



keep it clean

PREVENTING STORMWATER POLLUTION



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WHAT IS STORMWATER?

Living in an urban environment means we're often surrounded by bricks, concrete, and metal – in the form of footpaths, buildings, roads, and car parks. Rainwater that hits these large areas of hard surface cannot penetrate through. Instead, it runs off towards gutters and through stormwater pipes that carry the water directly to our streams, rivers, lakes, and harbours.

Unlike wastewater, **stormwater does not get treated**. This booklet will help you to understand how polluted stormwater affects the environment, and what you can do to ensure only water goes down the drain.



STORMWATER OR WASTEWATER - WHAT'S THE DIFFERENCE?

In towns and cities the **stormwater** and **wastewater** systems are two very different systems. It's important to understand how each works, if we want to protect our waterways effectively.

Stormwater

The stormwater system is designed to prevent flooding by collecting rainwater from roofs and paved areas of ground.

On its way to the gutter and the stormwater drain outside your house, this rainwater picks up pollutants and contaminants including litter, cigarette butts, animal excrement, dust, plant materials, petrol, oil, lead, and other metals or materials left behind on city roads.

The water then travels through a system of underground pipes and **is released directly and untreated into the local stream, river, or sea**. So whatever enters that drain outside your house – whether it's poured in intentionally or washed down with rainwater – enters our natural waterways in virtually the same untreated condition.

Wastewater

The wastewater system (also called a sewerage system) is designed to collect and remove domestic sewage and wastewater from your house. This wastewater is treated to remove harmful bacteria, solids and other pollutants so that it can be disposed of, either on land or out at sea, without impacting on our health or the environment.

Wastewater includes water and liquid wastes from hand basins, kitchen sinks, showers, washing machines, and toilets.

Rainwater guttering down pipe



Stormwater drains in the gutter



Wastewater gully trap



HOW DOES STORMWATER POLLUTION AFFECT THE ENVIRONMENT?

What we dump down our stormwater drains ends up in our natural waterways:



Fuels and solvents: These chemicals damage fish gills, poison animals and burn plants. They can contain carcinogenic chemicals, which build up in the tissues of aquatic animals.

Petrol is also a major fire hazard, particularly in small spaces like stormwater pipes.

Oil: The liquid wastes we get from draining radiators, bleeding brakes and changing car oil contain toxic substances – and these can dissolve in water and poison aquatic life.

Just one litre of oil can cover 100 square metres of surface water, preventing oxygen from entering the water. It can contaminate the equivalent of two Olympic-sized pools of water, and smother birds and other animals that come into contact with it.

Paint, ink and dye: As well as being poisonous to all creatures living in and on the edge of the water, paints and dyes block light from entering the water. This kills off plant life and the animals that feed from it.

Food: As food breaks down in water it uses up the water's oxygen, suffocating any animals that live in the water.

Sediment: Clay, silt and sand wash down from construction sites and subdivisions – and smother streambeds, destroy habitats and choke the creatures that live there. Sediment is one of the most significant contaminants in our waterways.

Concrete, cement and lime: Lime is a major component of cement. When it's dissolved in water, it produces an alkaline solution that burns and kills any animals or plants that it comes into contact with.



Nutrients: The nutrients in fertilisers and domestic sewage can lead to the uncontrolled growth of aquatic weeds and micro-organisms, which choke the waterways and deplete the oxygen supply.

Corrosives: Liquids such as battery acid, some cleaning compounds and cement wastes can damage eyes, gills and skin of fish. They can also kill juvenile fish and burn other animals.

Cleaning products: Detergents and disinfectants can poison and burn aquatic animals, and irritate their sensitive tissues. Even products labelled “biodegradable” or “environmentally friendly” can suffocate fish by depleting the water's oxygen used in biochemical processes.

On average, it takes **the oxygen from 70 litres of water** from streams, lake or the sea to **completely break down just one litre of wash water**.

Heavy metals: Metals such as zinc, copper and lead don't break down in water. They inhibit aquatic plant growth, and they poison aquatic animals by building up in their bodies. These metals then accumulate through the food chain as the smaller animals get eaten by larger ones.

Chlorine: Even in concentrations safe to humans, chlorine can be toxic to fish, insects and bacteria.

Animal excrement: Dog faeces that aren't removed from footpaths and grassed areas can get washed into waterways and eventually into the sea. Once the excrement is in our waterways, it increases the levels of harmful bacteria and viruses.

Litter: Rubbish such as cigarette butts and drink cans take a very long time to break down, destroying habitats and disrupting ecosystems.



HOW DOES STORMWATER POLLUTION AFFECT YOU?

Yes, stormwater pollution creates ecological damage. But it can also be a threat to public health – preventing us from taking part in and enjoying the recreational activities that we've all grown up with.



