

June 2009

From the EDITORS

Some of you may be finding your EBox boxes are getting rather full. If so, please let us know and we will send out a new box for you.

This issue of 'Your environment, Canterbury' is on a topic that could challenge some and hopefully prepare all — community resilience! What's that all about then? It is all about how well we adapt to change, and in this instance, to environmental change. The shake of an earthquake, a threat of floods and the global warming of our planet can all be a bit scary and daunting. So being ready is what it is all about! And, on a positive note, it is also about what we can do now to reduce the impact of environmental change.

Please contact us for further information or to make comment on EBox issues. We welcome your thoughts. Our contact details are below:

Sian Carvell, Andrea Creighton
and Paul de Spa
Christchurch Office, 58 Kilmore St
PO Box 345, Christchurch 8140
Ph: (03) 365 3828 Fax: (03) 365 3194
education@ecan.govt.nz
www.ecan.govt.nz/education

Debbie Eddington
Timaru Office, 75 Church St
PO Box 550, Timaru 7940
Phone: (03) 687 7800 Fax: (03) 687 7808
education@ecan.govt.nz
www.ecan.govt.nz/education



Are you ready?

Change is in the air, all the time, everywhere! Sometimes you are prepared for it and sometimes it is unexpected. But no matter what, it is a sure thing. In the words of Heraclitus, 'There is nothing permanent except change'.

Change can come in a number of disguises. When it comes to the natural environment, it can be sudden and unexpected like an earthquake, flood, or snowstorm, or more evolving such as a pandemic or climate change. But often, no matter what degree of warning we may have, it can mean change to the normal way of doing things. The more prepared we are as individuals and as a community, the more resilient we become.

In this issue of 'Your environment, Canterbury' we bunker down and contemplate how our changing world impacts on the way we do things now and in the future.

We discuss just what it means to be resilient, examine regional environmental threats, and highlight examples of communities which have successfully adapted to change or are setting themselves up to become more resilient. And, lastly, but most importantly, we look at how you, your family, and community can become confident and prepared for environmental change, and actions we can all take now to reduce the impact.



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Being ready!

Resilience is about being *ready, prepared for* and *adapting to* whatever change comes along – big or small, short or long term.

Resilience includes ideas based on sustainability, systems and community problem solving. Resilience is about cooperation and communication across the whole community – schools, government organisations, businesses and community groups. Increasing resilience helps communities adapt to change in a positive way. Making our communities more resilient will significantly decrease the time it takes us to recover after an event, e.g. a natural disaster or threatening event.

Did you know?

Sustainability is about meeting the needs of today, without compromising the ability of future generations to meet their needs. It can be applied across a range of areas, such as the environment, society and the economy.

Let's define it!

In common use **resilience** usually refers to the ability to 'bounce back' after shock. It is also the 'thinking' behind our actions, e.g. what new systems can we put in place? How can we benefit from this change? Who and what do we need to help us?

"Resilient adj. 1 resuming its original shape after compression etc.
2 readily recovering from a shock, illness etc; buoyant."

New Zealand Pocket Oxford Dictionary (2nd Edition, 1997)

There is also a deeper understanding of 'resilience' which has come from studying ecological and social systems. This idea includes the ability to learn from change and to adapt and benefit from change.

As we have said, resilience is about being *ready, prepared for* and *adapting to* change.

Preparedness refers to the state of being prepared for certain or unpredictable events or situations. It relates to the things we can 'do' before an event takes place, e.g. make plans, write lists, pack survival kits.

Preparedness is important in helping to achieve goals and in avoiding and reducing negative outcomes. It is a major part of emergency management and is particularly important in competitive areas like sport and military science.



Activity

What does it mean to be resilient and prepared?

Getting ready for change leaves us with two options:

- To carry on and make the most of the change
- If the change is not good, to ask – what can we do about it?

