

WATER QUALITY LAKES AND RIVERS



**POLLUTION
BUSTERS
CLUB**



Ko te wai te ora o nga mea katoa
Water is the lifegiver of all things

**Tena koutou ngā hoa ma
– Hello Pollution Busters**

This issue is all about our waterways!

There are lots of different things that affect the quality of our waterways, in this issue we are going to learn about some of them. We will also look at positive things we can do to help our water quality and the areas around our streams and rivers. By taking positive action we help the plants and animals that live in them.

Make sure you take part in our competition on page 11; there are some cool prizes up for grabs.

We hope you have a wonderful holiday break and enjoy spending time with whanau and friends.

“Kia u, kia ngākaunui ki ngā mahi pai”
Be steadfast and conscientious in all your good work.

From BuzzBOP and the team at
Bay of Plenty Regional Council.

Water in the Bay of Plenty!

Wai, water, H₂O, is one of the most important things to sustain life on earth. In the Bay of Plenty we are lucky as we have lots of rivers, lakes, streams and wetlands. All of these are taonga (a treasure) to us all.

What do we use our water for?

Our rivers and lakes are used for lots of things, some are listed below. Can you think of any others?

- Water supply – Drinking, showering, washing clothes (any water that comes out our taps)
- Hydro-electricity
- Fun – like fishing, boating and swimming
- Waste water treatment

The Bay of Plenty has more than 16,000 kilometres of rivers and streams – that's about 10 times the length of New Zealand!

The Bay of Plenty has eight major rivers that empty into the Bay from inland catchments, including the Wairoa, Kaituna, Tarawera, Rangitāiki, Whakatāne, Waioeka, Mōtū and Raukōkore rivers.

Rotorua lakes district has one of the highest numbers of accessible lakes in a small area in the world!

easy to get to and use

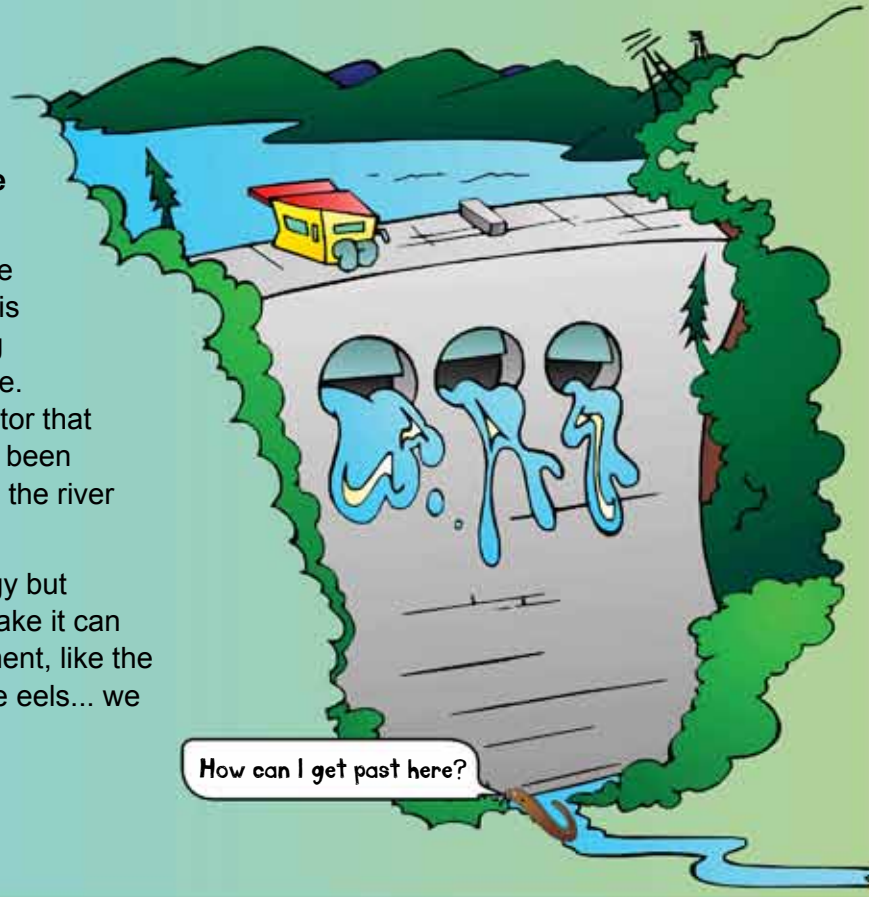
Which river is closest to where you live?

