

8

This chapter outlines actions to ensure there will be sufficient water to support growth in cities and towns and meet critical human needs during drought.



Safe and reliable drinking water

Guide to the chapter

Section 8.1 How urban water supplies are managed

- Water supply demand strategies
- Drought response plans

Section 8.2 Securing supply

- Expanding the water grid
- Improved access to the water market
- Using 'fit for purpose' supplies

Section 8.3 Managing demand

- Urban conservation and efficiency
- Temporary water restrictions

What is the issue with the existing arrangements?

Secure and reliable water supplies will continue to be provided to support growth and development in urban systems, despite reduced water availability. Work is underway to secure supplies in the long term through the implementation of water supply demand strategies, while drought response plans manage water shortages resulting from short-term variability. The Strategy reinforces the importance of these planning processes which include actions to interconnect urban supply systems, improve water conservation, and invest in alternative supply programs.

The current drought has highlighted potential improvements to urban water management. To ensure critical human needs are met, the Minister for Water has 'qualified rights' in many supply systems to redistribute water to priority uses. While necessary, this introduces inequity and considerable uncertainty for entitlement-holders. The Strategy seeks to ensure secure supplies for towns and domestic and stock customers, and reduce the need to qualify rights.

What improvements does the Strategy make?

- Guides the expansion of piped supply systems for domestic and stock users to ensure reliable supplies in light of climate change.
- Introduces flexible trade and carryover arrangements so that urban water corporations can ensure sufficient supplies for urban growth and acceptable service levels.
- Allows some businesses and community groups to purchase water on the market and have it delivered by their water corporation.
- Updates drought response plans to ensure they continue to be effective in more severe and prolonged drought conditions.
- Encourages 'fit for purpose' water use, including of return flows.

8.1 How urban water supplies are managed

A secure water supply is critical to the future prosperity of the Northern Region’s towns and regional centres. Climate change will likely reduce supplies for towns in the future. In addition, a growing population means that household and industry demands will increase (see Chapter 2). Water corporations and urban communities will need to be adaptive to long-term reductions and short-term fluctuations in water supply associated with a changing climate and drought.

Each urban water corporation has a water supply demand strategy to balance supply and demand over a 50-year period, and drought response plans to manage temporary shortages in supply due to drought (see Figure 8.1). These planning processes aim to provide urban water customers with an adequate level of service at a reasonable cost; generally the aim is to have restrictions in place only five or 10 per cent of the time.

The role of sustainable water strategies is to address any broader urban policy issues, including regional or state solutions that cross urban water corporation boundaries. Note that in this chapter, volumes of water are measured in ML (million litres) rather than GL (billion litres).

8.1.1 Water supply demand strategies

In 2007, urban water corporations released their water supply demand strategies, which aim to balance supply and demand in urban systems over the next 50 years (see Appendix 7 for summary). They contain a prospectus of actions that water corporations can bring forward or hold back as required to suit the water availability scenario or level of demand occurring.

For example, North East Water’s water supply demand strategy forecasts that Yarrowonga’s demand of 1,922 ML in 2005 will increase to 4,607 ML by 2055. At the same time, under medium climate change, its average supply yield of 1,943 ML could decrease to 1,542 GL. Table 8.1 outlines the key actions identified to meet the resulting shortfall of 3,065 ML. These actions aim to either increase supply or reduce demand to address this shortfall.

Water supply demand strategies are prepared every five years to take account of system augmentations, updated supply scenarios, demand forecasts (including population estimates) and changes to agreed serve levels. Their next revision is due to be completed in 2012.

Figure 8.1 The relationship between short and long-term planning for urban water supplies

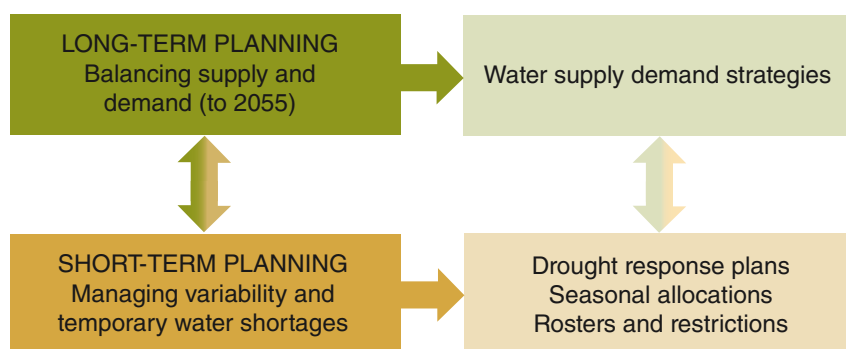


Table 8.1 Ensuring sufficient supplies in Yarrowonga through a water supply demand strategy⁵⁸