Discuss with the students what things have happened in their lives that have meant they had to change the way they did something or adapt to something new, e.g. school sports day or an important competition cancelled

due to bad weather; the teacher started the class with a pop test and you hadn't studied; you miss the school bus or are late for a school trip. On the board or on pieces of card have the following questions:

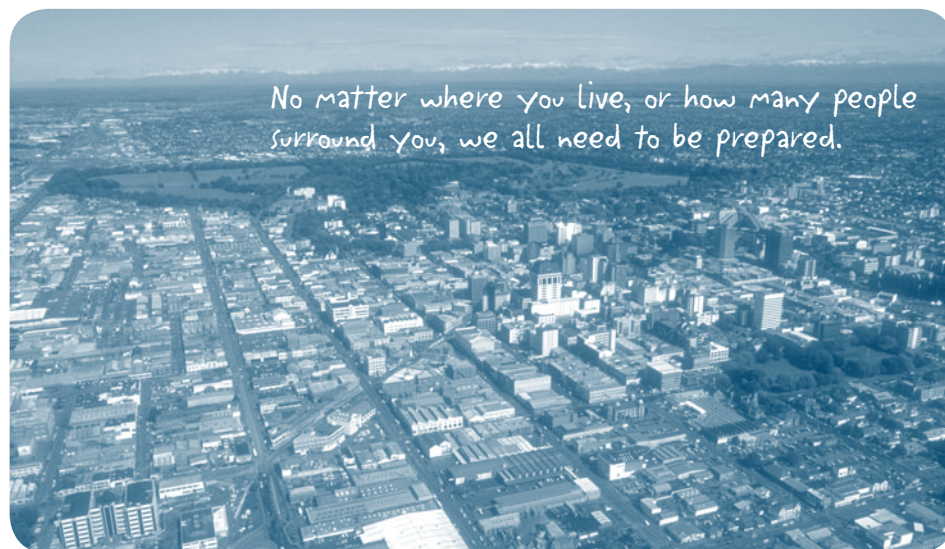
- Could you have been better prepared?
- How will things be different after this event?
- Did you change the way you do things after this event?
- How did it impact on you?
- Did you get any help? Where from?



What is community resilience?

A resilient community is a city, town or neighbourhood that reduces its vulnerability to dramatic change or extreme events, and responds creatively to economic, social and environmental change, in order to increase its long-term sustainability (www.un.org/en/).

Phew! That's a long explanation but basically, resilience helps make communities more able to respond to economic shocks from things like banking collapses, as well as changes resulting from natural events and disasters. It's about how well we adapt to change.



Key factors in community resilience

Making a difference

It is important to remember the small things we do (both at home and in the community) can make a difference to ourselves and our families. We do have the skills and the resources! It's all about working together, sharing resources and knowledge and becoming empowered in the face of change.

Participation and empowerment

Communities need to be involved in identifying their problems and helping decide solutions for themselves. Motivating and empowering communities means they can develop their resilience and ensure their sustainability.

Leadership and trust

Knowing who and where to go to for help before (and after) a major event is very important. While there are organisations and groups set up to help us, our families and communities in times of need, we also need to be prepared ourselves so we can look after ourselves and our families if help cannot reach us straight away.



A resilient community is one which:

- After major physical, environmental or economic events is able to maintain services and general wellbeing
- Has the ability to survive and can improve without relying on external aid
- Creates the capacity to be self-sufficient
- Is in a good position to help neighbouring communities when crisis hits
- Builds in resilience at a local level, increasing the region's capacity to withstand shocks or even potentially severe changes facing society
- Extends preparation for disaster recovery beyond the immediate aftermath of a disaster, to long-term recovery
- Is prepared in the face of long emergencies like climate change and oil depletion.

Ideas from www.resilientpathways.org.nz

← As a community, we support each other

Canterbury



Did you know?

An ecosystem is the plants and animals within an environment and the interactions between them.



Activity

Word unscramble

Unscramble the following words and match them with their meaning.

asbsuatiiniitly

meeting the needs of today, without compromising the ability of future generations to meet their needs.

cnereilis

the ability to 'bounce back' after shock – it's about being ready, prepared for and adapting to change.

dreaerpp

things made ready for a specific purpose, e.g. an event or occasion.

tisesrda

event that causes significant loss or damage to individuals and communities.

gmrenecye taangemmen

range of measures and/or procedures to cope with risks before, during and after an emergency or disaster.

tdapa

to adjust or change an individual/community to suit new or different conditions.

tipcaacy

a combination of all the strengths and resources available in a community which can reduce the amount of risk, or the effects of a disaster.

Answers

sustainability, resilience, prepared, disaster, emergency management, adapt, capacity.

Eco-logic?