HYDRO ELECTRICITY

Hydropower uses the energy of moving water and gravity to create electricity.

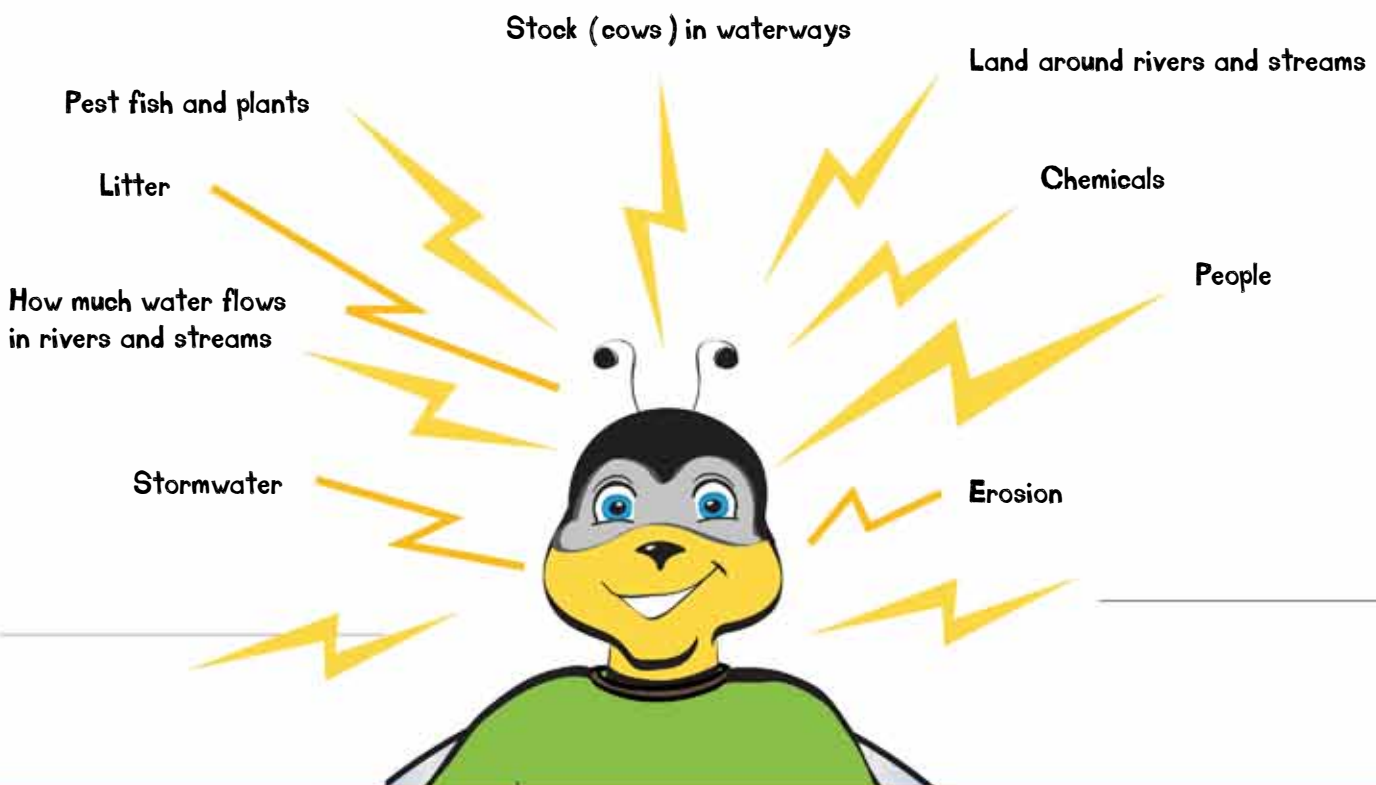
Most hydroelectric power stations use water held in dams. When the water is released the force of the water falling spins the blades of a really big turbine. The turbine is connected to a generator that makes electricity. After the water has been through the turbine, it flows back into the river on the other side of the dam.