Action identified to address shortfall of 3,065 ML*	Volume provided (ML)
Using the market to purchase water entitlements	1,700
Improved system operations (including leak detection, reuse of backwash, improved metering)	620
Demand reduction (including customer advice, incentives and restrictions)	490
Self-reliant households (including rainwater tanks and greywater reuse systems)	240
TOTAL	3,100

Note:
*Assumes Scenario B (medium climate change) water availability.

8.1.2 Drought response plans

Urban water corporations have drought response plans to manage temporary water shortages resulting from prolonged periods of below average rainfall. These plans provide the basis to implement the four stage uniform water restriction schedule, developed for application across Victoria. As restrictions increase from Stage 1 to Stage 4, outdoor water use is progressively restricted. Restriction decisions take into account projected water availability and the effectiveness of restrictions in reducing demand. The drought response plans also contain contingency actions to further reduce demand and/or augment supplies. They may in some cases bring forward actions in the water supply demand strategies to permanently increase supplies.

The past 12 years of ongoing low inflows (with little storage recovery) have already resulted in a number of towns experiencing prolonged high water restrictions, affecting individuals, businesses, community values and industry. Where the highest level of restrictions (Stage 4) has been insufficient to maintain a supply/demand balance, additional contingency measures have been required for many systems. Some, such as increasing the network of emergency water cartage points, are temporary. In other cases, for example accessing additional groundwater supplies or system interconnections, the augmentations will enhance future supply reliability.

Where a water shortage has been declared, the Minister for Water has qualified rights, redistributing water from some entitlement-holders to supply critical human needs (see page 11). However this process advantages some water users at the expense of others and is only enacted as a last resort.

Climate change is expected not only to reduce the overall availability of water supplies, but also to increase the frequency and duration of drought periods.

In order to maintain an acceptable level of supply reliability, drought response plans need to be updated to ensure consistency with longer-term planning in water supply demand strategies, which consider a range of water availability scenarios. Specifically, the plans need to take into account any recent system augmentations and operational changes, incorporate lessons learnt from managing the current drought, and include more detailed contingencies for further reducing demand and/or augmenting supplies if the highest level of restriction is not sufficient. Appropriate lead times for implementing contingency actions must also be allowed for. It is expected that revised drought response plans will have sufficient contingencies to minimise the need to qualify rights.



Bowling club bore water, Violet Town

Photographer: Bruce Cumming

Action 8.1: Updating drought response plans

Who: Urban water corporations; Department of Sustainability and Environment

Timeframe: 2011

Drought response plans will be updated to:

- examine the responsiveness to a range of water availability scenarios including a continuation of recent low inflows (Scenario D)
- incorporate all the necessary contingencies to augment supplies and further reduce demand to address or manage supply shortfalls
- ensure adequate consideration of the lead times involved in implementing contingency actions
- incorporate recent system augmentations and operational changes including piped domestic and stock water supply systems and use of carryover
- provide specific guidance on when restrictions will be eased or lifted.

8.2 Securing supply

Accessing additional water supplies will help to future-proof urban supply systems against growing demands and a future of less water availability.