Ecological systems are a great example of resilience and adaptation to change. There are many examples in New Zealand and in Canterbury. Ecosystem resilience simply means how well an ecosystem can cope with disturbance without collapsing and completely changing the way it works. A resilient ecosystem can survive shocks and changes and rebuild itself when necessary. Natural systems are all designed to be resilient to some extent. However, just as their capacity to cope with change can be reduced, it can also be improved. We could say the same for people and the communities we live in.

The unique Canterbury mudfish/kowaro demonstrates resilience and has an amazing ability to adapt to change. Wetlands and lowland streams are its natural habitat. Because these environments are exposed to changing water levels, under drought conditions for example, mudfish have developed a way of surviving during these tough times. They burrow into mud or under logs to keep moist. Although not ideal, under extreme pressure they can survive like this. Mudfish have also adapted to living in artificial environments like water races and drains – necessary as over the last 150 years people have destroyed much of their wetland habitat and introduced mudfish predators, like trout, to rivers and streams.



Canterbury mudfish/kowaro

But there are limits to the mudfish's resilience. Burrowing works during a drought, because a drought is a cyclical change – the water does come back. However, habitats are permanently destroyed through human land-use changes, this overwhelms the mudfish's capacity for resilience. As a result, mudfish are now a seriously threatened species.

Being resilient and preparing for change will only take us so far... we also have to be careful to look after the environments that support life – the creatures around us and us!

Of course, humans are also part of the natural world. Resilience within our communities may have the added capacity humans can bring, but we still depend on ecological systems for our survival. We continuously impact on the ecosystems in which we live, on a local and a global scale. It is up to us to make sure we share and manage the earth's resources so we can adapt to changes and plan for the future in a sustainable way.

What the...?

The human body is also an example of resilience and adaptation to change. Because it's so cold in Antarctica – your hair grows twice as fast when you are at the South Pole!

Crisis or creativity

Science tells us there are big social and environmental changes on the way. They include changes relating to energy, climate, water, food and pollution. We have discussed this a little already. Sustainable resilient communities are a possible solution. This means moving towards smaller local communities providing for themselves and developing solutions and alternatives that are creative and meet local needs, e.g. energy and food needs. Project Lyttelton in Christchurch is a great example of working towards this.

The soul of a sustainable community

Project Lyttelton is a non-profit organisation committed to building a sustainable, connected community. Through a range of exciting projects, Project Lyttelton is harnessing the power of community.

Some of their community projects include: local food production (including community gardens and a farmers' market), looking at ways to meet energy needs through creative community solutions, reducing waste, creating occasions for people to come together for fun, and information and skill- sharing (the Lyttelton Timebank).

For more information visit www.lyttelton.net.nz

Putting it all into practice

What does it mean to be prepared and resilient?

In New Zealand, earthquakes, floods, storms, volcanic eruptions – as well as non-natural threats – all have the potential to damage and destroy. Although these events have always occurred, the accelerated changing of the earth's climate, due to human activities, means more extreme weather events are likely. All of these changes have high economic, social and environmental costs.

Although we cannot prevent most disasters, it is important we understand them and what they can do, and understand the steps we can take to ensure we are prepared and able to cope – if and when they do occur. The more we are aware of and understand the risks, the better prepared we, and our families, can be.

Some disasters may be preventable, for example we can make sure we don't build houses in high risk areas such as flood plains, and we can act to reduce emissions of greenhouse gases responsible for climate change. However, there are others that are, of course, not preventable, e.g. earthquakes and storms.

Experience around the world has shown that where people are aware of the risks around them and have prepared a plan for their response, the injuries, damage and resulting trauma are significantly reduced.

Reducing the risk – making ourselves aware

What is an extreme natural event?

Floods, droughts, storms, tsunamis, earthquakes, landslides, coastal erosion... all these events could and do occur in Canterbury, affecting our environment as well as our communities and individual people. Other natural events include volcanic eruptions, tornadoes and hurricanes, though these are not likely to occur in Canterbury.

It is important to remember that although we can't stop these threats from occurring, we can be prepared in order to lessen the chances of being hurt or completely devastated.



Did you know?

A threat is a source of risk or danger. A non-natural threat refers to something caused by human activity.



Activity

Begin with a brainstorm...

- Ask students to list all the threats they can think of and then to divide them according to whether or not they think they could occur in Canterbury.
- Divide the class into enough groups to give each group a natural threat (that could occur in Canterbury). Send them to the library or to look up the internet to find out a little more about their specific threat and then present findings back to the rest of the class.