Hydroelectricity is a renewable energy but the large dams that are needed to make it can have negative effect on the environment, like the migration of fish species (for example eels... we will learn all about them on page 10).



What affects water quality?

There are lots of things that affect the water quality of our lakes, rivers and oceans. Buzz has had a brainstorm below – can you add any others?



Follow the water!

Have you ever thought about where the water that we use in our homes and schools come from, and what happens to it after we have used it? Follow the water below to find out.



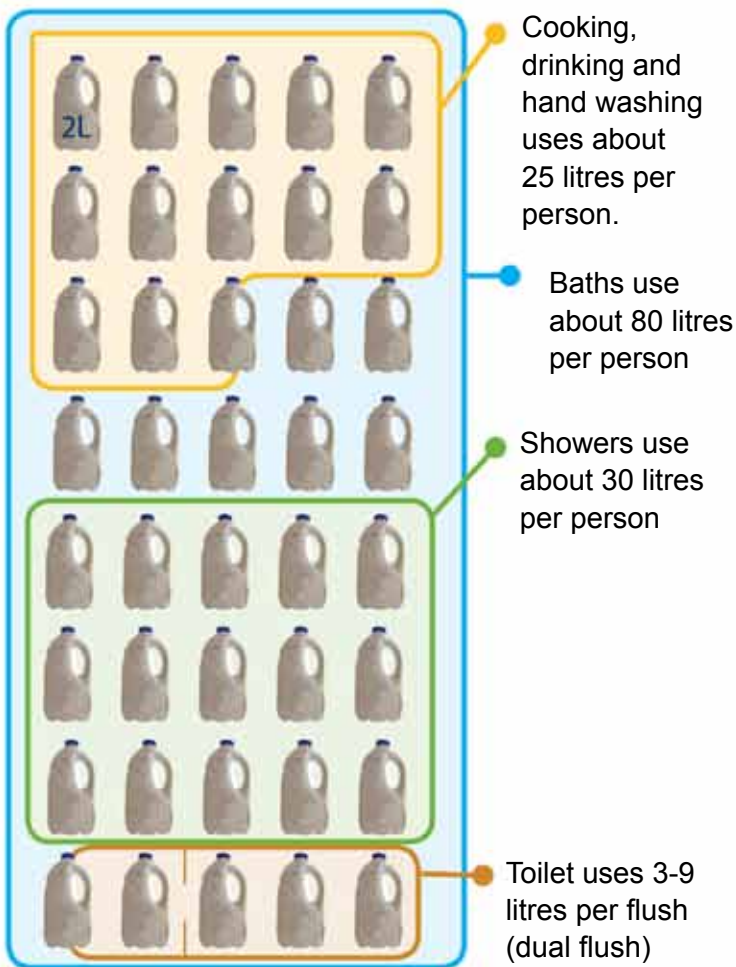
Reduce the amount of water that needs treating!

- Fix leaky taps.
- Only use water when it is needed so turn off the tap while you brush your teeth.
- Wash full loads of washing and dishes.
- Take a shower (instead of a bath – it uses less water).
- Use the half flush on your loo!
- Water your garden at night – or even better collect rainwater to use on your garden.

How much water do we use?

New Zealanders use between 250 and 300 litres of water per person per day! That is a lot of water. We think that with a little effort we could all use less.

