

Water use

Water distribution

Supplying water for use in urban areas involves collection, storage, treatment and distribution, followed by collection of wastewater for treatment or disposal.

» Collection and storage

After water has been collected in catchments it is stored in dams, lakes and rivers until it is required. Some water comes from groundwater sources.

» Preparation for distribution

Water is treated to safe drinking standard at a water treatment plant, in preparation for distribution throughout the reticulation system (see below).

» Town and city reservoirs

Treated water is pumped through large water mains for storage in town and city reservoirs that are usually located on high ground to provide the necessary pressure (from gravity) throughout the reticulated network.

» Water reticulation and distribution

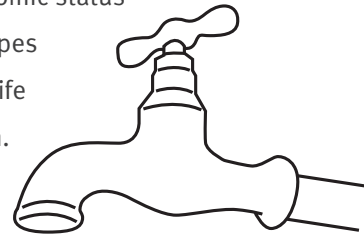
Water is gravity-fed from town and city reservoirs into underground water mains. Buildings and houses are supplied from these water mains through a metered connection. Customers own the plumbing from the meter into the premises and are responsible for maintaining household plumbing.

Reticulated drinking water is usually treated before use, and wastewater is treated before it is returned to rivers and the ocean, or reused.

Personal water use

Personal water use varies throughout the world and is influenced by:

- ◆ average rainfall
- ◆ groundwater and surface water sources
- ◆ technology and infrastructure
- ◆ socioeconomic status
- ◆ housing types
- ◆ quality of life
- ◆ population.



The table below compares average daily personal water use of people across major areas of the world.

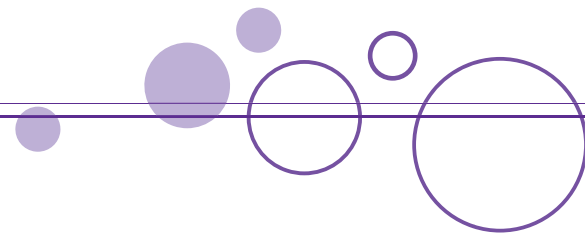
Table 2: Average daily water use per person of people living in major areas of the world

Continent/Country	Average daily water use per person (L)
Africa	47
Asia	85
Australia	224
United Kingdom	334
United States of America	578

(Sources: TCC, 2007; WSAA, NWC & NWI, 2007)

A person living in a developed country may consume 5 to 50 times as much water as a person living in an undeveloped country.

Indigenous knowledge of water use and protection has changed over time, but continues to influence Australian society today. For example, the traditional approach to preserving water sources was to use water from the most arid places first, moving to areas of permanent water when necessary. This is now practised only in some areas of the country because of the establishment of water storage systems such as dams and reservoirs.



Regardless of whether contemporary or traditional approaches to water use are adopted, Aboriginal people’s respect for and relationship with the land and the natural resources it provides are paramount. Protecting the fragile environment is important to most Aboriginal Australians; many people today still practise seasonal and purposeful movement, staying in and utilising certain areas for a defined, relatively short period of time, in order to manage water supplies and other natural resources. Recognising the scarcity and importance of clean drinking water ensured that Aboriginal Australians developed ingenious ways to store it and use it carefully.

In contemporary Australian society, 20 to 50 litres of clean water per person is used daily for drinking, food preparation, cooking and basic sanitation. The remainder of household water consumption is used for showering and washing clothes, maintaining gardens, filling pools and spas, and washing cars or outdoor surfaces.

Depending on seasonal conditions, Australians use between 18 000 and 22 000 gigalitres (GL) of water a year, enough to fill Sydney Harbour almost 50 times. One gigalitre is one thousand megalitres (ML). One megalitre (a million litres) of water is approximately equivalent to the water in three lanes of an Olympic swimming pool.

Table 3 gives the breakdown of water use in Australia during 2004–05. Total consumption was 18 767 GL.

Water consumption by Australian agricultural industries in 2004–05 fell by 19% compared with water consumption in 2000–01. This dramatic reduction was primarily the result of reduced water availability due to drought conditions.

Before the implementation of water restrictions in 2005, Australians were among the highest consumers of water per person in the world. Each Australian used 1.31 ML of water each year—that is, 350 L/day of water treated to drinking water standard. Up to half of this volume of water was used for gardening, and another third for showering and flushing toilets (TCC, 2007).

With increasing awareness of water as a precious finite resource, and the implementation of water restrictions in a number of areas throughout Australia, water use per person dropped to 224 L/day, based on 2005–06 statistics from major urban water utilities (WSAA, NWC & NWI, 2007).

Extended drought conditions in South East Queensland led to the introduction of new levels of water restrictions from May 2005, in an effort to conserve water. For the next two years, faced with decreasing dam levels, businesses and residents in South East Queensland experienced tightening restrictions on the amount of reticulated water they could use. With the introduction of the ‘Target 140’ campaign in 2007, home water use reduced significantly and remained consistently under the targeted 140 L/person/day. Before the introduction of Level 5 water restrictions, on 10 April 2007, average water use was 171 L/person/day.