Natural events can happen anytime, anywhere...



Canterbury



What the...?

Magnitude refers to the size and strength of an earthquake. Earthquakes can be measured on the Richter scale, which measures the amount of energy released at the source (epicentre) of the earthquake or by the Modified Mercalli intensity scale (MM intensity scale). This is the measure of an earthquake's strength, based on effects on people and structures.

Risky business

Some places in Canterbury are more prone to threats than others, for example places near beaches, rivers, lakes or hillsides. These areas are often where people choose to live because they are likely to have high scenic or recreational value.

People who live in these areas are putting themselves at risk. Threats will occur – they are natural after all. So when we knowingly choose to live in a risk area, we must be prepared for the consequences. If you think you're safe, think again... everybody who lives in Canterbury could be at risk.

All shook up – earthquakes in Canterbury

Canterbury regularly experiences small earthquakes – less than 6 on the Richter scale. This is not surprising when you realise the Canterbury Plains and foothills flank the Southern Alps/Ka Tiritiri o te Moana. This alpine fault is the largest active fault in New Zealand and is over 500 km long. Large earthquakes along this fault uplifted the land, forming the Southern Alps.

The West Coast, sitting closer to the alpine fault line than Canterbury, has experienced the strongest earthquake in New Zealand's recorded history.

In 1888, in North Canterbury, a shake measuring 7-7.3 saw the Christchurch Cathedral steeple break off, but little serious damage was reported. Three years later, in November 1901, a 6.9 earthquake centred on Cheviot created chaos, as chimneys crumbled and buildings collapsed.

The Selwyn District has experienced around 30 significant earthquakes (measuring 6 or greater on the Richter scale) since 1840.



Did you know?

There is a 65 percent chance that a magnitude 8 earthquake will occur on the Alpine Fault (along the Southern Alps) within the next 50 years!

What do we do during an earthquake?

- Drop, cover and hold.
- Stay where you are until the shaking stops.
- If inside – remain inside; if outside – stay outside.
- Do not attempt to run outside.

New Zealand experiences around 200 earthquakes a year. Not all are big — most you wouldn't even feel!

Earthquake effects

Shake, rattle and roll

Shaking or movement of the ground will damage roads, bridges and buildings, and it can cause landslides.

Landform change

The earth's surface can become distorted. This normally results, over time, in the formation of hills and mountains.

Liquefaction

Land loses its consistency and acts like water.



Try this! Liquefaction in action...

Next time you go to the beach, take a walk on the wet soft sand left behind after a wave races back to the sea. Gently put weight on your foot and wriggle it about. Watch what happens. The mixture of sand and water moves under the pressure of your foot, and your foot sinks into the wet sand. Liquefaction is much like this. Watch out for the next wave!

Rain, rain, go away!

Floods are one of New Zealand's most frequent disasters. They can occur as a result of storms and heavy rain, causing rivers to overflow their banks. There are three main types of flood:

- Some rivers have periodic floods, forming flood plains.
- Flash floods occur with little advance warning and are caused by intense rainfall in a relatively small area.
- Coastal areas can occasionally be subject to floods from the sea caused by unusually high tides or a tsunami.

For more information visit www.whatstheplanstan.govt.nz

Well, what do we expect when we live on a flood plain! The Canterbury Plains were formed over thousands of years of our rivers flooding and changing course – which they do naturally – bringing down sediment from the mountains and depositing it on the plains.

We might think we're safe but are we? Let's take the Waimakariri River, for example. It could flood, breach its stopbanks and overflow into the Avon River, causing major flooding in Christchurch. In 1869, one newspaper wrote, "in colonising the country we must first civilise the river..."

What happens in a flood?

In rural areas:

- initial floodwaters will erode land and damage buildings, but fine fertile alluvial soils will be deposited when floodwaters recede
- loss of life, wildlife and stock as well as property damage is likely to be high, as a result of short warning times.

In urban areas:

- by the time floodwaters reach the large coastal urban areas much of the energy from flooding rivers is reduced
- as a result, warning times are longer, and the threat to life is lower than in rural areas
- because of the concentration of development and investments, the total cost in damages could be greater.