Check out how many 2L bottles of water it takes for these every day activities:



- Washing machine, 49-100 litres per wash (depending on how efficient the machine is)
- Dishwasher, up to 35 litres per wash
- Dripping tap can waste up to 3640 litres per year (more than a bath full each week)
- A hose or garden sprinkler can use between 1000 and 2000 litres per hour.

sourced and adapted from www.nrc.govt.nz

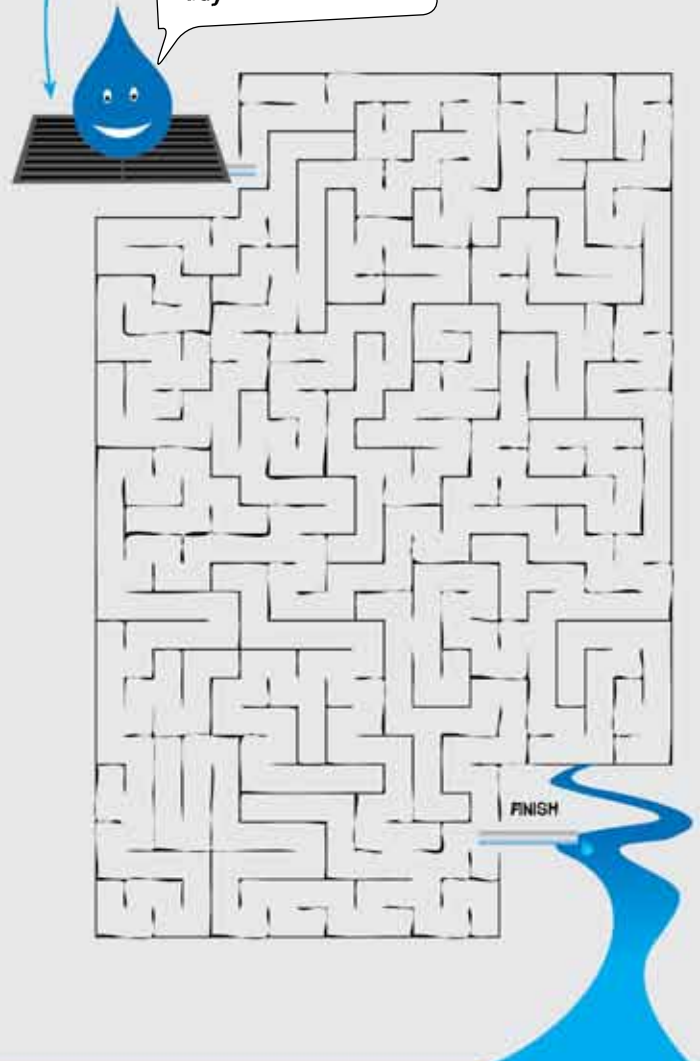
Stormwater drains...

Stormwater drains take water away from buildings and sealed surfaces like roads and car-parks into natural water ways like rivers, streams and beaches.

