

Stormwater

What is Stormwater?

Rainwater that falls on roofs, roads, driveways, gardens, and parks around our towns and cities creates water runoff that becomes stormwater. As stormwater runoff travels over the ground around your town or city it picks up a range of contaminants (pollution), such as rubbish dropped on the streets, oil dripping from cars and dog droppings we've not picked up. In most towns and cities stormwater flows into pipes and travels underground to creeks or the coast, where the contaminants can cause serious environmental harm and potential human health problems at popular swimming and recreational areas.

Challenging the design of traditional streets and stormwater drains

Rain that falls on roofs, roads and footpaths in built up areas is prevented from soaking into the ground, and instead rapidly accumulates on these surfaces. The traditional approach to dealing with this excess water has been to get it draining quickly away into pipes underground to prevent flooding and damage to our homes, schools and other buildings. But this approach means that the pollution picked up by stormwater is also moved into our waterways.

Innovative "water sensitive urban design" solutions involving landscape, garden features and even rain tanks can be used to reduce the amount of stormwater entering our waterways, slow down its flow and improve its quality. Stormwater, as the name implies, is mostly water and a fantastic resource that can be reused. Rainwater on our roofs is relatively clean, easy to capture, and appropriate for use in the garden, home, business, or school. Capturing rainwater in a rainwater tank reduces the total volume of stormwater runoff and the size of the problem it creates.

More than just water

Typical stormwater entering creeks and the coast from our towns and cities contains a number of contaminants (pollution).

Sediment

Sediment (or dirt) enters stormwater when it is washed from areas of bare ground, such as construction sites, ploughed fields, garden beds, gravel driveways and road edges. Sediment is considered a pollutant because it:

- blocks up stormwater pipes resulting in flooding of streets and homes,
- muddies up our lovely creeks, bays and beaches,
- buries underwater plants and animals,
- reduces light levels through the water so underwater plants can't grow,
- interferes with fish gills,
- transports other polluting chemicals that were attached to the sediment.

How to help

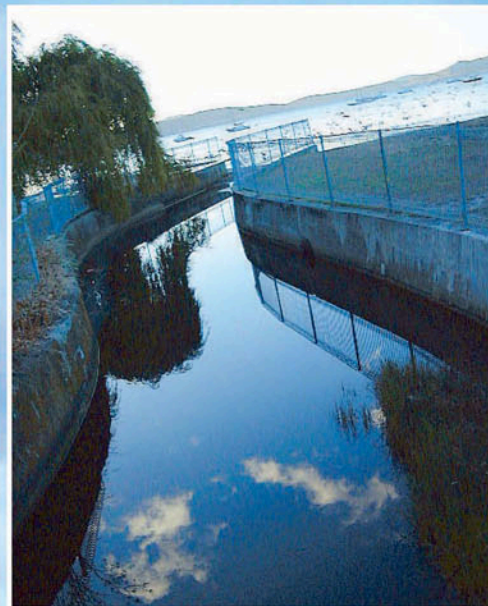
- install sediment erosion control measures when building (e.g. silt fences),
- grow grass or other small plants along open drains to filter out sediment.
- Build a rain garden to capture run off from your driveway (see Rain Gardens section)

Pathogens

Pathogens comprise viruses, harmful bacteria, protozoa and other microorganisms (living creatures not visible without a microscope) that can cause illnesses, such as stomach complaints (gastroenteritis) and ear, nose or mouth infections. The main source of pathogens in stormwater are sewerage spills or leaks, and animal faeces especially from dogs. Pathogens reach our waterways (freshwater and marine environments) via stormwater. They can make the water unsafe and even cause the closure of popular swimming beaches.

How to help:

- pick-up after the family dog when we go for walks.



Keeping waterways clean is a major challenge.

Nutrients

Nutrients are essential for life; however, if high amounts enter our waterways they can cause significant problems, such as unnatural algal blooms which can shade light reaching the bottom of shallow lakes, creeks and bays, causing aquatic plants to die. Algal blooms are sometimes toxic and decomposing algae depletes the water of dissolved oxygen, which can kill fish. Large amounts of nitrogen and phosphorus are the main nutrient problem, as they are common in fertilisers used on gardens and parks. Soaps, detergents and washing liquids may also contain these nutrients.

How to help:

- plant native gardens that need less fertilisers,
- avoid over-watering your garden to prevent runoff going down the drain,
- wash your car on the lawn, not out on the street,
- choose soaps, detergents or washing liquids that are low in phosphates.



Litter is ugly and can cause flooding by clogging drains.

Heavy Metals

Heavy metals are highly toxic and include elements such as arsenic, cadmium, lead, and mercury. The major source of heavy metals entering stormwater comes from vehicle wear, exhaust emissions, fuel or oil spills, and industry discharges and spills. Heavy metals can damage living things at low concentrations and tend to accumulate in the food chain. Humans can be exposed to heavy metals through inhalation, skin or eye contact, but more commonly if we eat contaminated seafood.

Did you know:

- Stormwater runoff contributes significant amounts of heavy metals to the River Derwent.

Hydrocarbons

Hydrocarbons are organic compounds found in fuels (e.g. petrol and diesel), motor oils and grease. Hydrocarbons are toxic in low to moderate concentrations and enter stormwater due to fuel and oil spills. Vehicle exhaust emissions also contain hydrocarbons that build up on roads and are particularly concentrated at busy traffic intersections and carparks where they are picked up in stormwater runoff.

