Policy and Guidelines for Assuring Future Urban Water Security for NSW Local Water Utilities

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1. Background
2. NSW Security of Supply Basis
3. Pilot Study
4. Adopted Secure Yield Basis
5. Guidelines for Assuring Future Water Security
6. Conclusions
‘Scale’ of NSW Country Towns Water and Sewerage

- Urban population served:
  - water 1.82m (98.0% coverage)
  - sewerage 1.72m (95.4% coverage)
- Annual revenue $1.04B
- Water & Sewerage asset current replacement cost $23B
- 105 local water utilities
- Infrastructure – 350 water supply systems, 285 water treatment works, 295 sewage treatment works, 3,900 sewage pumping stations, 116 dams/weirs, 38,000 km water mains, 19,000 km sewer mains
NSW Government’s Best-Practice Management of Water Supply and Sewerage Framework (BPMF) is the key driver for reform and performance improvement for country NSW Local Water Utilities (LWUs). 19 requirements:

- Integrated Water Cycle Management (IWCM - 2)
- Current strategic business and financial plans (2)
- Pricing and regulation of water supply, sewerage and trade waste (11)
- Demand management (1)
- Drought management (1)
- Annual performance monitoring by each utility (2) (since 1986)

Overall, LWUs are now meeting 86% of the 19 BPMF requirements.
NSW Best-Practice Management of Water Supply and Sewerage Framework

NSW BEST-PRACTICE MANAGEMENT OF WATER SUPPLY AND SEWERAGE GUIDELINES, 2007 (BPMG)

Guidelines

BPMG Elements

1. Integrated Water Cycle Management (IWCM)
2. Strategic Business Planning* (SBP)
3. Pricing and Regulation of Water Supply, Sewerage and Trade Waste
4. Water Conservation
5. Drought Management
6. Performance Monitoring

Outputs

30-year IWCM Strategy
20 to 30-year SBP, Total Asset Management Plan (TAMP) & Financial Plan (FP) with Typical Residential Bills in current dollars
Water Conservation Plan
Drought Management Plan
Annual TBL Performance Report & Action Plan to Council

Outcomes

Best-value IWCM Scenario Identified
Sustainable Water and Sewerage Services Implemented
Complying Water & Sewerage Tariffs, Full Cost Recovery, Strong Pricing Signals to encourage efficient use of services
Comply with NSW Framework for Regulation of Sewerage and Trade Waste
Efficient water use
Exposure to drought mitigated
Emerging issues addressed and corrective action implemented following annual TBL performance review
ACHIEVEMENTS OF NSW LWUs (1)

- Overall compliance of LWUs with NSW Best-Practice Framework is now **86%** compared to 46% 6 years ago.
- **99%** of the urban population in non-metro NSW receives a water supply which **complies with ADWG**.
- 93% of LWUs comply with ADWG for microbiological water quality.
- 91% of LWUs have sound 20 to 30 year **strategic business plans**.
- **Full cost recovery** by **98%** of LWUs for water supply.
- **Strong pricing signals** - median residential water usage charge has increased from effectively nil to **180 c/kL** over past 16 years.
- Annual water allowances for potable water abolished in 2007.
- The residential revenue from water usage charges increased from **20%** to **70%**.
- **52% reduction** in **residential water supplied**/property over the last 20 years (from 330 to 159 kL/property).
- Slight real **reduction** in **water** supply **Typical Residential Bill** over last 16 years.
ACHIEVEMENTS OF NSW LWUs (2)

- Annual water allowances for potable water abolished in 2007
- 95% of LWUs have appropriate non-residential water charges
- 86% of LWUs have commercial water developer charges.
- The number of LWUs with complying liquid trade waste fees and charges has increased from 20% to 74% compared with seven years ago.
- 81% of LWUs have an appropriate trade waste regulation policy.
- 93% of LWUs have a drought management plan
- 92% of LWUs have a water conservation plan
Large Reduction in Residential Water Supplied per property (1)

52% reduction in average annual residential water supplied in country NSW over last 20 years (330 to 159 kL/connected property).
Large Reduction in Residential Water Supplied per property (2)

As there has already been a 52% reduction in water use, now much more difficult to achieve 20% reduction to current water consumptions than it was 20 years ago.