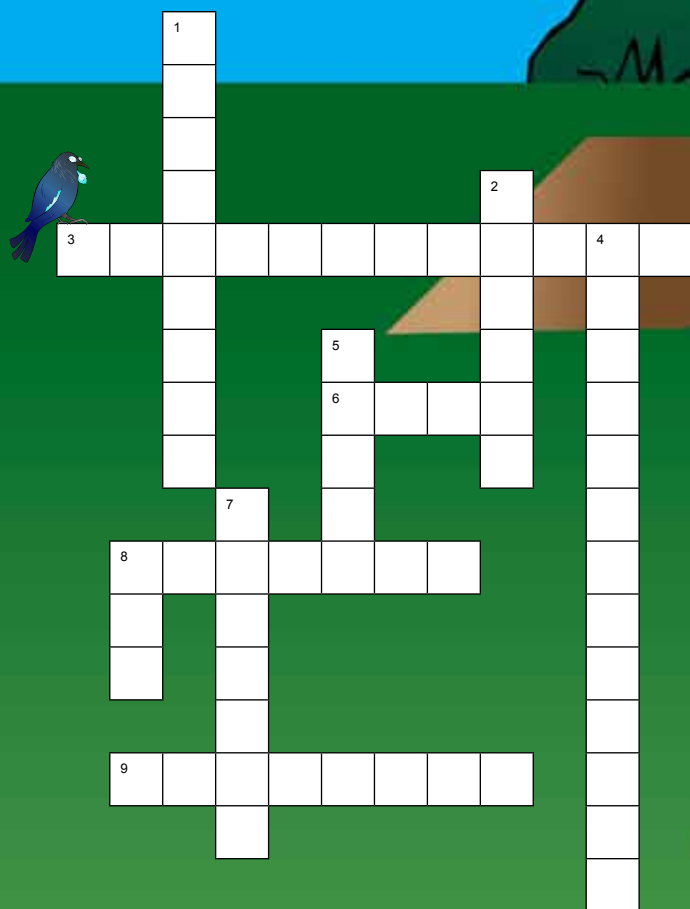
This water isn't treated, so anything (like dirt and oil) that is on the surface will be washed into the waterway. Even litter that goes down the drains ends up in the water – this is not good for our water quality or our plants and animals, their habitats can be damaged or destroyed.

This drain just drains the rain!

Can you help me find my way back to the river?



HOW DO THE DIFFERENT ACTIVITIES AFFECT THE WATER QUALITY OF THE RIVER AND LAKE?



ACROSS

- 3 Lake Tarawera is an _____ lake (12)
 6 Māori name for eel (4)
 8 If it's _____ and black, put it back! (7)
 9 They purify water and are like big spongy filters (7)

DOWN

- 1 Fertiliser has lots of it (9 letters)
 2 Stop the _____ (6)
 3 Small insects without a backbone (13)
 5 What should we keep out of waterways? (5)
 7 Eels _____ to the ocean to breed (7)
 8 Māori word for water (3)

TIP: you can find all the answers in this newsletter.



waimate - dead/stale water

Most rivers used to be bordered by forests filled with birds and insects. The trees gave shade to the fish and other creatures.

rivers and streams

Fertiliser and animal waste
getting into waterways
through the land

Erosion

Riparian fencing

Wetlands

Community planting

Rainwater collection for
watering the garden

Rainwater

Good water
= Lots of birds,
eels, fish and
insects

aquatic pest plants

STOP the
SPREAD



Check, Clean, Dry
when moving between waterways

Rubbish bins

waioira - healthy water

Māori and water

WAI= WATER

The Māori word for water is wai. Can you think of some rivers that start with wai and find out their meanings? Look up Pollution Busters Issue 49 – Water, on www.boprc.govt.nz if you need some help!

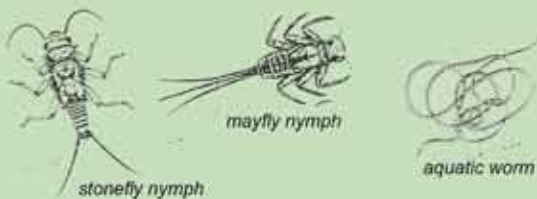
Māori used to use the rivers like roads, travelling by waka (canoe)!

In Māori culture, water is the life-giver, it represents the blood of Papa-tū-ā-nuku, the Earth Mother, and the tears of Ranginui, the Sky Father.

Did you know?

Aquatic Macro-invertebrates (small insects with no backbone) are the insects that can tell you how healthy a waterway is, this is because some of them are more tolerant to pollution than others.

For example in streams with good water quality (lots of habitat, cool clear water and a rocky bottom) you will find mayfly and stonefly larvae, but in more polluted, muddier and warmer streams you will find snails, fly larvae and worms.