Table 3: Breakdown of water use in Australia during 2004–05

Water using activities	Water used (% of total)	Water used (GL)
Agriculture	65	12 191
Household	11	2 108
Water supply industry	11	2 083
Other industries	6	1 059
Manufacturing	3	589
Mining	2	413
Electricity and gas production	1	271
Forestry and fishing	0.28	52

(Source: Australian Bureau of Statistics, 2006)

South East Queensland achieved a record low for the week ending 7 September 2007—average water use per person per day was 122 litres.

(Source: Queensland Water Commission)

Regardless of the water situation in the local area, we all have a responsibility to reduce our personal water consumption and so help conserve water. Water use efficiency is an important strategy in conserving this vital resource and encouraging sustainable water use techniques into the future.

❖ Reducing water consumption

Water is a precious, finite, limited resource; the consequences of not managing water resources sustainably are far-reaching and impact on everyone. The effects of climate change and recent prolonged droughts have highlighted the importance of managing our water resources now to ensure a good quality supply for future generations. Reducing the amount of water that individuals use daily is an important step towards ensuring sustainability of our water resources.

All levels of government are encouraging water savings in ways that best align with their responsibilities and commitments. For example:

- ◆ education programs: the Waterwise program <www.nrw.qld.gov.au/waterwise/education>
- ◆ funding for water-efficient appliances: almost every state in Australia has offered some kind of rebate program to encourage installation of water-efficient appliances such as shower heads, washing machines and rainwater tanks. Local governments often encourage residential water savings through funding programs. These programs are an important way of helping people take charge of their own water efficiency in times of drought.

- ◆ legislative changes: the recent drought has highlighted several instances where the law can be and has been strengthened to encourage water savings. These include:
 - introducing tougher water restrictions
 - enabling water service providers to place requirements on businesses to meet certain levels of water efficiency
 - changes to billing systems so that the people who are responsible for the water actually receive the bill and can compare their use with the average in the vicinity
 - Commonwealth measures such as the introduction of the Water Efficiency Labelling Scheme (WELS) which requires all water-using products to be registered and rated for their water efficiency.

Reducing water wastage is a key component of the drive to reduce water consumption. Market research has shown that almost all water consumers feel they could do more to reduce their own water consumption. Relatively simple steps towards changing water use behaviour are the foundation on which to reduce water wastage. To fully appreciate where water can be saved within the home it is helpful to understand where water is used in the typical household.

In Queensland, household water consumption varies considerably from location to location, depending on factors such as climate, cost of water, age and type of housing, local industries and community behaviour.

Estimating how people use and save water in the household is inherently imprecise because the way people use water is highly individual. Notwithstanding this, several studies have been undertaken to try to quantify water use and savings in the home. Typical household water use is shown in Table 4.

Table 4: Household water use

Household end use	Approximate proportion of total use (%)
Showers and baths	18–21
Laundry	10–13
Toilet	12–16
Kitchen	9–13
Outdoor	35–55
Leakage	1–10

(Sources: Loh & Coghlan, 2003; Roberts, 2004 & 2005; Australian Government, 2006)

Some comparisons of water volumes

- ◆ an Olympic swimming pool holds about 2.5 million litres
- ◆ a typical backyard rainwater tank holds about 5 000 L
- ◆ a wheelie bin holds about 240 L
- ◆ a typical bucket holds 9 L.

When considering water use and water savings it is helpful to know that, in Queensland, there is typically 2.6 people per household.

Here are some ideas and facts to encourage reduction in water use and wastage around the home and at school.

» General water use and maintenance

- A dripping tap wastes between 20 and 27 L of water a day. Over a year this adds up to about 9 800 L—the volume held by two average backyard rainwater tanks or 41 wheelie bins.
- Leaks from toilets can be a real problem as water can flow down the drain unseen, making them hard to detect. A leaking toilet will sometimes hiss. If you can hear a hiss, the leak is about 260 L per day—about one wheelie bin full of water. A hissing leak could waste 95 000 L of water a year! That’s enough to fill 19 rainwater tanks.

Calculation example:

$$27 \text{ L/day for } 365 \text{ days} = 27 \text{ L} \times 365 = 9855 \text{ L}$$

$$9855 \text{ L} \div 240 \text{ L per wheelie bin} = 41 \text{ bins}$$

- If you need to run the tap until hot water comes through, collect the cold water for reuse.
- Save the nutrient-rich water from cooking vegetables; put it in soups or on your garden.
- Place unwanted ice in your pot plants or garden (not touching the plants).
- Empty school water bottles on pot plants.