8.2.1 Expanding the water grid

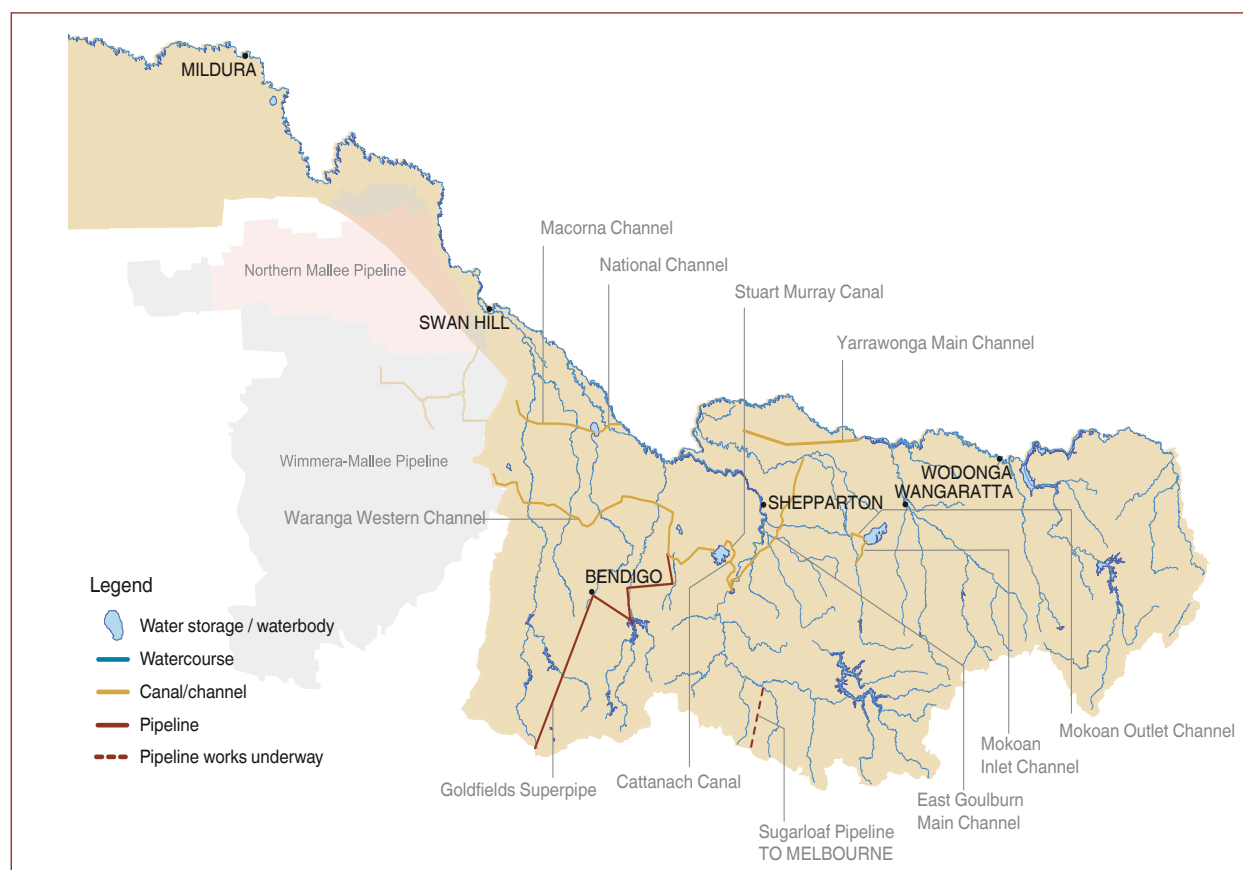
The ‘water grid’ is the system of rivers, channels and pipes that distribute water for irrigation, urban and environmental needs. The grid has been gradually expanded over the past 100 years or so and will continue to be expanded to allow better risk management in light of a drier climate.

These interconnections will be particularly important to provide reliable urban and domestic and stock supplies.

Connecting systems to supply towns and cities

The water grid will facilitate and support effective trade and carryover for urban water corporations. Together, all three will enable towns and regional centres to secure their water supplies, and support the continued growth of regional centres and urban industries. Recent expansions of the grid, including the construction of the Goldfields Superpipe to connect Bendigo and Ballarat to the Goulburn system, have averted potentially catastrophic failures in town water supplies (see Figure 8.2).

Figure 8.2 Major interconnections in the Northern Region



Case study: Axedale pipeline

Following the completion of the Goldfields Superpipe, Coliban Water has completed an 11.7 km pipeline to connect Axedale to Bendigo's water supply system and the wider Victorian water grid. This provides the town with the option of purchasing water to help improve water supply reliability and quality.