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EROSION
INVERTEBRATES
KOURA
LAKE
OLIGOTROPHIC
POLLUTION
RIPARIAN

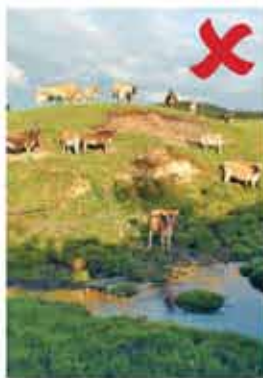
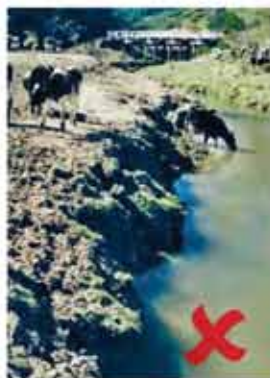
RIVER
STORMWATER
STREAM
SUPERTROPHIC
TUNA
WATERWAY
WETLAND

Water in our lakes and rivers

Rotorua has 12 major lakes that were all created by volcanic activity. The water quality of the lakes is affected by man-made activities and some natural ones. The water quality ranges from oligotrophic (excellent) to supereutrophic (poor). For example Lake Tarawera is an oligotrophic lake and Lake Okaro is a supereutrophic lake. Why do you think this is?

One thing that is affecting the Rotorua Lakes' water quality is farms, or actually the animals. They make lots of poos and wees and the farmers use fertilisers that have lots of nutrients to make the grass grow, these can get washed through or over the land and into the waterways, including streams and rivers that flow to the lakes.

Cow poos have bugs like ecoli and giardia that make the water unsafe and can make us sick.



Fertilisers are sometimes too much of a good thing! In the right place nitrogen and phosphorous are good but when they get washed into the streams, lakes and rivers they upset the balance. They can make aquatic pest plants grow really fast and use up the oxygen in the water, upsetting the food web.

If you want to learn more about the Rotorua Lakes and their water quality go to www.rotorualakes.co.nz.

On the Regional Council website www.boprc.govt.nz you can check the water quality of our lakes and if they are safe for swimming – we know it's a bit cold now but remember it for summer! They also monitor the river levels, lakes, tides and rainfall. So you can go online and see how much rain fell last month or yesterday, or how full the rivers and lakes are.



Riparian fencing can help water quality!

But what is it? Riparian means the banks of a natural course of water. So riparian fencing is fencing out livestock and planting trees along stream banks which will help to stop erosion, stop the poos and wees going in the water and create places for native fish and invertebrates to hide.



floating wetland

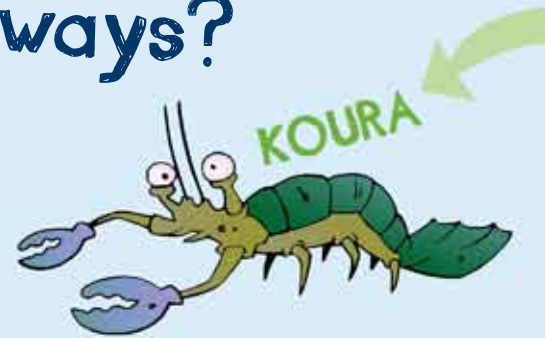
Wetlands for water quality!

Wetlands purify the water and are like big spongy filters, taking out sediment and nutrients that are washed off the land and the plants add oxygen to the water. They also help stop flooding, stop erosion and are home for many plants and animals.

For more information on wetlands go to www.boprc.govt.nz Pollution Busters Issue 47 - Wetlands.



Who lives in the waterways?



EELS (TUNA)

You might think that eels look a bit scary but eels are actually very special, we think once you have learnt about them you will love them too!

In New Zealand we have shortfin eels and longfin eels. Longfin eels are generally black and wrinkle when you bend them. Eels only breed once and migrate to reproduce (have babies) – *check out the longfin eels life cycle below.*

The longfin eel is endemic (found only in the rivers and lakes of New Zealand) which is why it is so special. Shortfin eels can be found in other countries as well.