» Bathrooms and toilets

- Taking a 4-minute shower rather than a 7-minute shower will save about 18 L of water. That’s a saving of 2 buckets of water every time you shower—over 40 wheelie bins full a year.
- Replacing a standard shower head with a 3-star shower head saves about 15 000 L of water per household per year—enough to fill over 60 wheelie bins or 3 backyard rainwater tanks.
- Catch shower water in a bucket. The water can be used to keep plants and lawns green between rains.
- If you replace an old-fashioned single-flush toilet with a 4-star rated dual-flush type (the most efficient types of toilet generally available, with a flush of 4.5 litres / 3 litres) the water savings will be about 26 L per person per day. For an average-sized family this can save about 25 000 L of drinking-quality water per year. That’s enough to fill 5 backyard rainwater tanks each year.
- Turning off the tap while brushing your teeth saves around 10 L of water. If you brush your teeth morning and night, this simple step saves about 30 wheelie bins full of water a year.

- Unnecessary flushing of the toilet is one of the biggest wasters of water—don't flush needlessly, and never flush tissues and other rubbish down the toilet.
- Turn off the water while washing your hair and save water!
- For maximum water savings, connect toilets to tank water for flushing.

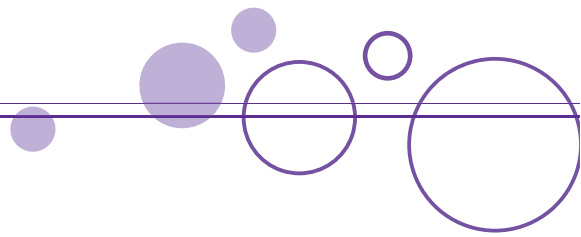
» Laundry and washing areas

- Replacing a top-loading washing machine with a 4-star rated front-loading washing machine will save the household about 22 000 L of water each year—around 91 wheelie bins full of water.
- Completely fill your washing machine with clothes each time you use it and you will reduce water use by reducing the number of washes required.
- Choose the efficient or low water setting on the washing machine.
- Connect a hose from your washing machine to divert greywater to your garden (check your manufacturer's warranty on the machine before making modifications to its operation). Use biodegradable, eco-friendly washing detergent.
- For maximum savings, connect the washing machine to tank water for filling.

» Kitchen, cooking and dishwashing

- Most people wash the dishes with the sink about half full—usually 10 to 15 L per wash. A 5-star efficient dishwasher uses about 7 L of water per wash, cutting water use in half.
- Completely fill your dishwasher before using it and reduce your number of washes.
- Use the economy setting on your dishwasher to save water and power.
- To wash fruit or vegetables, use a bowl of water instead of having the water running continuously. The water from this bowl can then be reused on the garden.
- The kitchen tap can deliver water at up to 20 L per minute, but the flow is more often between 3 and 7 L per minute. Installing a flow limiter on your kitchen tap will make sure the flow is never more than 9 L per minute, and will also help prevent splashing.
- Keep a jug of water in the refrigerator so that water isn't wasted running the tap to get colder water for drinks.
- Where possible, compost vegetable and food scraps rather than using a garbage disposal unit, because you need to run water while the garbage disposal unit is being operated.





» Outdoors

- When there are no water restrictions in place, between 35% and 50% of all household water is used on gardens and lawns.
- Mulching garden beds reduces evaporation, reducing loss of soil moisture so plants have water where they need it—at the roots. Water crystals also help to hold moisture in garden soil.
- Installing a 5000 L rainwater tank for outdoor use could save up to 50 000 L of water per year being taken from the reticulated water supply. Water from the tank can be used for garden watering, car washing and house maintenance.
- Select Waterwise plants to reduce the water your garden needs.
- Use a broom, brush or rake to sweep and clean outdoor paths and paving areas.
- Installing a greywater reuse system can potentially save 50 000 L of drinking-quality water being taken from the reticulated water supply per year.
- A properly fitted pool cover can almost completely stop evaporation from the pool. The best type of pool covers allow rainfall to enter the pool yet still stop evaporation. Water savings vary from place to place, depending on how hot and dry the location is, and on how often the pool cover is in place.
- Avoid watering when it's windy; the wind causes more water to evaporate and blows spray to areas where it is not needed.
- Group plants that require similar amounts of water together in the garden, so that you can efficiently water them all, giving each group only as much as is needed.

» Pressure and leakage management

Not all the water from treatment plants reaches consumers; some water loss through leaking underground joints and valves is unavoidable. The amount of water lost depends on the age and condition of the pipe systems, as well as overall system pressure.

When a major pipe bursts, the resulting flooding is usually quite obvious and repair crews can respond quickly. Small and medium sized leaks, however, are much harder to detect and can result in much greater water losses because they remain undetected much longer. Sophisticated listening and sensing devices are used to help detect small to medium leaks.

The rate of leakage from the reticulation network increases with water pressure. In many areas, pressure within the system is higher than is necessary to meet consumers' needs, so pressure-reducing valves and flow meters are being installed, thereby reducing leakage with little or no change in the pressure of water delivered to the household. These 'intelligent' devices are able to increase available pressure when increased flow is required—for example, when fire-fighting hoses are connected to the mains.

Leak detection investigations and repairs are continually being implemented by local governments in South East Queensland. Local governments in other parts of the state are also required to reduce leakage where economically viable to do so.