



## Christchurch's Urban Water



*Photo 1: There are about 78km of Rivers in Greater Christchurch*

Aside from our waterways, there are three different sorts of managed water systems in our cities and towns – drinking water, wastewater and stormwater. Canterbury is fortunate to have a good quality source of drinking water which comes from the deep groundwater aquifers that flow under the city.

Wastewater is the water that flows from the plumbing system in your home or business. It travels through the sewers to a wastewater treatment plant, before it is discharged to the ocean.

Stormwater is the water – and anything else – that flows down the drains alongside and under our footpaths and roads. It collects rubbish, oil, chemicals, and anything else in its path, and goes directly into our streams and rivers, untreated. This can have a negative impact on health when we swim in, or drink from these streams and rivers, as well as affecting the flora and fauna that lives in and near the waterway.

**Did you know?** There are about 78km of Rivers in Greater Christchurch and around 2605km of smaller streams - that is a lot of waterways! Christchurch City Council is responsible for monitoring the health of these waterways and has been undertaking monthly water quality monitoring for over ten years and each year they put out a surface water quality monitoring report. Many of these waterways have dedicated voluntary groups who are extremely passionate about the, protection and enhancement of these waterways.

In Pre-European times Ōtautahi / Christchurch was mainly swamp land with an abundance of low-lying interconnected streams. Māori relied on these waterways for their traditional practices of Mahinga Kai, living from the land. Early European settlers brought a variety of different engineering knowledge with them and chose to drain large parts of the area to make the land more 'hospitable' to their European ways of life. This also offered people more protection from waterborne, disease-producing pathogens in highly populated urban areas. Today, Ōtautahi / Christchurch still has a large number of streams and rivers weaving their way throughout the city which are a reminder of the city's origins.



*Photo 2: Christchurch City Council is responsible for monitoring the health of Christchurch's waterways*

### Want to know more?

- Christchurch City Council Waterways - <https://ccc.govt.nz/environment/water/waterways>
- Environment Canterbury Mahinga Kai - <https://www.ecan.govt.nz/your-region/your-environment/our-natural-environment/mahinga-kai/>
- Canterbury Maps earliest survey of the Canterbury Land District - <https://apps.canterburymaps.govt.nz/BlackMaps/index.html>
- TedX Talk: A New Vision of Sustainability 700 years old - <https://www.youtube.com/watch?v=acmT21524rQ>

## Stormwater Pollution

**Did you know?** Stormwater is used to describe all the water that falls on hard impervious (water resistant, waterproof, hard) surfaces such as roofing, road surfaces and car parks. As the water travels across these surfaces it washes away any dirt or fine particles which may be present, transporting them into streams and rivers (and eventually the sea). If any pollution ends up on these surfaces (also known as contaminants) it will harm the streams and rivers.

Unlike the wastewater created inside your house from toilets, washing machines, sinks and showers, stormwater is not usually treated or cleaned before entering waterways.

**What can you do to help?** One way to stop the pollution reaching our rivers and streams, is to preventing pollution occurring in the first place. Everyone can do their bit to help. We can all learn more by doing things such as taking part in this Mother of All Clean Ups Home Edition activity, and finding out what things we can improve on at home.

Feel free to share what you learn with others.

### Want to know more?

- Environment Canterbury, where does urban water go? - <https://www.ecan.govt.nz/get-involved/news-and-events/stories/urban-water-where-does-it-go/>
- Environment Canterbury stormwater - <https://www.ecan.govt.nz/your-region/your-environment/water/whats-happening-in-my-water-zone/christchurch-west-melton-water-zone/stormwater/>

## What can you do at home to help?

### Roofing

**Did you know?** Roofing material can make up a large contribution of heavy metal pollution we see in our urban waterways. In particular Zinc Alume or Zinc Galvanised roofing releases large amounts of Zinc when it rains. This is



*Photo 3: Zinc Alume roofing*

because the Zinc acts as a 'sacrificial lamb' to protect the other metals the roofing is made up of (this prevents rusting). Generally, as the roof material ages, the amount of Zinc released increases. Zinc is a micro-nutrient for most stream life - this means it is required in very small amounts, however in larger amounts it becomes toxic and can poison the stream life. Currently many streams in Christchurch have too much Zinc (levels above guideline values), especially when it rains. Research from the University of Canterbury calculated that at least 340kg per year of dissolved Zinc was leaching from roofs into one stream, with a stormwater catchment of 243 hectares.

Copper roofing and buildings with Copper spouting and flashing leach in a similar way to Zinc and also impact streams badly without treatment.

Decromastic tiles are made of galvanised steel with a bitumen overlay (and a stone or other chip on top sometimes). These tiles were commonly used in the 1970's and are known for being lightweight and easily installed. If the bitumen and chip overlay has worn down then they will also release heavy metals.

Concrete does not contain metals. However, as they age they can wear down and leak sediment into waterways. Currently there is little research on how much impact this has on our waterways. Build-up of moss and lichen on these surfaces is greater than on metal roofs, which means they might have to be cleaned more often.

