



MINISTRY OF EDUCATION

Te Tāhuhu o te Mātauranga

New Zealand Government

From

TAKING ACTION



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Down the Drain

by
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Part one: **The problem**

In 2016, students from Wilford School in Petone were snorkelling at Lowry Bay. Under the ocean, they were amazed by all the different forms of life: fish, starfish, seaweed, a stingray ... The 253 pieces of rubbish they found were less impressive.

The students realised that rubbish from Petone town centre was ending up at their local beach. Three students – Harvey, Ethan, and Jemma – decided enough was enough. It was time to do something about it.

Next 



What is stormwater and where does it go?

Have you ever wondered what happens to all the water after it rains? When it rains, water that falls on grass or soil normally soaks into the ground. Water that lands on hard surfaces, such as roofs, roads, or **waterlogged** soil, can't drain away. This is called stormwater.

In rural areas, stormwater **runoff** finds its way into streams and rivers. In towns and cities, it goes down gutters and into drains. From there, it travels through underground pipes to be released into rivers or the sea. Stormwater isn't cleaned, so any rubbish it collects as it goes down a drain will end up polluting the environment.

Wastewater is different from stormwater. Wastewater is the water and solids from kitchens, toilets, laundries, and bathrooms. It flows through a different series of pipes and is cleaned in a wastewater treatment plant. Then it is released back into rivers or the sea.



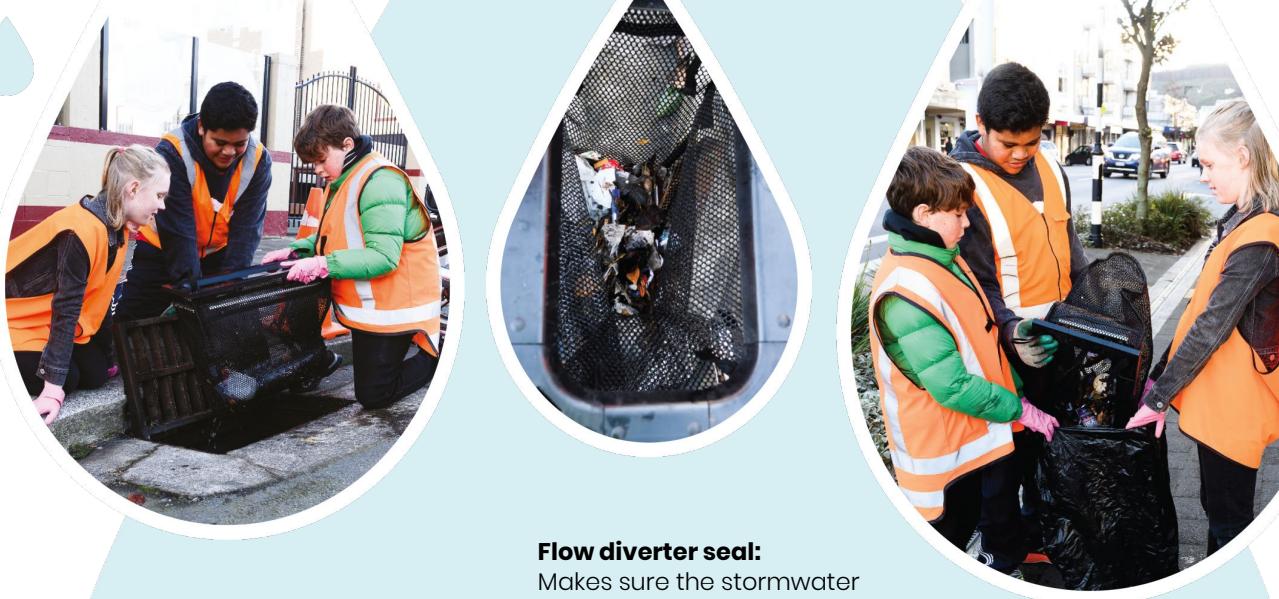
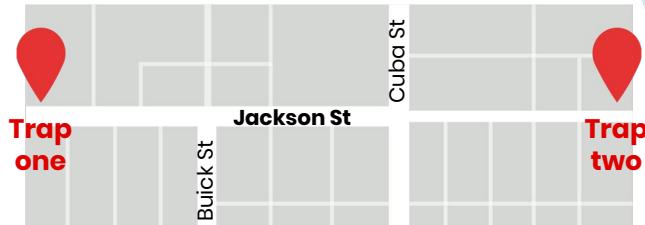
waterlogged – full of water