In the classroom

Identifying disasters

Collect a range of pictures of disasters. Look through books, magazines, websites etc. As a class, or in small groups, discuss these images. Use the following questions to guide discussion:

- What do you think might be happening?
- Why do you think this happened?
- If there are people in the pictures, how do you think they are feeling?
- What could they have done to prepare for this disaster?
- What do you think they might do next?
- Is this an example of a natural or non-natural disaster?

Students could then write about and draw these images, describing how the people might feel and what caused these effects. Present the writing in different ways so that students can read what others have written.

Activity adapted from www.whatstheplanstan.govt.nz

Canterbury

A case in point – the July 2008 storm

On June 30 2008 a large storm hit the Northland region. It brought huge amounts of rain, strong winds and intense thunderstorms. The whole country experienced local flooding and power outages due to strong winds.

Canterbury experienced heavy rains, and the districts from Kaikoura to Ashburton were severely affected. Coastal rivers burst their banks and flooded parts of Kaikoura and large landslips blocked off State Highway One, from both the north and south.

The strong winds generated extreme storm surges along the coast with 6- to 8-metre swells crashing onto the coast line. Off the Banks Peninsula coast the largest wave ever recorded (14.6 metres!) struck a buoy.

The Amberley and Leithfield beach settlements were both evacuated to welfare centres in Amberley township. Surface flooding created lakes and ponds throughout the region and it took months for these lakes to drain away.

While this storm was an uncommon event, a similar event occurred just three weeks later, in August 2008. This one had less wind but brought more rain to the region, and only Kaikoura, Hurunui and Waimakariri districts were affected. One farmer recorded 500 mm of rain in 24 hours on his farm!

Overall the two events caused havoc across the region and cost millions of dollars in repair bills for the damage.



Did you know?

As Canterbury is dominated by agricultural land, lack of moisture is a serious threat to our way of life and economy.

Rain, rain, come again! The threat of drought

During summer in Canterbury, the rates of evaporation can exceed the amount of rainfall three times over.

Because droughts are slow to develop, can be around for a long time and end gradually, people often ask...

We declare a drought:

- when it's been a long time since a substantial rainfall
- when our water storage evaporates faster than it can be refilled
- when soil becomes so dry so that it either gets eroded away or is not useful for production.



"At what point do we declare we have a drought?"



Activity

Fill in the gaps from this list of words.

Fire, livelihoods,
livestock, habitats,
drop, nor' west,
stunted

What happens in a drought?

- people's _____ can be threatened
- wildlife _____ are affected (lack of food and water)
- reduced crop growth, tree growth could be _____
- fodder for _____ could be affected
- soil would be vulnerable to wind erosion, particularly from the dry _____ wind
- increased _____ risk
- hydro lake levels could _____ causing pressure on electricity generation

Tsunami – this is not one to surf!

Tsunami (pronounced soo-nahm-ee) is a series of huge waves that happen after an undersea disturbance, such as an earthquake or volcano eruption. (Tsunami is from the Japanese word for harbour wave.) The waves travel in all directions from the area of disturbance, much like the ripples that happen after throwing a rock.

What can happen when a tsunami strikes?

- Roads, bridges, piers and buildings could be damaged or destroyed.
- Harbours and ports could be severely damaged due to deep waters allowing the tsunami to retain more energy.
- Low-lying land could be flooded with saltwater.
- Any person caught too close to the coast runs the risk of being swept away. 2,200 people died in the Papua New Guinea tsunami in 1998.



...but surely not in Canterbury?

Afraid so! A tsunami is a very real and threatening threat to the Canterbury coastline. If there was an earthquake in South America it would take the tsunami 12 hours to travel across the Pacific Ocean to New Zealand. We would have one hour of warning because that is the time it takes to reach our coast from the Chatham Islands.

In our own backyard

Research shows that an earthquake off the Kekerengu Bank Fault, 35 km off the north Kaikoura coast, poses the largest local tsunami hazard to coastal areas north of the Kaikoura Peninsula, particularly around Kekerengu and the Clarence River mouth.

There is a different local source for the area south of the Kaikoura Peninsula between Oaro and South Bay – an underwater landslide into the Kaikoura Canyon. The head of the canyon is only 1 km offshore at Goose Bay and the sea bed drops away very quickly to over 2000 metres deep. Research shows that sediment from the North Canterbury rivers is accumulating at the head of the canyon. This sediment could slide down into the canyon creating a very large but localised tsunami.