Asbestos roofing does degrade over time and particles of this will be transported through stormwater drains to nearby waterways. Asbestos is not currently known to be harmful in water to streamlife. Asbestos can be extremely harmful to human health if in its unbound form and breathed in so always employ specialists if you are removing anything containing asbestos.



**What can you do to help?** There's no one easy or cheap solution, but we do know that the older the roof (both Zinc and Copper), the greater amounts of heavy metals are leached. If you have a very old Zinc or Copper containing roof, perhaps it's time to think about reconditioning or replacing it with less polluting materials.

*Photo 4: Keeping stormwater drains free of chemicals, sediment and other harmful materials can help the plant, fish and invertebrates like these thrive. Aren't they cute?!*

There are other solutions such as reducing the amount roof water entering the stormwater network from individual properties and considering alternatives such as raingardens and rain tanks.

If you use chemical products to clean either your roof, gutters or driveway then it is important to ensure that downpipes have been disconnected prior to applying the product. During cleaning and rinsing none of the water you are using to wash the roof, gutter or driveway should run into the drains. You can run the water onto the lawn instead, or capture and empty it into the wastewater system. Cleaning products often contain chemicals, detergents and phosphates that are harmful to the life in waterways. Even 'environmentally friendly' labelled products are not safe to put down the drains – remember, only clean rain water is to enter

your stormwater drains. If possible, use detergents derived from plant products which contain less harmful chemicals and are easier to treat in the wastewater system.

If you own a business property, find out what material your roof is made of and how old it is. If you don't already have onsite treatment of stormwater, could you investigate retrofitting your site? Or consider inviting research students to undertake monitoring and trials to assist.

### Want to know more?

- University of Canterbury stormwater innovation - <https://www.canterbury.ac.nz/news/2019/storminator-takes-out-innovation-award.html>

### Guttering and Downpipes

**Did you know?** In order for downpipes, gutters and drains to do the job properly they need to be clean and free from debris.



*Photo 5: Blocked drain*



*Photo 6: Clear drain*

**What can you do to help?** Keep roof gutters and drains under downpipes clean and free from debris. When cleaning these, it is important you make sure you do this safely. If you can't, then you can employ a specialist to undertake this work for you.

### Sediment

**Did you know?** Sediment (soil) is a key pollutant causing problems for lots of Christchurch's waterways. There have been two events that have significantly increased this problem in Christchurch - the liquefaction from the 2010 and 2011 earthquakes, with the unprecedented demolition and redevelopment; then the Port Hill fires in 2017 which resulted in a huge loss of ground cover and exposed loess soils which were easily washed downhill and downstream. Although these issues have and are being tackled, it is an ongoing challenge to reduce the amount of sediment entering streams from so many different individual sources.



*Photo 7: Sediment running into a stormwater drain*





*Photo 8: Sediment in waterways can suffocate fish, plant and invertebrates, leading to their death*

**What can you do to help?** If you are landscaping, parking your car on the verge, digging near your driveway or doing other excavations, minimise disturbance and keep any exposed soil covered.

For more information, check out the Erosion and Sediment Control Toolbox for Canterbury, linked below. If you have any friends and family who you might know who work in the construction sector, then please share this information with them. You could also consider volunteering on projects to replant riparian (native streamside plants) margins of waterways with indigenous plants. When established, these plants naturally stabilise stream and riverbanks and filter

sediment, preventing it from entering waterways. They also provide a natural barrier to discourage large flocks of exotic birds such as Canada Geese and Mallards from accessing waterways. These are problematic to waterways as they defecate in the water and increase nutrients and sources of *E. Coli*

If you notice any sediment running off any construction sites, then phone our incident response phone line and our officers can investigate - 0800 765 588.

**Want to know more - Erosion and Sediment Control Toolbox for Canterbury links:**

- <https://www.esccanterbury.co.nz/project/a-scientists-voice/>
- <https://www.esccanterbury.co.nz/project/soil-and-surface-stabilisation-practices/>
- <https://www.esccanterbury.co.nz/project/small-sites/>

## Paint and oil

**Did you know?** Paints and oils can be extremely harmful to stream life due to the chemicals they contain. It only takes 1 litre of oil to cover a stretch of water the area of an entire rugby pitch with a sheen. Oil is less dense than water therefore floats on the surface.

**How can you help?** Make sure that if you are doing D.I.Y painting at home you choose to do this on a good dry period of days so that the paint can dry properly and isn't going to be washed away into the stormwater drains. Also make sure you clean your paint brushes in your laundry sink afterwards, which ensures it goes into the wastewater system to be treated.



*Photo 9: Paint in waterways can kill animal, fish and invertebrates (Nathan)*

If you have a car, then check underneath the bonnet. If you see oil stains when you move the car then book in with your mechanic to check and repair any small leaks. In the meantime,

find a container you can put underneath to stop the oil leaking onto the drive and being washed into the stormwater drains when it rains.