It is therefore proposed that future planning in NSW is based on achieving a 10% reduction in consumption ie. a “5/10/10 rule”.
2. NSW Security of Supply Basis

Under the NSW Security of Supply basis, (commonly referred to as the ‘5/10/10 rule’) water supply headworks systems are normally sized so that:

a) **Duration** of restrictions does not exceed 5% of the time (5/x/x),

b) **Frequency** of restrictions does not exceed 10% of years (x/10/x) (ie. 1 year in 10 on average), and

c) **Severity** of restrictions does not exceed 10%. System must be able to meet 90% of the unrestricted water demand (ie. 10% average reduction in consumption due to water restrictions) through simulation of the worst drought on record, starting with storage at the restriction volume at which restrictions should be applied to satisfy the above 5% and 10% conditions (x/x/10).
3. Pilot Study

- Pilot study conducted for 11 LWU water supplies for ~2030 using the 15 global climate models (GCMs) with daily data.
% Change in Secure Yield for GCMs compared with Historical Data
4. Adopted Secure Yield Basis

The Steering Group has recommended:

1. planning for the median GCM but

2. ensuring the utility can survive if the lowest GCM occurred.
The “10/15/25 rule” is considered to provide a reasonable balance between avoiding excessive capital expenditure by the utilities and avoiding very harsh future drought water restrictions.

The 25% severity for the GCM with the lowest secure yield is considered to be acceptable in view of the low probability of occurrence of such a GCM and is informed by the outcomes of at least 35% reduction in consumption achieved by several NSW utilities in the 2001-10 drought.
Adopted Secure Yield

The adopted secure yield is therefore the lesser of the secure yield for:

– median GCM under a 5/10/10 rule
– lowest GCM under a 10/15/25 rule
### Examples of Secure Yield Results & Definitions

<table>
<thead>
<tr>
<th>Case</th>
<th>Coastal LWU [3]</th>
<th>Inland LWU [7]</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Secure Yield (ML/a)</td>
<td>Change Compared to Historical</td>
</tr>
<tr>
<td>1. Historical</td>
<td>12,400</td>
<td>4,850</td>
</tr>
<tr>
<td>2. Range for 15 GCMs</td>
<td>11,400 to 13,400</td>
<td>-8% to +8%</td>
</tr>
<tr>
<td>3. Median GCM</td>
<td>12,200</td>
<td>-2%</td>
</tr>
<tr>
<td>4. GCM with lowest secure yield, 25% Restrictions</td>
<td>12,600</td>
<td>+2%</td>
</tr>
<tr>
<td>5. Adopted Secure Yield (lesser of 3 and 4)</td>
<td>12,200</td>
<td>-2%</td>
</tr>
</tbody>
</table>

Coastal LWU [3]: GCM with lowest secure yield, 25% Restrictions

Inland LWU [7]: Case
Adopted % Change in Secure Yield for GCMs compared with Historical Data [the lesser value]
Adopted % Change in ~2030 Secure Yield
Guidelines for Assuring Future Urban Water Security are being prepared by the Office of Water to provide guidance to NSW local water utilities on assessing and managing the impact of variable climatic and weather patterns on the secure yield of their urban water supplies for ~2030.

In the Guidelines it is proposed that LWUs with a storage dam, weir, run-of-river or a shallow bore supply, analysis similar to that carried out in the pilot study is generally recommended.

An assessment of secure yield of water supplies will need to be undertaken in accordance with these Guidelines and is an integral part of a utility’s Integrated Water Cycle Management (IWCM) strategy.
In the Guidelines it is proposed that approximately 20 utilities will need to move to undertake a secure yield study for ~2030 in accordance with the Guidelines. NOW will contact the utilities.

These studies will need to be undertaken by a specialist hydrological consultant (NOW concurrence to consultant required). The secure yield of the existing system and the key augmentation strategy will need to be determined in accordance with the Guidelines and Section 60 approval provided by NOW.

The consultant may then undertake secure yield analyses for the other scenarios in the utility’s IWCM strategy on the same basis. The utility may then finalise and implement its IWCM strategy.
Other utilities undertaking an IWCM strategy will also need to determine their secure yield for ~2030 on the above basis.
Use of a **locally calibrated daily rainfall-runoff model** for each water supply is **essential**.

In NSW, such a local daily rainfall-runoff model is routinely developed for any water supply secure yield study. Similarly, a suitable system simulation model is routinely developed in NSW for any water supply secure yield study.

Use of **generalised streamflow estimates** available from NSW database has been found to be **inappropriate** for security of water supply analysis.
Other Considerations

Utilities relying on deep groundwater bores -

- Such utilities should consult with NOW on ~2030 impact on their secure yield.

Utilities relying on a State Water Dam -

- Such utilities should consult with NOW on ~2030 impact on their likely future water allocations. They may also wish to examine the merits of purchasing additional water entitlements or constructing a local off-stream storage to increase their water security.
6. Conclusions

1. Sound basis has been developed for local water utilities to assess and manage the impact of variable climatic and weather patterns on urban water supply security.

2. The pilot study results show that the main impacts on ~2030 secure yields are:

   - **No greater than a 9% reduction for the 7 coastal utilities**

   - **Reductions of almost 30% for the 3 inland utilities in mid and southern NSW, after allowing for augmentation of the existing small storage for Utility 9**

3. Guidelines for LWUs are being prepared along the lines carried out in the pilot study and are expected to be released shortly.
QUESTIONS?