- Shellfish, eels, watercress and fish can become contaminated by toxins or die off completely – either way, that puts an end to fishing trips and seafood dinners.
- Water activities such as swimming, surfing or water skiing can become hazardous to our health because of the high levels of bacteria and poisons released into our lakes and harbours through polluted stormwater.
- Streams and beaches can become blocked or littered with rubbish carried down by stormwater. This makes them unsightly – and a breeding ground for disease and bacteria.
- Councils' water supply sources can become contaminated from waterways that receive polluted stormwater, making our drinking water costly and difficult to treat.



THE LAW

Under the Resource Management Act 1991, it's illegal to discharge contaminants on to land and water without council authorisation. This means that nothing but clean rainwater can be released on to the ground, into stormwater drains, or into our natural waterways.

Anyone found guilty of causing pollution can face one or more of the following penalties:

- infringement fee of up to \$1,000
- imprisonment for a maximum term of two years
- a fine of up to \$200,000 – with a further \$10,000 for each day the unauthorised discharge continues.

Individuals are responsible for ensuring that their activities do not result in pollution under the Act. This means that everyone must take responsibility for their own actions.

WHAT YOU CAN DO ... IN YOUR WORKSHOP, GARAGE AND DRIVEWAY

Changing your car oil, draining radiators or working with other liquid wastes?

Never get rid of these wastes by pouring them down the stormwater drain... and don't put them into the wastewater system, either. (See "Toxic wastes and the wastewater system".)

Washing your car?

The best way to avoid car-washing pollutants getting into the stormwater is to use a car wash at a service station – their wash water is recycled. But you may be unable to get to a service station, or may prefer to do the job yourself.

Remember it's illegal to wash any equipment or vehicle over the stormwater drain, or to let the run-off get into the stormwater system. Doing this can result in an instant fine of up to \$1,000, or prosecution.

The ideas below can help you make sure that contaminants don't get into the stormwater system:

- If you're replacing old parts such as radiators and batteries, drain all fluids first (and dispose of them as suggested below). Store the empty disused parts on a sealed surface undercover, if you're not going to discard them immediately.
- Oil is recyclable. You can return it to your local service station or to a recycling station, where the contaminants are removed and the oil is reused. Radiator fluids are also recyclable.
- Used antifreeze can be flushed down the toilet – provided your house is connected to the public sewerage (wastewater) system. If your toilet's connected to a septic tank, put the antifreeze in a closed container and take it to the hazardous waste facility. Check with your local council for location details.
- Always use a drip tray when transferring or draining oil, or working with parts that contain fluids. Wipe up any small spills or drips.
- If your car leaks oil or other fluids, repair it as soon as possible to stop these fluids washing down the road and into the stormwater drains.

Toxic wastes and the wastewater system

Materials such as solvents, oils and oil-based paints, paint thinners and herbicides can block pumps and damage pipes both in and outside of treatment plants. They can also kill the bacteria and other organisms required to treat sewage, or contain toxic chemicals which can't be removed by treatment processes.

These ideas will help your car-washing have minimal effect on the water environment:

- Always use cleaning products sparingly, by following the instructions.
- Wash your vehicle on the lawn if possible, so that the run-off soaks into the ground.
- If you can't wash your car on the lawn, channel the water away from the stormwater gutter and towards a grassy area or garden.
- Pour any left-over cleaning water down the laundry sink, or on the garden, instead of down the gutter.
- If your vehicle's a muddy 4WD, remove as much of the dirt as possible at the track before washing at home.
- Conserve water, by using a trigger hose or rainwater from a tank.

WHAT YOU CAN DO ... IN YOUR HOUSEHOLD D.I.Y



Doing some painting?

When you're purchasing paint, work out the exact amount required for the job – and buy only what you need. That way you won't have the problem of storing or disposing of left-over paint.

If you do find yourself with left-over paint, try these suggestions:

- Left-over paint (for touch ups) can be stored in its can for years. Store the can upside down, so the paint forms an air-tight seal around the lid.
- If you'd rather not hold on to the left-over paint, donate it to community or theatre groups or to your local school's art department.

And make sure you clean up safely:

- Equipment used with **water-based paints** can be safely washed in the laundry tub or a wastewater gully trap. Make sure the washing water goes into the wastewater – don't pour it down the stormwater drain.
- Take **oil-based paints** and solvents to your local refuse station, or put them out for collection on your council's household hazardous waste collection days. Contact your local council for more information.
- Small amounts of excess **oil-based paint** can be painted on to cardboard or allowed to dry in their tins. They can then be put into a rubbish bin or an approved recycling bin.
- Re-use **solvents** such as turpentine or brush cleaners – let the paint particles settle, then pour off the clear liquid.
- **Oil-based paints** and **solvents** used for cleaning oil-based painting equipment must **not** go down the stormwater or the wastewater system.