runoff – water that runs over the surface of the land

Part two: The set up

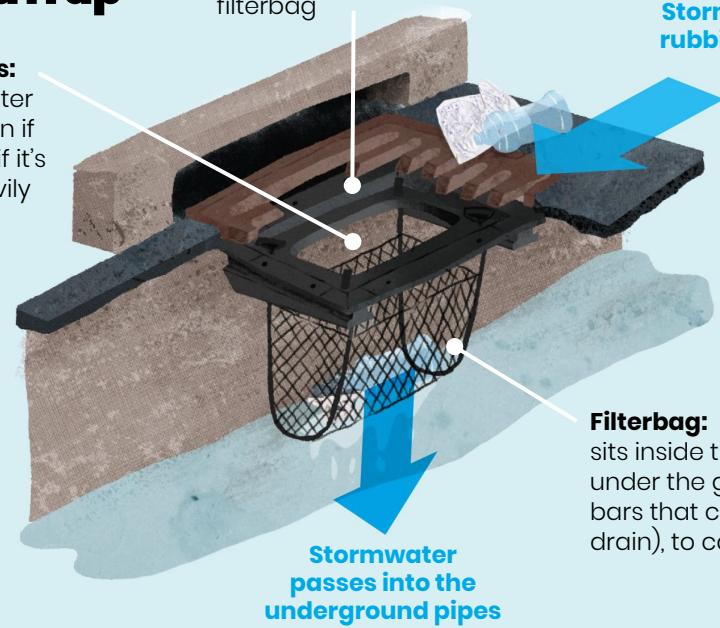
The students found that stormwater was gathering rubbish from Petone town centre and washing it down footpaths and gutters into drains. From there, it was going directly into Lowry Bay. Jemma, Ethan, and Harvey wanted to find a way of catching the rubbish before it reached the sea. They decided to target the gateway that all the rubbish passed through – the stormwater drains.

The students set up traps in two drains on Jackson Street, the main street in Petone. They investigated different technologies and chose the LittaTrap™ because it was easy to use. Trap one was set up outside restaurants and cafes in the shopping area. Trap two was at the far end of the street, surrounded by houses.



The LittaTrap™

Overflow bypass:
lets the stormwater flow into the drain if the bag is full or if it's raining very heavily



**Stormwater and
rubbish flow into
drain**

Flow diverter seal:

Makes sure the stormwater and rubbish goes into the filterbag

Filterbag:
sits inside the drain, under the grating (the bars that cover the drain), to catch rubbish

How long until it's gone?

Rubbish that ends up in the ocean can take a long time to break down.

Part three: The collection

Once a week, their teacher Mrs Webb drove the students to the two sites to empty the traps. They wore hi-vis vests and put marker cones on the street so the passing traffic could see them. Each of the students had a different job.

Harvey took the grating off and lifted the trap out, Ethan tipped the contents of the trap into a rubbish bag, and Jemma replaced the trap in the drain.

Back at school, they put on disposable gloves, laid a large sheet of paper on a desk, and emptied the rubbish bag onto it. Then they sorted the rubbish into categories, such as hard and soft plastics, food, paper, and cigarette butts. They didn't count any **organic** material, such as wet leaves, because it doesn't harm the environment. Lastly, they counted the items in each category and entered the data onto a computer spreadsheet. The students repeated this process for twelve weeks.

organic – from living organisms

Polystyrene:
500
YEARS TO
FOREVER

Plastic straws:
200
YEARS

Food wrapper:
25
YEARS

Cigarette butts:
1-5
YEARS

Glass:
1 MILLION
YEARS

Aluminium can:
80-200
YEARS

Parking ticket:
20-30
YEARS

Library receipt:
2-5
MONTHS

Plastic bottle:
450
YEARS

Nylon fabric:
30-40
YEARS

Wooden blocks:
10-20
YEARS

Cardboard:
2
MONTHS

Part four: The results

At the end of the investigation, the students held an information evening to share their findings with the community. People from Hutt City Council, the Department of Conservation, Wellington Water, and other community groups were there. “They were a bit shocked by the amount of stuff we had collected,” Harvey said.

- In twelve weeks, the students collected 2,680 pieces of rubbish from two drains. That meant 2,680 pieces of rubbish that didn’t end up in the sea.
- Half of these pieces (50 percent) were cigarette butts.
- Other rubbish included plastic, aluminium cans, polystyrene, wood, broken glass, straws, soft drink bottles, parking tickets, library receipts, food wrappers, cardboard, and fabric.
- The stormwater drain outside the cafes and restaurants collected much more rubbish than the drain outside the houses.

The students used a calculator to estimate how much rubbish is sent to Lowry Bay from Jackson Street every year.