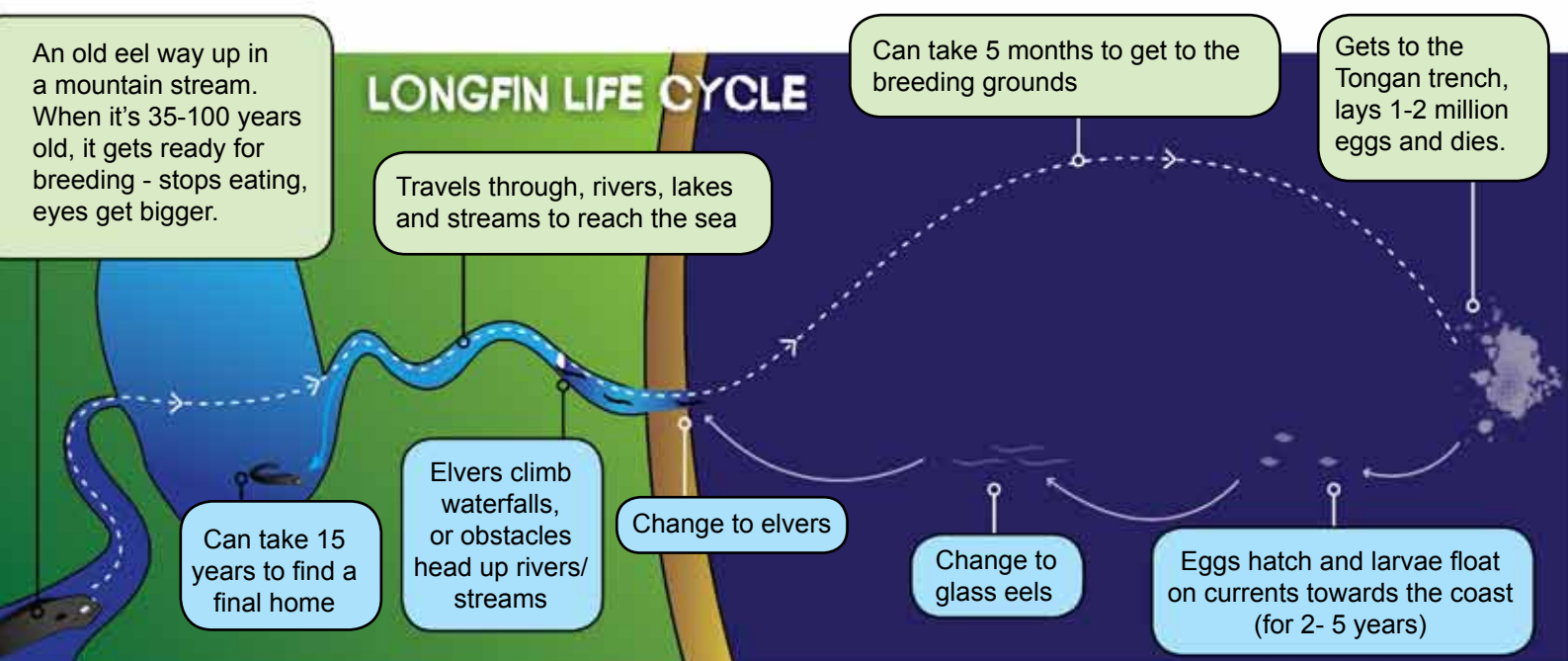
Longfins are threatened and live inland in streams, rivers and lakes but once they are 35 or older (sometimes they could be 90 years old!) they travel all the way to the Tongan Trench in the South Pacific Ocean (about 3000 kms away) to release their eggs and die. Shortfins head towards Fiji for their adventure!

This is why they are so important and their future depends on the big eels being able to return to the ocean to complete their journey and breed.

Other interesting things about Longfin eels:

- Have bad eyesight but good sense of smell.
- Lived in NZ for 80 million years and are endemic.
- Biggest fresh water eel in the world – females grow to about 2m.
- Young ones are called elvers, and they can climb really really high on a wet and not too smooth surfaces (like up a 20 metre high waterfall!).
- Adults can go over land when it's damp and raining because they can breathe through their skin.
- They grow really slowly.
- They release slime when they are stressed. – it also helps protect their skin when they are out of the water.
- Traditionally they have been hunted for food.

