of water for SEQ, are not advanced enough at this stage to provide a reliable and consistent source. Refer to Section 3.4 for further details.

Given that the QWC has been operating for little over a year, I found that it has adequate systems in place to measure the achievement of a short-term water balance for SEQ. The audit did identify however some improvements in relation to data integrity and the need for more regular publication of the actual water balance projections.

I found that the QWC places significant reliance on the integrity of source data supplied by third parties for use in its various water supply and demand models. While

the QWC does some reasonableness checking, audit recommended further improvements to the QWC's quality control measures over this data. There is also a degree of reliance on individual knowledge of the specialist models used and I encourage the QWC in its plans to implement adequate succession planning to ensure corporate knowledge of key data and systems is not lost.

The media regularly informs the community about average water consumption and supply. However, I consider that this information should be brought together to show the effect on the water balance. Regular publication of the illustrated water balance projections, which includes dam inflows, alternate sources of water coming on line and demand, would present a more holistic picture of the water situation in the Region.

The focus of the QWC over the last 15 months has been mostly on water restrictions to reduce demand. The QWC and the Queensland Government also have strategies in place for the long-term management of water resources. While the QWC receives some informal feedback from industry and interest groups on actual water restriction impacts it does not undertake formal systematic, comprehensive and documented post implementation reviews. So that better informed policy decisions can be made in the future, the QWC should regularly conduct post implementation evaluations to assess the actual impacts of the strategies that have been implemented. These reviews should assess not just the effects of the measures on the demand for water but also the social, environmental and economic impacts experienced by both residential and non-residential users. The findings should be reported formally to the Commissioners and Queensland Government.

1.3 Key findings

Inflow assumptions and calculations

The QWC has in place adequate frameworks and systems to support underlying assumptions regarding water inflow. There are controls in place at the QWC over the input of water inflow data provided by Department of Natural Resources and Water (DNRW). Whether the data provided by DNRW is complete and accurate was not tested in this audit. However, the QWC has compared model outputs between the QWC model and a similar model used by SEQ Water which is run with the same demand, inflows and evaporation characteristics. The comparison found that both models predicted a very similar outcome with insignificant

deviation. A range of scenarios were modelled by the QWC, including worst case inflow scenario, and the QWC regularly reviewed the applicability of different scenarios.

Managing and forecasting demand

Users within the Region have so far successfully achieved or exceeded the water use targets set by the QWC, particularly since the implementation of Level 5 water restrictions in April 2007.

Audit considers that the framework used at the QWC for developing and designing water demand management measures includes sufficient levels of research, consultation and analysis for residential and non-residential water users in the Region.

The QWC undertakes extensive consultation and analysis of the potential impacts of the proposed water restrictions. However, there was no evidence of systematic, comprehensive and documented post implementation evaluations on the social, environmental and economic impacts experienced by both residential and non-residential users following the implementation of each stage of the water restrictions.

Post implementation evaluations provide valuable information on whether the strategies put in place achieved original objectives. Additionally they compare the identified potential impacts with the actual impacts. In this situation, there is a need to measure and report on the actual impacts of the water restrictions, not just water savings achieved, but also the resultant lifestyle, social, economic and environmental implications.

In addition, while the QWC designed and implemented various restrictions and compulsory demand management measures, it is the responsibility of local governments to monitor and control compliance with the measures. Audit was advised that the monitoring and control regimes are inconsistent between the 12 councils subject to Level 5 water restrictions. Inconsistent and potentially ineffective identification and control of high-level users across the Region may prevent the expected reductions in water demand being achieved.

The SEQ emergency program

The SEQ emergency program refers to projects currently approved and listed in the *Water Amendment Regulation (No. 6) 2006* as alternate sources of water and demand reduction strategies for the SEQ Region. These projects are

scheduled to add to the water available for the Region by December 2009.

Audit noted that comprehensive reporting on the emergency program is provided to the QWC's Executive Management Group and Commissioners every fortnight. This report includes estimated completion times and expected yields for each of the projects.

However, the QWC has not obtained any formal certification of the final service provider reports from authorised senior officers of the project management entities responsible for the SEQ emergency water program (service providers). As this information is critical to the QWC modelling, it is important that it is reviewed and approved at senior levels of the service providers with evidence of this reflected in the QWC records.

Achieving a water balance

The QWC has adequate systems in place to apply the water balance model and undertake reasonable validation checks on the model's various projected outcomes. The QWC also has adequate systems for selecting the supply and demand scenarios.

The QWC relies on various external sources for data to feed into the supply and demand models. The QWC has limited control over the quality of the data it receives. This increases the risk over the integrity of the water balance model's final projections.

There is significant public interest in whether SEQ will achieve a water balance to meet short and long term demand. The source of the short and long-term water supply is also of great public interest.

Regular reporting of key information by the QWC, includes the water level of dams in the Region, progress of the approved emergency projects, and details of demand management strategies, including water restrictions, and their effectiveness. The QWC's focus has been on the promotion of demand management strategies, such as water restrictions and installation of water efficient devices and appliances. The public is kept informed of daily water use and storage levels through information from related entities such as SEQ Water.

The projections of the water balance model used by the QWC have only been released to the public twice since July 2006. The regular publication of the illustrated water balance projections as shown in Figure 3.3 in Section 3.5.1 of this report would present the public with a clear picture

of the expected water balance for the Region. It would also provide an overview on how the various components of the short-term water balance are contributing towards achieving that objective.

At the time of this report audit notes that the illustrated water balance predicts the combined water storage levels in the WSNP dams are not projected to fall below five per cent during the period to July 2010. However, the achievement of this result is reliant on the project managers for the alternate water projects actually achieving the completion dates and forecast water yields that are currently projected, as outlined in Table 3.1 in Section 3.4.