Axedale's 120 residents traditionally drew water from the Campaspe River, but water quality and availability due to drought have been so severely affected that Coliban Water has been carting in 0.05 ML (50 kilolitres) a day for the past 18 months.

Coliban Water will now focus on other high-priority towns, including connecting Raywood and Sebastian to Bendigo water supply systems. There may also be opportunities to connect to Bendigo's recycled water pipeline, which runs from Epsom and Spring Gully, to substitute potable demand for non-drinking purposes.

Expanding domestic and stock reticulated supply

With reduced water availability, domestic and stock dams will be less reliable. Water users that currently depend on these dams will need to investigate alternative supply options. In addition, modernisation will result in some irrigation channels being closed down (see page 113). Rural and urban water corporations will need to consult with affected domestic and stock customers about alternative supply options. Expanded reticulated (piped) urban

and rural supply systems will become an important source of water for domestic and stock purposes. Piped supplies are often a more efficient supply than dams or channels as they result in fewer losses. The expansion of reticulated domestic and stock systems will be mainly investigated by rural and urban water corporations to ensure a consistent approach. Water corporations should include a number of important considerations, such as alternative supply sources, local climatic conditions and level of service required in their planning processes.

Action 8.2: Expansion of reticulated systems for domestic and stock use

Who: Rural and urban water corporations; Department of Sustainability and Environment **Timeframe:** 2012

A consistent approach will be developed to manage the expansion of reticulated domestic and stock supply systems, taking into consideration:

- cost effectiveness
- who will provide the service (that is, an urban or rural water corporation or community co-operative)
- whether the service is required for one customer or a group of customers
- required level of service (that is, the water quality required and whether the supply is needed only for the irrigation season or for the whole year)
- proximity to existing supply systems
- terms and conditions for the customer and how to determine a fair and reasonable price.

Pricing arrangements will need to be consistent with the Essential Services Commission's existing pricing principles and any future principles developed as part of a state-based third party access regime.

8.2.2 Improved access to the water market

Regional urban water corporations in northern Victoria have already participated in the water market to address water shortfalls and to sell to rural users. To achieve a balanced approach to water management, trading is only one of a number of measures used to manage supply and demand. Conservation and efficiency, carryover and the use of alternative water sources are examples of other measures.

Carryover and trade are important tools that urban water corporations will continue to use to secure sufficient supplies during temporary water shortages and to manage the long-term impact of a drier climate and population growth. For towns such as Kyabram that are supplied by the irrigation distribution system, the usefulness of carryover and trade is entirely dependent on the system being operated in extreme droughts. To ensure this, Chapter 5 outlined actions to secure operation of the distribution system (see page 88).

Carryover and the spillable water account

Chapter 5 described how carryover and trade allow all entitlement-holders to manage the risks of variable water availability. In March 2009, it was announced that entitlement-holders could carry over up to 50 per cent of their entitlement volume into the 2009/10 season. This was an important change for some urban water corporations who require this amount of carryover to ensure that critical human needs can be met. But the change also presented some additional risk. The rules mean that carryover water would be lost to the system reserve if full allocations were made in the following season. As with all entitlement-holders, forfeiting a 50 per cent allocation is a significant cost for urban water corporations, which would be passed on to customers.

To reduce this risk of forfeiting allocations, the Strategy introduces the 'spillable water account' (SWA), which allows entitlement-holders to store additional carryover water, only forfeiting it when it physically spills from the storage*. Introducing the SWA significantly reduces the risk of all entitlement-holders losing what they carry over. For urban water corporations it protects their investment in water purchases and should reduce customer charges.

Trade for community groups and businesses

In recent years, there have been calls for urban customers to have greater access to the water market. Accessing water through the market could ease the impact of water restrictions on community facilities such as sports grounds, and businesses and industries that rely on outdoor water use. In response, North East Water instigated a pilot 'urban water trading' project developed as part of the Victorian Government's drought response package. The pilot allowed community groups and businesses that met special criteria to purchase additional temporary water on the open water market.