How to help:

- dispose of old fuel or oil at the recyclers, not down the drain
- make sure the family car is not dripping oil onto the road or driveway
- take your time filling up the car with fuel as the small spills add up.

Litter

What happens to rubbish (including cigarette butts) dropped on the ground or blown out of bins onto the streets? Next time it rains this litter washes into stormwater drains to creeks and the coast. This creates a problem because:

- it is ugly,
- it can trap or be eaten by animals (penguins, seabirds, seals and fish),
- it can release toxic chemicals when it breaks down,
- can clog up the drains and cause flooding.

How to help:

- Litter pollution is easy to prevent. Just remember, if you happen to drop some litter on the ground, or sweep garden rubbish down the drain, you may be swimming with it next time you're at the beach.

Stormwater in the Derwent Estuary

A greater Hobart stormwater monitoring program started in July 2002, with water samples collected quarterly by the regional Councils, Waterwatch groups and the Derwent Estuary Program. The program targeted five stormwater drains and 12 rivulets that receive stormwater runoff. Generally the results showed that increased development activity has an adverse effect on stormwater quality. Therefore the easiest way to deal with pollution is to stop it at its source, which is where we all can make an immediate difference through the "How to help" tips.

Stormwater Pollution Solutions

Rainwater Tanks

Installing a rainwater tank on your downpipe is a great way to save water and protect local waterways.

You can use the water you collect for watering the garden, flushing toilets, supplying water to the laundry and even your hot water system. This can save about half of your annual water use!

If every house in Hobart collected all the water that falls on their roof in a water tank, it would be enough to fill an Olympic swimming pool 5000 times or fill the volume of the West Point Casino tower 115 times!

Interested in installing a tank? Talk to a GreenCity Service® provider (a program initiated by the Master Plumbers Association) for advice on the most environmentally appropriate product for your water needs. They can also assist you in applying for a Water Efficiency Rebate in the Hobart city area. Call 1800 667 766 or visit their website at: <http://www.mpatas.com.au/>.

Rain gardens

Rain gardens are a great way to slow and cleanse stormwater to protect waterways and save on garden watering. Water tolerant vegetation is planted in a sunken garden bed of sandy-loam soil underlain by a layer of gravel and drainage "ag-pipe". Water from hard surfaces is directed into the garden bed and filters down through the soil where it is collected in the under-drainage and returned to your stormwater pipe. As the water percolates into the soil it is filtered by soil particles and cleansed by soil microorganisms.

Rain gardens are exceptionally versatile and can be built to virtually any size or shape. There is also a huge range of vegetation that will thrive in these conditions. Some local natives that may be used include:

- Flax lily - *Dianella tasmanica* (or other *Dianella* species)
- Sagg - *Lomandra longifolia*
- Loose-flower Rush - *Juncus pauciflorus* (or many other *Juncus* species)
- Cord rush - *Baloskion australe*
- Curly Sedge - *Carex tasmanica*
- Purple-flag - *Patersonia occidentalis*
- Native Violet - *Viola hederacea*

There are also many native shrubs that could be incorporated into your rain garden including tea tree (*Leptospermum*) and paper bark (*Melaleuca*). Of course the plants don't even have to be native, anything non-weedy that will tolerate frequent wetting and drying is suitable.

The best places to put rain gardens are in locations conducive to the collection of water, such as at the bottom of driveways and car parks. You can also direct water from your downpipe (or the overflow from your water tank) into a rain garden provided you ensure that any water that overflows or is collected by the under-drains will be piped to the stormwater system.

Before starting be sure to check with your council for permit requirements.

To see a rain garden in action, visit the Royal Tasmanian Botanical Gardens.

Places to visit examples of stormwater treatment or re-use

There are lots of places that local councils have put in measures to manage stormwater including car parks, wetlands, parks and gardens. Contact your local council for information.

Website links and educational resources

Derwent Estuary stormwater information:

<http://www.derwentestuary.org.au/index.php?id=30>

Department of Tourism, Arts and Environment

<http://www.environment.tas.gov.au>

Water Sensitive Urban Design

<http://www.wsud.org/pics.htm>

<http://www.urbanwater.info/index.cfm>

<http://wsud.melbournwater.com.au>

Rain Garden - Royal Botanical Gardens (Hobart):

<http://www.rbg.tas.gov.au/raingarden.html>

Stormwater teaching guide (good site for school teachers)

<http://www.environment.nsw.gov.au/stormwater/hsieteach-guide/index.htm>

Stormwater education (case studies of different education formats)

<http://www.environment.nsw.gov.au/stormwater/casestudies/index.htm>

Acknowledgements

This feature was prepared as part of the stormwater program of the Derwent Estuary Program and the State Government's Living Environment Program.

The Derwent Estuary Program (DEP) is a regional partnership between local governments, the Tasmanian state government, commercial and industrial enterprises, and community-based groups to restore and promote our estuary. The DEP was established in 1999 and has been nationally recognised for excellence in coordinating initiatives to reduce water pollution, conserve habitats and species, monitor river health and promote greater use and enjoyment of the foreshore. Our major sponsors include: Brighton, Clarence, Derwent Valley, Glenorchy, Hobart and Kingborough councils, the Tasmanian state government, Hobart

Water, TasPorts Corporation, Norske Skog Boyer and Zinifex Hobart Smelter.

The Living Environment Program (LEP), announced as part of the 2005-06 State Budget, is a package of urban environment initiatives. It focuses on achieving environmental improvement in urban areas where the majority of Tasmanians live and work.



Domestic rainwater tanks can help to protect waterways.



Rain gardens absorb and cleanse stormwater.