### Want to know more?

- Maritime NZ oil impact - <https://www.maritimenz.govt.nz/public/environment/oil-impact.asp>

## Car Washing

**Did you know?** We have to be careful when we are cleaning our cars at home that the wash water does not enter stormwater drains. The detergents we use to clean cars contain chemicals and phosphates harmful to stream life.

**How can you help?** If you have a lawn or shingle driveway (which are both permeable e.g. water drains from them into the ground) then wash vehicles on these. The ground acts as a filter and grass and plants will absorb phosphates, that will actually help them grow (phosphates are used commonly as a fertiliser).



*Photo 10: Washing your car on the lawn or gravel can help keep chemicals and other nasties out of the stormwater drains*

If you wash your car on impermeable concrete or asphalt driveways, or the road, the wash water flows straight to the stormwater drains.

If you don't have access to a lawn or shingle driveway then take your car to a licensed car wash. Car washes are required to send their wash water to the Council's wastewater network. This network treats all the water entering it to a certain standard before it is released back into the environment via the sea.

### Want to know more?

- Christchurch City Council Christchurch wastewater treatment - <https://www.ccc.govt.nz/services/water-and-drainage/wastewater/treatment-plants/christchurch-wastewater-treatment-plant>
- Ministry for the Environment managing stormwater - <https://www.mfe.govt.nz/sites/default/files/risk-radar-managing-stormwater-2.pdf>

## Street Gutters

**Did you know?** As we head into autumn you may notice beautiful autumnal leaves falling and leaving their mark on the ground. Although beautiful and fun to jump in, these leaves can cause havoc with the stormwater network by clogging up drains and increasing the risk of localised flooding. If they do enter our waterways they also create a large influx of biological matter which will eventually be broken down by bacteria. This bacteria uses up dissolved oxygen in the water, leaving less available for the fish and invertebrates. It can also result in a large increase of nutrients entering waterways which can result in increase of algal blooms or weeds that choke the waterways.



*Photo 11: Although beautiful and fun to jump in these leaves can cause havoc with the stormwater network, clogging up drains and increasing the risk of localised flooding*

**How can you help?** Adopt your closest gutter and keep it free from leaves and debris. Only do this if it is safe and a quiet enough road to do so. Put leaves and natural debris in your green bin and any litter in the red bin.

### Want to know more?

- Newline story - <https://newline.ccc.govt.nz/news/story/autumn-leaves-blanket-city-in-gold>

## Dog Poo

**Did you know?** Not only is dog poo unsightly and smelly, it can also contain pathogens (bacteria and viruses) which if ingested, can make people quite ill. If this is washed into waterways it can make it unsafe to people to use streams and rivers for recreation.

**How can you help?** If you have a dog always be a responsible owner by taking dog poo bags out with you on every walk. Make sure you pick up dog poo with the bags and put it in your red bin when you get home (or where available, a park bin).

## Raingardens

**Did you know?** Raingardens are shallow depressions, typically planted with plants (preferably native), strategically located to collect, infiltrate and filter rain that falls on hard surfaces like roofs, driveways, alleys, or streets to minimise negative impacts of excessive runoff from these surfaces on urban waterways.

Not all properties in Greater Christchurch have suitable land types for constructing rain gardens, this depends on a number of factors such as soil type (how fast water passes through it), depth of water table and slope or gradient of the land in question. At present, Christchurch City Council is working on information applicable to residential situations in Greater

Christchurch. If you have expressed interest in this, we will let you know when this information is available, in the meantime you may find this site useful:

<https://www.landcareresearch.co.nz/science/living/cities,-settlements-and-communities/urban-stormwater-management/bioretenion-devices/raingardens>.

## Rainwater tanks

**Did you know?** As communities have become larger and more centralised, community water treatment and distribution systems have gradually replaced the collection of rainwater as our primary water supply. However, as we have begun to understand the need for sustainable use of water worldwide there has been a renewed interest in collecting rainwater.

Using rainwater:

- Reduces demand for mains water supply and you save on your water rates
- Reduces flooding by providing temporary storage for rainwater
- Reduces wet weather sewage overflows
- Reduces pollution of our beaches and waterways

At present, Christchurch City Council is working on information for people in residential areas of Greater Christchurch. If you have expressed interest in this, we will let you know when this information is available.

## Want to know more?

- Christchurch City Council stormwater and your property - <https://ccc.govt.nz/services/water-and-drainage/stormwater-and-drainage/stormwater-and-your-property>



*Photo 12: Community planting days contribute towards the health of Canterbury's waterways. Keep an eye out on Facebook and other news sources for the next one in your area!*

## Mother of All Clean Ups is a community collaboration of:

- Avon-Heathcote Estuary Ihutai Trust
- Avon Ōtākaro Network
- Ōpāwaho Heathcote River Network
- Conservation Volunteers New Zealand
- Cassels Brewing Co.
- Citycare Water
- Drinkable Rivers NZ

## With support from:

- Christchurch City Council
- Environment Canterbury
- Christchurch West Melton Zone Committee