Case study: Water trading by an urban customer

In February 2008, North East Water had to introduce water restrictions to ensure there was enough water for its customers. Stage 4 restrictions in Wodonga meant that many sporting ovals had become unfit as playing surfaces. The Wodonga Senior Secondary College oval plays an important role in the community. It services secondary students, and community members who play a range of sports on the oval each week. In response to the water restrictions, the Wodonga Senior Secondary College invested in a more efficient watering system, and re-turfed with a drought-tolerant type of grass. However, low rainfall, resulting in empty water tanks,

meant the grass could not be watered in its first week, after which it would have been sufficiently established to survive.

The school was an ideal candidate for North East Water's pilot 'urban water trading' project. Through North East Water, Wodonga Senior Secondary College purchased 11 ML of water for the critical first week of watering for its new turf. As a result, the school children and other community groups could play sport and undertake other activities on a safe playing ground.

Footnote:

* For storages on the Murray system, this includes an internal spill from Victoria's share of the storage.

Since the success of North East Water's pilot project, other urban water corporations in the Northern Region have used this concept. North East Water, Coliban Water, Lower Murray Water and Central Highlands Water have all purchased some water on the open market on behalf of customer groups. The following principles are generally applied to the purchase program:

- a) Eligibility is limited to community organisations where water is used to maintain community facilities and small businesses able to demonstrate financial loss as a result of ongoing water restrictions.
- b) Customers pay the full price of water delivered through the reticulated system, in addition to the market price for the water.
- c) Only 80 to 90 per cent of water purchased is delivered to allow for treatment and system operating requirements.
- d) Participants are required to adhere to efficient water use practices

It has been argued that all urban customers should be able to access the water market. However, residential customers and small businesses are generally excluded due to the considerable administrative process and costs that would be required to establish and monitor all trade and use. Further work will be done to investigate the possibility of all urban customers accessing the water market, including the:

- likely demand for such a service by individuals
- administrative processes required to keep track of trades (including linkages with the Victorian Water Register)
- impact on the effectiveness of restriction policies in balancing supply and demand and on policing compliance with restrictions
- community response to allowing some customers to use the water market to avoid water restrictions.

It is important to emphasise that urban water corporations are still expected to provide a minimum level of service to all their customers.

Policy 8.1: Enabling urban customers access to water markets

Regional urban water corporations are responsible for providing a minimum level of service (as specified in their water supply and demand strategies and drought response plans) to all their customers.

In providing the minimum level of service, water corporations should consider all viable options including the water market.

Facilitated access and direct access to the water market by all customers may occur subject to a range of policy issues being investigated and addressed – including the terms and conditions of access and assessment and establishment of an access regime, likely demand for access, administrative and decision-making responsibilities and processes, equity considerations, and community views.



Football match, Violet Town

Photographer: Bruce Cumming

Under current arrangements, water purchased on the market cannot be delivered through water corporation works without agreement to terms and conditions, known as a third party access regime. The regime is designed to provide certainty as to rights of access, conditions of water delivery, prices and other arrangements. As recommended by the Victorian Competition and Efficiency Commission⁵⁹, the State Government has asked the ESC to undertake an inquiry into the development of a state-based access regime, including consultation with stakeholders. A particular issue for consideration by the ESC is how new services are to be regulated, and ensuring customers are provided with appropriate levels of assurance and protection in the delivery of those services.

Experience in Victoria and interstate indicates that there is a demand for innovative water and sewerage services, and that there are operators potentially interested in providing such services. A third party access regime would enable businesses and other parties to access the water and sewerage infrastructure of water corporations to provide a broader range of services.

8.2.3 Using 'fit for purpose' supplies

Using alternative sources that are 'fit for purpose', that is, of an appropriate quality for its intended use, can help reduce reliance on water from rivers and reservoirs. In light of the expected reduction of traditional water sources as a result of climate change, individuals, households, businesses and water corporations should continue to explore opportunities to use alternative sources. These should be implemented where cost effective and practical and where possible, high-value uses should be encouraged over low-value uses, returning higher value to urban communities. The Victorian Government will continue to encourage the use of alternative sources.

Large-scale recycled water use

The reuse of treated water from sewage treatment plants is common throughout the region. Agricultural reuse is prevalent because water quality requirements are less stringent than for urban use and therefore lower in cost. For example, Class A, B, C or D recycled water can be used, subject to conditions, for non-food crops, woodlots, turf and flowers. The potential to implement further high-value agricultural reuse should be investigated, especially with reference to creating new 'food bowl' areas close to a reliable source of water. There is also potential to increase reuse for industrial and urban applications and to use recycled water more efficiently.