What not to do!

It might be an unusual sight but don't go to the coast to have a look. Find a good viewing spot somewhere up high!



All the way from Chile

The Canterbury coast has experienced some frightening tsunamis. Back in 1960, an earthquake in Chile, South America, sent shock waves travelling across the ocean to our coastline. Just 12 hours later waves of two metres swept up the Kaiapoi River north of Christchurch. Timaru Harbour experienced a large sea swell and Charteris Bay, Lyttelton Harbour, filled up quite unexpectedly with a metre of water one night around 11.30 pm.

The following day authorities alerted people to the danger and what did some people do? They flocked to the sea to watch the second anticipated big wave. Luckily, it had lost its energy by the time it reached the coast and was too slow to cause any damage or sweep away the hundreds of sightseers.

Did you know?

Kaikoura's coast is in the zone where the Australian and Pacific tectonic plates meet, creating active faults and deep canyons offshore.

Canterbury



In the
classroom

Not all threats
are the same

- 1) Outlining examples of threats, and possible effects on people and the environment, below are three lists. Draw up three columns with the same headings as the lists. Work through the items in List 1, and for each one choose the appropriate items from the other two lists. Add anything else you can think of.

Example:

Threat	Effect on people	Effect on the environment
Landslide	Transportation disruption	Vegetation damaged
	Injury, loss of life	New landforms
	Temporary displacement	Natural damming of waterways

List 1

Threats in Canterbury - examples

- drought
- floods
- earthquakes
- landslides
- storm surges
- severe storms (hail, snow, wind, etc.)
- tsunamis
- snow avalanches
- coastal erosion
- coastal flooding

List 2

Effect on people - examples

- transportation disrupted (road, rail, air, or water)
- communications cut (telephone, internet etc.)
- power shortages
- loss of electricity
- loss of farm production
- sewerage system damage
- shelter damaged or destroyed (housing, schools, community halls etc.)
- property damage or loss (cars, furniture, computers etc.)
- loss of essentials (food, clothing, housing etc.)
- injury to people or death
- panic, fear and long-term trauma
- temporary or permanent displacement
- loss of stock
- spread of disease

List 3

Effect on the environment - examples

- new river channels (or river movements)
- natural damming of waterways
- water-logged areas
- dry soil (loss of soil moisture)
- erosion or loss of soil
- sediment deposited
- increased fire risk
- new landforms
- loss of vegetation (plants)
- wildlife disturbed
- loss of habitat (home of wildlife)
- loss of soil nutrients
- low lake or river levels
- loss of land
- change in landscape
- spreading of plant pests

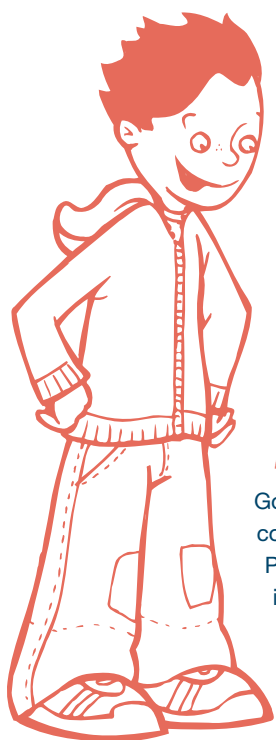
- 2) Discussion questions

- Using these tables, which threat is likely to cause the most damage to the Canterbury environment?
- When managing threats, should the threat to humans be considered over the effects on the environment? Why? Why not?

- 3) Using the lists and tables, draw flow diagrams showing how one threat can cause another.
Here's an example:



So, what do we do about it?



We can't stop these threats occurring, but we can prepare ourselves and our homes in order to reduce the impacts of the threats. There are some things the whole region is responsible for and some things each individual or family is responsible for.

As individuals...

The most obvious suggestion is to avoid living in a high risk area.

We need to think about where we live and ask ourselves what price we are prepared to pay (in lifestyle or financially) to live somewhere. Then we need to consider all the possible steps we could take to make sure that we, and our property, will be safe in the face of a threatening event.

As a region...

Government agencies are responsible for protecting towns and communities from earthquakes, flooding and other threats.