1.4 Summary of recommendations

RECOMMENDATIONS

- 1. In relation to managing demand, I recommend that the QWC:**
 - a. undertakes and documents formal systematic and comprehensive post implementation evaluations to identify the social, environmental and financial impacts of implemented demand management measures for both residential and non-residential users in SEQ**
 - b. creates robust guidelines for implementation by local councils to ensure greater consistency and effectiveness of monitoring the high water user program and controlling of compulsory water efficiency measures in SEQ**
 - c. improves guidance to the various local governments for the collection, storage and aggregation of data by including requirements over quality control and certification processes over the various data required**
 - d. incorporates, as part of the institutional arrangement design processes currently underway, regulatory obligations for the reporting, storage, quality control and certification of water billing and usage data by local governments**
 - e. urgently develops greater knowledge and understanding within the Commission about the operation and maintenance of the actual demand model and the forecast demand model**

- f. formalises and documents the process of regular comparative analysis of actual versus planned demand to monitor the forecasting model's accuracy and to identify which forecast scenarios are most accurate in predicting demand.
2. In relation to the SEQ emergency program, I recommend that the QWC ensures final monthly service provider reports are reviewed and authorised by a senior officer of the service provider prior to submission to the QWC.
3. In relation to achieving a water balance, I recommend that the QWC makes the illustrated version of the SEQWater dams draw down chart (water balance model chart), as depicted in Figure 3.3, available to the public and that it be updated on a regular basis.

1.5 Response

The QWC response

In addressing each recommendation, the Chair of the Commission stated in her response of 8 November 2007:

Recommendation 1a

“The QWC currently collects feedback from Councils, peak industry groups, politicians and the general public on the impacts of each level of restriction and other demand management measures being planned and implemented ...

The results from this process has a dual purpose; to canvass feedback on the previous level of restriction including social and economic impacts and to gauge ideas and support for any further initiatives that could be included in next level restrictions. The results of this information are included in briefing papers to the Commissioners, forming the basis of options for the development and approval of further demand management measures to ensure water security in SEQ.

Prior to the commencement of restrictions an economic study was commissioned to understand the impacts of restrictions on the SEQ community. In regard to a more strategic and longer term analysis, the QWC is participating in a significant five year project to understand the social impacts of

restrictions and demand management initiatives. The project is part of the \$50 Million SEQ Urban Water Security Research Alliance between the Queensland Government, CSIRO, University of Queensland and Griffith University. The project has scope to also include an economic study into the impact of restrictions.

The Commission considers that a cautious approach needs to be adopted to evaluation of demand management measures which are still underway and have not been fully implemented ...

There has been a relatively short period of time between restriction levels making it impractical to undertake comprehensive assessment of the restriction measures in the interim.”

Recommendation 1b

“The Commission has already provided significant guidelines to Water Service Providers and other relevant parties (such as Water Efficiency Assessors, sporting clubs) to ensure a consistent and effective approach to compulsory measures ...

However, in developing draft Level 6 Restrictions the Commission has acknowledged that more consistency is needed in relation to non-residential users and residential restriction compliance.

For Level 6, the Commission has further developed its control measures to ensure consistency in compliance programs and has developed standard compliance practices, procedures, templates, assessment tools and reporting requirements. The Commission intends to issue Notices of Procedure to each Council governing their implementation and enforcement activities, which will have the force of subordinate legislation from late November 2007. This will also provide the Commission with a regular (monthly) monitoring of the Councils’ implementation of the compulsory water efficiency measures.”

Recommendation 1c

“... with the development and implementation of the South East Queensland Water Accounting Framework (SEQWAF), data quality control and certification processes will be improved. This system will have the capability of creating exception reports that will be automatically generated and sent to each respective council for their attention.

In the interim, the QWC is in the process of implementing a standardised data management and processing system that will lead to improved data integrity.”

Recommendation 1d

Recommendation accepted.

Recommendation 1e

“It would be desirable to note that during October, the Commission finalised its recruitment of permanent staff to two key roles in the water information and accounting team. These staff are dedicated to demand data collection and analysis.

In addition, a specialist modeller is currently being recruited. It is intended that the externally developed model will be able to be operated wholly within the Commission.”

Recommendation 1f

“... The Commission has a planned program to regularly update and calibrate the model. The most robust method is to undertake statistically based survey at an end user level. It is important to acknowledge, as the Commission does, that there is difficulty in ascribing the actual performance of individual measures due to multiple factors occurring simultaneously. For instance, residential household demand is likely to be impacted by: voluntary behavioural change in response to the Target 140 initiative (eg. shorter showers); structural efficiency (eg. the Home Waterwise program which retrofits efficient fittings) and demand restriction (eg. reduction in outdoor watering due to restrictions). Households will undergo a different demand outcome based on their relative take-up of each initiative and the performance of each will vary depending on the time of year, number in the house and behavioural patterns.

However, notwithstanding these difficulties, the Commission will continue to seek up-to-date statistical information from a range of market-based surveys in order to calibrate and update the water efficiency take-up rates for various end uses.”

Recommendation 2

“QWC has now written to all relevant service providers requiring the monthly status reports to be signed off by a nominated authorised officer before submission to QWC and requesting advice regarding who this is.”

Recommendation 3

“QWC updates and calibrates draw down curve for the combined three storages currently operated by SEQWater (Wivenhoe, Somerset and North Pine) each month. This is released to service providers at the regular monthly Project Management Group. QWC will now also include this alongside the monthly status reports when these are published on the QWC web site each month.”

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