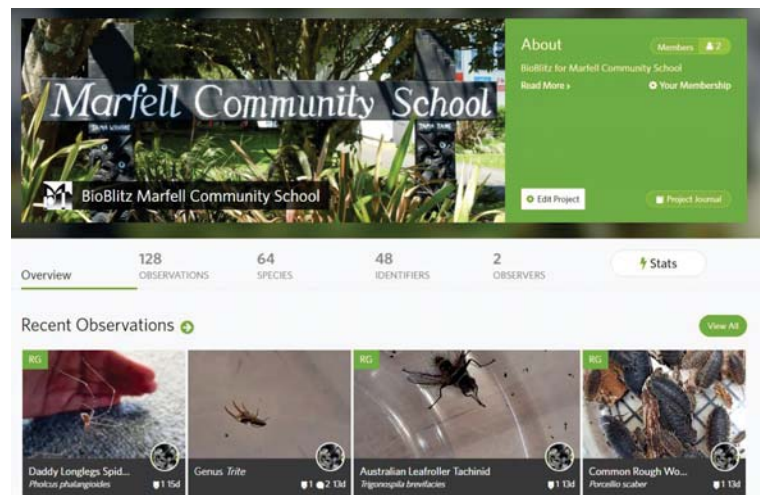
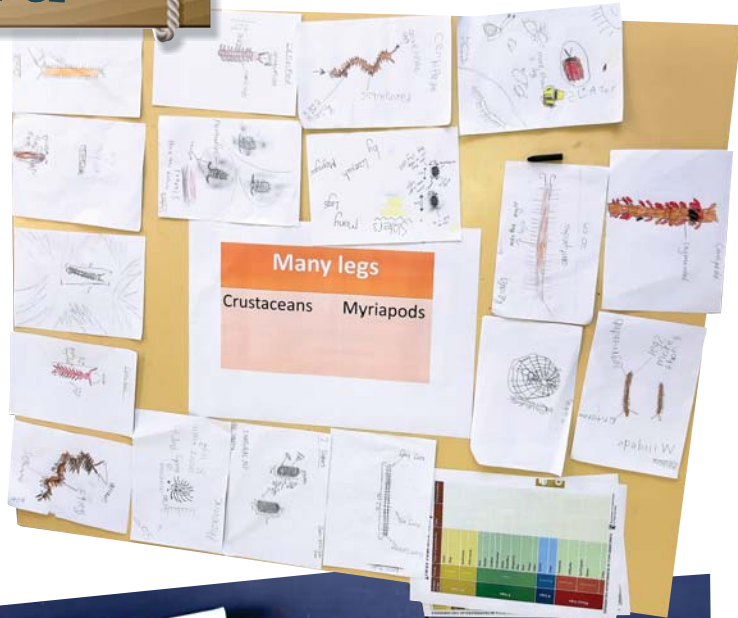




Marfell Community School

Students at Marfell Community School have been busy learning all about invertebrates that live in their school grounds. Following a bug hunt, they classified the invertebrates into different groups based on the number of legs and added photographs and biological drawings to the school BioBlitz on iNaturalist NZ. Through investigating the bugs present in their BioBlitz students were able to assess how healthy the ecosystem was and identify ways to improve habitat around the school for native invertebrates. Tracking tunnels were used to detect predators harmful to native invertebrates, helping guide where best to place traps. Top job!



Tēnā koutou katoa

After a few months away, it's great to be back on board and in full swing working with schools around Taranaki. This last term I've worked with a number of schools on topics involving invertebrates, both in streams and on land. These spineless creatures make the ideal topic for investigation as they are everywhere. They are relatively easy to survey using some simple hands-on methods, providing a great way to engage the whole class. There are a number of key environmental concepts that can be thread through analysis and interpretation of survey results including understanding biodiversity, identifying goodie natives and baddie pests and assessing the effects of pollutants on the ecosystem.

In addition to studying bugs close to school, you might want to consider an invertebrate-related field trip. There are some great options for this around Taranaki, including Pukeiti Rain Forest (education@trc.govt.nz) and predator-free Rotokare Scenic Reserve (educator@rotokare.org.nz). This newsletter only scratches the surface of what's possible; there are lots of great options and resources when it comes to investigating mini-beasts.

Nominations for the 2021 Taranaki Regional Council Environmental Awards are now open. These awards are made in five categories including Environmental Action in Education. For more details see www.trc.govt.nz/enter-awards-2021

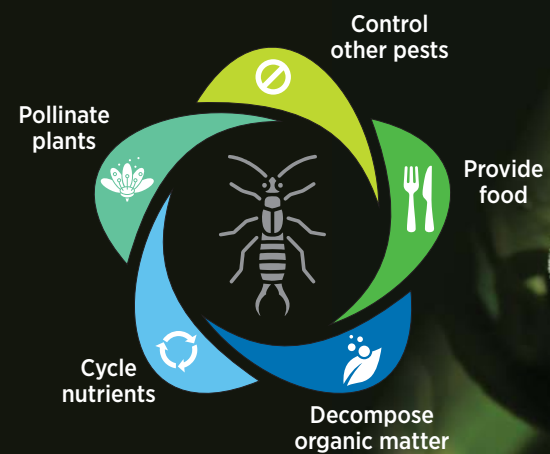
Naku noa na,
Dr Emily Roberts

Invertebrates

There are so many reasons to study invertebrates. To start with, they are outrageously diverse. Did you know that 97% of all known animal species are invertebrates? The diversity of beetles is particularly bonkers. There are more species of beetles on earth than plants! In New Zealand alone there are over 4,500 named beetle species, more than all mammal species worldwide!