Chapter 4 outlined new policy to allow entitlement-holders to retain ownership of their return flows, rather than losing them to the communal resource (see page 83). In the case of urban water corporations, water from sewage outfalls could be delivered downstream to other customers via the river and irrigation distribution systems. Enabling urban water corporations, as individual entitlement-holders, to reuse or trade their return flows will be important in achieving the maximum value of recycled water. For example, a water corporation may decide to upgrade a water treatment plant to supply downstream users with better quality recycled water via the waterway. This could replace investment in an expensive dual pipe system.

Large-scale stormwater use

Urbanisation significantly alters both the quality and quantity of water that is delivered to receiving waterways. Large peaks of stormwater from rainfall running off impervious surfaces can cause pollution events, that is, elevated concentrations of nutrients and contaminants in waterways. Better management at the source, for example using activated charcoal to treat sewage outfalls to prevent blue-green algal blooms, can reduce the impact of these events. Harvesting stormwater at the allotment and street scale in urban areas provides an alternative source of water and improves stream health.



Hepburn Springs

Photographer: Visions of Victoria

Case study: Water conservation and recycling for Bendigo Hospital

Bendigo Health Care Group have recently completed a project that is anticipated to save up to 32 ML of potable water per year at the Bendigo Public Hospital and associated health care facilities.

The project involves an all-round approach to water savings through water conservation and reuse. Sources of water include rainwater, stormwater, and water recovery using reverse osmosis technology, from on-site industrial waste processes. Industrial wastewater comes from nursery drainage, kidney

dialysis, laundry washes, evaporative cooling and weekly testing of the hospital's fire sprinkler system. Restrictors were also installed in showerheads and tap outlets.

The collected water is being used for garden irrigation, toilet flushing and car washing. The on-site car washing facility at the John Bomford campus helps in the rehabilitation of psychiatric patients who are able to wash cars to earn income before returning to the community.



Water conservation and recycling for Bendigo
Photographer: Bendigo Health Care Group

Household-scale schemes

Rainwater tanks collect and store rainwater from roofs for household use on gardens and inside the house, for example, toilet flushing and clothes washing. Householders benefit from reduced water bills and an alternative water supply for outdoor use during water restrictions. The State Government continues to encourage Victorians to use alternative water supplies for non-drinking uses where there is a net benefit to the community and to minimise detrimental discharges to the environment.

The use of other on-site stormwater management devices such as collecting runoff from roof areas and paving, infiltration systems and rain gardens (that is, garden beds that act as a biological filter), can also go some way in reducing the current amount of run-off and pollutants leaving a site.

Greywater reuse at the individual household level reduces demand on potable water supplies for garden watering. The Water Smart Gardens and Homes Rebate Scheme provides rebates of up to \$500 for greywater systems and rainwater systems (see www.ourwater.vic.gov.au/saving/home/rebates).

8.3 Managing demand

Managing demand is an important way of reducing the cost or need for supply augmentations in a system. As with rural users and the environment, urban users have a responsibility to use water efficiently.

8.3.1 Urban conservation and efficiency

The State Government is committed to ensuring water conservation measures are implemented by households and industries throughout Victoria. This has been shown to be a cost-effective and energy-efficient way to save water.

The current drought conditions have increased awareness of the need for water conservation in urban areas. Associated behavioural change has already contributed to a reduction in average per capita water

use since the 1990s. To encourage conservation in the long term, each urban water corporation has established targets of 10 to 32 per cent reduction in per capita consumption by 2055. Per capita consumption is measured in litres/person/day and includes residential, non-residential and non-revenue components of water use. The specific targets, and the programs to meet them, can be found in each water corporation’s water supply demand strategy.

Urban water corporations will continue to work with householders and industry to encourage adoption of water conservation practices, and will improve their data and understanding and monitor progress towards targets. Table 8.2 summarises the conservation actions of each urban water corporation and the estimated savings to 2055.