Threats to eels: Over-fishing, flood gates, polluted waterways, dams and culverts (stop them travelling inland or on their migration), loss of habitat (drained wetlands), predators (introduced fish). Can you think of any others?



- Koura are New Zealand's freshwater crayfish.
- They are part of the crab family (called crustaceans).
- Have a hard shell with no bones... and really strong claws.
- Live in rivers, streams, lakes and ponds under rocks, roots or in mud holes.
- Usually come out at night to eat baby eels, rotting plants, water insects, worms and some fish.
- Are between 10cm – 30cm (that's as long as this newsletter is tall!)
- Eels (tuna) will eat koura, but big koura will eat little eels!

Aquatic pest plants and pest animals
In Issue 53 we learnt all about pest plants and animals, can you remember what damage aquatic pests do and how they spread?

What can you do to help tuna?

- Pollution – don't do it!
- Hydro dams – have fishways so eels can get past – in some places they trap the eels on one side and take them and release them on the other. (This happens at Matahina dam).
- Have ropes that elvers can climb to get through culverts and over or around obstacles.
- Join a group and help with clean-up and planting of wetlands and stream margins.
- Take less when eeling and let the really big ones go. **Remember - if it's wrinkly and black, put it back!**

If you want to learn more about longfin eels check out www.longfineel.co.nz.

Information sourced and adapted from www.doc.govt.nz and www.longfineel.co.nz.

TAME A WILD TUNA

Find a place on a stream and put the same food into the water at the same time each day.

Try red meat, cheese or twisties. Soon you will find that the tuna will come out of the water to get the food, you might even be able to touch it. But remember to be safe around water – make sure you have an adult with you.



A video how Ngāti Awa are combining mātauranga and science to create an innovative model for a sustainable eel industry. <http://www.sciencelearn.org.nz/Science-Stories/TVNZ-Innovation-Stories/Sci-Media/Video/Innovations-lwi-eel-research>

COMPETITION

On an A4 piece of paper:

Design a poster about improving water quality or helping tuna (eels).

Write your name, address and age on the back and send it before 20 August 2013 to:

**Pollution Busters Club Competition
Bay of Plenty Regional Council
Freepost 122076
PO Box 364
Whakatāne 3158**

Biodiversity winners:
Sophie McCavley, 14, Tauranga
Abbey Simcock, 9, Tauranga
Jordyn Wilkins, 12 Te Puke



Tips for a good poster: Make sure the words are clear and large, draw a simple picture (not too much detail) and use bright colours.

BuzzBOP's Friends

Richard Harris and Annette Munday
Laboratory Technicians

What do you do?

We take samples from streams, rivers, and estuaries to check they are healthy for kids to play in and people to use.

What is the best part of your job?

Getting out and meeting people in the field while we take samples.

What is your message to Pollution Busters?

Be thoughtful of what you do around water ways and what you put in them.



Photos: Richard and Annette with students at the 'How clean is my stream - Hands on Water Expo' at Roydon Downs Farm.

Pollution Busters join up or change of address here

Please have an adult check that the details are correct before you send this.

- ☐ I am a new Pollution Buster
☐ I am already a Pollution Buster but I have changed my address

Name _____

School _____ Birthday _____
day / month / year

Address _____

BuzzBOP and Team
Bay of Plenty Regional Council
Freepost 122076
PO Box 364
Whakatāne 3158

Email: buzzbop@boprc.govt.nz

Write your name, age and address on your letters and on the back of your artwork.

Have you moved and changed address?

If you have moved and changed address, please write or email us so we can make sure you get your newsletter.



MAILBAG! Send your photos, stories, art etc. to BuzzBOP to feature in the club page. (Remember you can also email competition entries, letters, stories, jokes or photos to buzzbop@boprc.govt.nz)



Thanks to the pollution buster who sent us these cool drawings