Many of our New Zealand invertebrate species are endemic (only found in NZ). There are quite a few species, particularly the big juicy flightless ones, that are at risk of extinction as a result of being munched by introduced predators. For this reason, invertebrates are a great way to help students understand the importance of predator control and get actively involved in trapping programmes including Towards Predator-Free Taranaki.

We absolutely rely on invertebrates to carry out a number of crucial roles so we'd be in a lot of trouble without them. Invertebrates are ridiculously important because they:



Water Quality Monitoring with

Merrilands School AND Oakura School

We were able to work around the weather to monitor water quality and macroinvertebrates in the Te Hēnui Stream with Merrilands School and in the Timaru Stream at Pukeiti Rainforest with Oakura School. We found an abundance of macroinvertebrates at both locations and even some native fish that love to feed on the aquatic bugs.



Recognising environmental champions

If you know of a school or class that have accomplished wonderful things for our environment – nominate them now!



www.trc.govt.nz/enter-awards-2021

Emily Roberts
Education Officer
Taranaki Regional Council
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Using invertebrates to assess ecosystem health

Invertebrate species vary in their tolerances to pollutants and other environmental factors affecting ecosystem health. For this reason the types of invertebrates present can be used to indicate the health of an ecosystem.

Here are some of the aquatic invertebrates we found last term:

Freshwater invertebrates

Taranaki freshwater environments provide home to more than 150 species of aquatic invertebrates which include different types of insect larvae, crustaceans, molluscs and worms. They live under rocks, plants, wood and other debris and are surprisingly easy to sample with just a sieve, scrubbing brush and tray.

Aquatic invertebrates differ in their tolerance to pollution. Some aquatic invertebrates including most mayflies, stoneflies and caddisflies are sensitive to pollution and are usually found in healthy streams. These species are given high scores, with the most sensitive types scoring ten out of ten. Others are more tolerant of pollution including worms, midges, snails and leeches. These species have much lower scores, with the most tolerant scoring only one out of ten.

The overall health of a stream can be assessed using the Macroinvertebrate Community Index. This can be calculated by identifying the different types of invertebrates present and assigning scores. Add all of the scores together, divide by the number of species found and multiply by 20. A higher Macroinvertebrate Community Index generally indicates better stream health:

excellent	>119
good	100-119
fair	80-99
poor	<80



Large green stonefly
Stenoperla prasina
Oakura School
Timaru Stream



Spinygilled mayfly
Coloburiscus humeralis
Merrilands School
Te Hēnui Stream



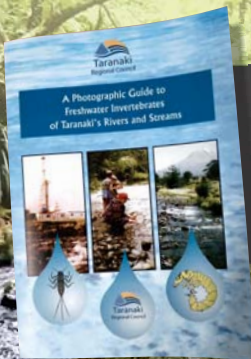
New Zealand dobsonfly
Archichauliodes diversus
Oakura School
Timaru Stream



Stick caddisfly
Triplectides
Merrilands School
Te Hēnui Stream



New Zealand mudsnail
Potamopyrgus antipodarum
Merrilands School
Te Hēnui Stream



Tolerance scores for most Taranaki aquatic invertebrates can be found in 'A Photographic Guide to Freshwater Invertebrates of Taranaki's Rivers and Streams'. Get in touch if you'd like a hard copy.

Invertebrates close to school

Green spaces within school grounds and areas of bush close to schools can make fabulous locations for bug hunts. 'Experiencing invertebrates in your green space' is a great Department of Conservation education resource that provides top tips on how to look for bugs and how to identify them. For more detailed identification, add your invertebrate observations to iNaturalist NZ. In addition to experts helping you identify the bug to species or genus level, this website will also indicate if it's endemic, native or introduced and provide a permanent record of your observation.

Once you know what species are present you can assess how healthy the ecosystem is using the table below:

Healthy ecosystem	Unhealthy ecosystem
A wide variety of invertebrate species	Few invertebrates and not many species
Leaf litter filled with invertebrate life	Leaf litter has not much living in it
Beetles and/or wētā found	Beetles and/or wētā not found
Lots of native/endemic invertebrate species	More introduced invertebrate species than native species
Pollinator invertebrates found including bees and butterflies	Not many pollinator invertebrates
Insect calls heard during warmer months, especially at night	Not much insect noise
Land hoppers found in leaf litter	Land hoppers not found



KEY ● Endemic ● Native ● Introduced

Get your class planning ways to improve habitat for native invertebrates. Consider:

- ✓ Predator control
- ✓ Providing safe shelter
- ✓ Planting for pollinators
- ✓ Not using chemicals that harm invertebrates