The two drains that the students investigated collected 2,680 pieces of rubbish over 12 weeks.

- 2 drains
- 2,680 pieces of rubbish
- 12 weeks

This meant that one drain would have sent about 1,340 pieces of rubbish to the sea in 12 weeks.

$$2,680 \div 2 = 1,340$$

And each week, one drain would have sent about 110 pieces of rubbish to the sea.

$$1,340 \div 12 = 111.67
(rounded down to 110)$$

To work out how much rubbish this is over one year (52 weeks), the students multiplied 110 by 52.

$$110 \times 52 = 5,720$$

There are 93 stormwater drains in and around Jackson Street, all leading to the sea. If one drain sends about 5,720 pieces of rubbish, then 93 drains could send 531,960 pieces of rubbish into Lowry Bay every year.

$$5,720 \times 93 = 531,960$$



Part five: The message

It wasn't always easy for Jemma, Harvey, and Ethan to keep going with their project. The rubbish was often messy and smelly. They collected it at lunchtime and had to catch up on any classes they missed if the collection took longer. It was also scary to present their information to a large group of people.

At the end of the project, all these difficulties made the students feel proud of what they had achieved. They'd taken action over an issue and made a difference in their community. More people started talking about stormwater pollution, and the Hutt City Council donated two Drains to Sea plaques for the students to attach to the drains. These plaques make the drains more noticeable, so people know not to drop rubbish nearby. Students from other schools were even inspired to start similar projects.

For Jemma, Ethan, and Harvey, it all comes down to a pretty simple message.

Don't litter!

Just put rubbish in the bin. Don't dump it on the ground!

We all need to help.

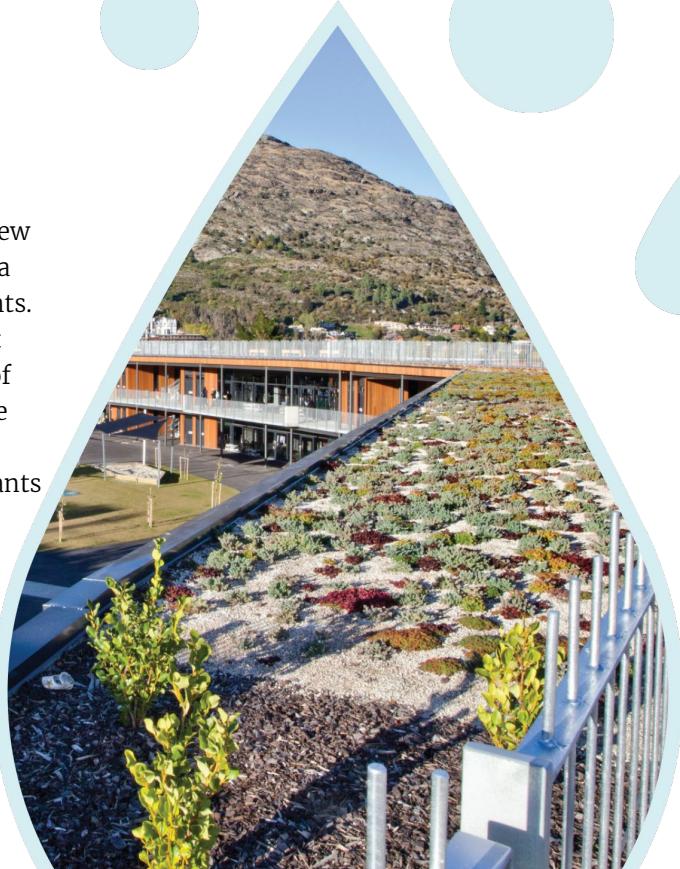


Sustainable solutions

There are lots of ways that we can stop stormwater sending rubbish to our rivers and oceans. One way is to use the stormwater before it disappears down the drain. Communities in New Zealand and around the world are coming up with clever ways to do this.

Green roofs →

Remarkables Primary School in Queenstown has a garden on its roof. It was the first school in New Zealand to build a green roof – a roof completely covered by plants. The plants soak up the rain that would normally flow off the roof and into stormwater drains. The students love showing it off to visitors, especially when the plants are flowering.



Stepped roofs ↑

Bermuda is an island off the coast of the United States. It doesn't have any lakes or rivers, so the people who live there depend on rain for their water. To collect the rainwater, the roofs on their houses have steps on them. The steps slow down the rain as it flows down the roof so it collects in the gutters and doesn't spill off. These gutters then direct the rain into an underground tank. The tanks provide enough water for all the people who live inside the houses – and are refilled every time it rains!

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