Table 8.2 Major conservation actions from urban water supply demand strategies

Water corporation	Conservation action	ML/year
North East	Demand reduction and management (Wodonga)	1,200
	Demand reduction and management (Wangaratta)	750
	Demand reduction and management (Yarrawonga)	490
	Delivery system performance (Yarrawonga)	620
	Self-reliant households (Wodonga)	690
Goulburn Valley	Major industry resource efficiency program	1,380
	Reduction in non-revenue water program	800
	Indoor appliance upgrades	760
	Four star washing machine replacement program	460
	Basix house sustainability tool program	310
Coliban (Coliban system)	Rural reconfiguration	4,000
	Urban leakage control	1,400
	Permanent water savings measures	1,000
	Non residential conservation programs	700
	Community education programs	350
Central Highlands*	Leakage prevention and reduction (unaccounted water strategy)	N/A
	Development and implementation (eg. retrofitting and rebate programs)	N/A
	Residential water conservation (eg. retrofitting and rebate programs)	N/A
	Community and school education programs	N/A
	General water saving promotions, events and information	N/A
Lower Murray	Customer education and awareness program	1,000-2,000
	Implementation of efficient garden program	
	Promote water efficient appliances	
	Leakage detection program	500
	Saving water in industrial and commercial businesses	1,000

*Conservation estimates are calculated by system, with a projected total savings of 521 ML/year.

Non-residential use (comprising industry, commercial/institutional buildings and open spaces such as parks and gardens) accounts for one-third of urban water use in the Northern Region. The Victorian Government is supporting water conservation by industries and businesses through the state-wide implementation of WaterMAP. Non-residential customers that use greater than 10 ML a year are required to develop a water management action plan (WaterMAP) with an indicative target of 10 per cent improvement in water efficiency (see www.ourwater.vic.gov.au/saving/industry for more information).

Another measure to reduce water demand was the introduction of permanent water saving rules for urban water supplies in 2004. These are common sense measures to promote urban water conservation and efficiency. The rules include a ban on the hosing of footpaths and requiring trigger nozzles to be attached to hoses and they apply every year all year round. The current rules apply to reticulated urban supply systems, but do not apply to water supplied from groundwater, unregulated or regulated supplies. It makes sense to eliminate wasteful practices regardless of the source of water.

8.3.2 Temporary water restrictions

The application of water restrictions in accordance with drought response plans has been effective in balancing urban supply and demand during droughts (see page 154). However, they come with social and economic costs, particularly at the highest level of restriction. Stage 4 restrictions ban all outdoor use and as a result, negatively affect community facilities, such as sportsgrounds, and businesses that rely on outdoor water use. In recognition of this, some exemptions from Stage 4 restrictions have been granted, but the consistency of these exemptions across Victoria needs to be improved.

It is likely that the number of properties with stock or rural industry needs connected to urban systems will increase with a drier climate. This would place additional demand on supply systems, particularly during droughts as customer water demands are high. Under current arrangements, this stock and rural use is treated as industry and as such, is not subject to the standard urban water restrictions. Drought response plans need to consider applying restrictions to these new demands.

Under continued water shortages, more people are turning to groundwater sources to water gardens during periods of severe water restrictions. Having dual supplies (that is, access to both rural and urban supplies) raises equity issues where customers may be able to avoid the most severe impacts of water restrictions. However, there may not be any stress on groundwater supplies in the urban area under water restrictions. Therefore, groundwater supplies will not be restricted in line with urban supplies, unless required to protect the groundwater resource (see page 69).

Action 8.3: Expanding water conservation measures

Who: Urban water corporations; Department of Sustainability and Environment

Timeframe: 2011

WaterMAPs will be required to be developed by any non-residential customer using more than 10 ML/year who connects to the urban supply system.

The capacity to apply permanent water savings rules to all water sources will be investigated, including regulated, unregulated and groundwater sources where users have access to reticulated supplies.

Action 8.4: Updating the uniform water restrictions schedule

Who: Urban water corporations; Department of Sustainability and Environment

Timeframe: 2013

The uniform water restriction schedule will be reviewed to:

- build on the lessons learnt from recent dry conditions
- improve consistency in the application of exemptions across Victoria (when appropriate)
- consider the need to apply water restrictions to domestic and stock customers and rural industry when connected to the urban supply system.