Doing your own plastering?

- All plastering wastes should be allowed to dry at the work site. You can then get rid of the solid waste – either put it in a bin, or take it to a refuse station.
- Solid wastes such as calcium sulphate can also be used as a modifier for gardens, especially those with clay soils.



WHAT YOU CAN DO ... IN YOUR OUTDOOR D.I.Y

Pressure Water-Blasting

The water that comes off the house when you're water-blasting can be full of pollutants – cleaning solutions, paint, lichen, and cement residues.

Use these suggestions to avoid discharging water-blasting contaminants into the stormwater:

- Assess your property well, before you start the job. Can you make sure any run-off water flows on to an unsealed area like garden or lawn, where it can soak into the ground?
- When you're water-blasting your roof, disconnect the downpipes and channel the run-off on to the lawn or garden.
- If you're water-blasting the walls in an area where the ground surface is sealed, again channel your run-off towards the garden or lawn.
- If you can't channel the run-off to an unsealed area and are only blasting dirt or flaking paint, stretch a filter cloth over the drain grate. This will allow the water to pass through and the paint and dirt to be collected for disposal.
- If you're using chemical additives, or the run-off contains oils, fuels and other chemicals, then allow the run-off to flow into a **plugged** stormwater sump where it can then be collected by a liquid-waste contractor. Contact your local council for more information on this.



Concrete, cement, and asphalt.

Wastes associated with cement and asphalt works can't be disposed of anywhere near stormwater drains or natural waterways.



Use the following guidelines to dispose of concrete wastewater properly:

- Divert run-off to a pit, or to a grassed or unsealed area where it can soak into the ground.
- If you're working close to the road or footpath, plug the stormwater sump, and then pump your waste to an area where it can soak into the ground – or get it collected by an approved liquid-waste contractor. Ask your local council for more information.
- Cover any exposed soil, cement or other materials with plastic sheeting, to prevent it from blowing or washing into the stormwater system.
- Cut bricks and pavers over a container that can collect sediment. Then sweep up any debris that's spilled on the ground, to stop it from washing into the stormwater drains.
- If rain's forecast, hold off any work involving cement, lime or asphalt.

OTHER THINGS YOU CAN DO ...

Landscaping your garden? Designing your dream home? These onsite techniques not only help to reduce flooding, but also help to filter pollutants from stormwater before it reaches a natural waterway.

Porous Paving:

Porous paving has a permeable surface. Rainwater slowly passes through the permeable surface, and enters a layer of gravel and crushed stone. Underneath this layer is a specialised fabric that filters oil and smaller particles out of the water before it finally seeps into the subsoil. Many councils use porous paving for footpaths and parking lots, to reduce the amounts of pollutants that get into the soil.

Other permeable surfaces:

You can reduce the amount of impermeable surface area on your property by replacing solid concrete paths with other materials – such as shell, gravel, bark, or paving slabs that have grass or gravel between them. You can also add a grass filter-strip down the centre of your driveway. A grass strip lets water soak into the ground, and also acts as a filter to catch driveway contaminants.

Rain Gardens:

Rain gardens look like any other garden – but they're planted in low-lying areas to improve water quality by removing pollutants from rainwater. The soil in these gardens is carefully structured, so that the rainwater slowly filters through specific layers of soil and mulch.

You also need to be careful about the plants you select for a rain garden. Native grasses and shrubs are usually recommended, because they're less prone to disease and need less maintenance than exotics once established. For advice on creating a rain garden, visit your local council or garden centre.

Rainwater tanks:

A rainwater tank collects the rain that would otherwise be lost as stormwater and stores it for later use, such as watering gardens during dry spells. So it reduces the risk of flooding during heavy downpours *and* it eases the demand for water from the council's water supply.



WHERE THERE'S WATER COMMUNITY ENVIRONMENTAL GRANTS

The pollution that runs through the stormwater drains has drastic effects on our waterways. But fortunately some of this damage is reversible.

Community and school groups passionate about the health and well-being of their local waterways can apply for funding of projects that improve New Zealand's water environment – through the BOC Where There's Water grant programme.

Applications are considered once a year on World Water Day (22 March). Grants of \$1,000 to \$5,000 are available for projects focusing on streams, rivers, lakes, wetlands, estuaries and beaches.

Some of the successful projects carried out by schools and community groups from previous years have included:

- growing plants for future planting on the banks of a neighbouring waterway
- weed eradication and control within the riparian zone of a local wetland
- equipment for scientific monitoring of water quality to determine river health
- painting 'Stormwater Only' signs on public drains.

For more information on applying for a grant, or to read about successful projects, please visit www.nzwwa.org.nz/wheretherswater, email wtw@nzwwa.org.nz, or call 04 472 8925.





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