Protection works and development rules and restrictions are put in place to prevent major disasters. They are costly, but that's the price we pay for building towns in threat-prone areas. These measures do not provide 100 percent-guaranteed protection, so it is also up to individuals to protect themselves.



In the classroom

Turn your classroom into the Canterbury region!

Your class may like to look at a map of Canterbury before it starts this exercise.

1. Rearrange the classroom so that it resembles the Canterbury region. Make mountains, rivers and lakes out of desks, chairs and other classroom items. Identify areas that could cause, or be prone to, threats by marking them with bright coloured paper, e.g. show where the Alpine Fault is, flood plain areas are and coastal threats etc.
2. Students choose their ideal place to live and stand in their chosen spot. Ask them why they have chosen their areas.
3. List threats on the board, e.g. earthquake, flood, drought, heavy snow, storm surge, tsunamis, landslide, avalanche. Discuss who would be at the highest risk of being affected by each threat. Give students a chance to move from their chosen spot.
4. Students consider what their risks are and write down all the measures that could be taken to lessen the affect a threat will have on them.
5. Students think about a real situation. Where is the school situated? What threats could affect the school? What could be done to lessen the effects?
6. Each student could now do the same for their own homes.

Who and what is affected?

We know threats affect people and the environment, but what specifically will happen? It's often not until an event occurs that we realise the effects can be long term. We focus on the drama of the moment, often forgetting that the consequences may continue for years.

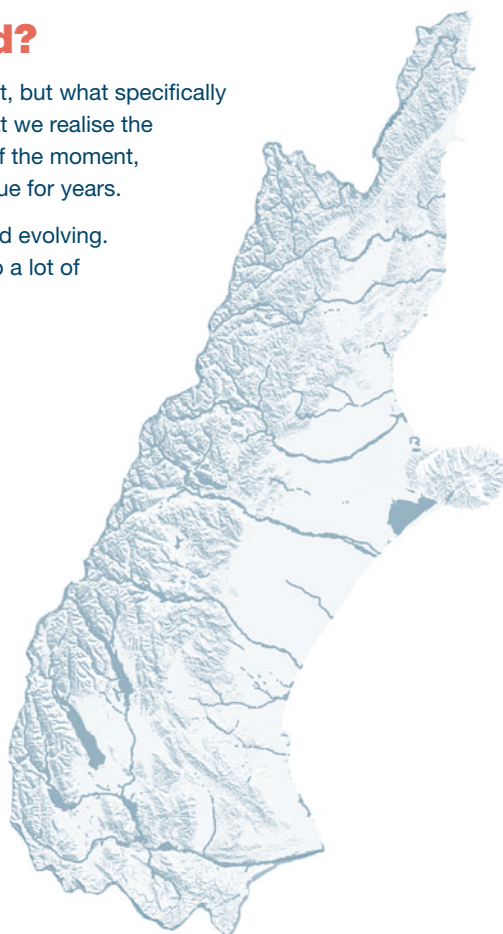
The natural environment is continually changing and evolving. Extreme natural events help to stir the pot. They do a lot of work, usually making large fast changes.

A dangerous combination...

The snowball effect...

Some threats will begin a series of others, and some threats are repeated on top of other ones, e.g. another drought on top of a recent drought. When there hasn't been time to recover from the first event, the results of the second are so much more damaging.

A prime example of one threat causing another is an earthquake causing a landslide which, in turn, dams a waterway. Flooding then results behind the dam and the waterway is forced to alter course.



Canterbury

Preparing for the worst...

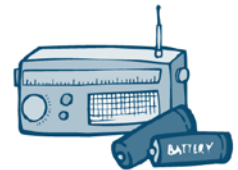
Your disaster survival kit

In the event of disaster you might have to leave your house in a hurry. Preparing in advance will dramatically increase your chances of survival. You will need a disaster survival kit. Your kit needs to have most of the items listed below, yet remain light and able to be easily carried. It should be updated every 12 months and batteries checked on a more frequent basis.



In your kit you should have:

- canned or dried food
- bottled water
- a manual can opener
- a cooking device – primus or BBQ
- a first-aid kit
- candles and matches/lighter
- a waterproof torch (and spare batteries)
- an emergency (portable) radio (and spare batteries)
- blankets or sleeping bags
- all-weather gear
- good strong shoes
- special supplies: glasses, hearing aids, mobility aids
- baby supplies: food, clothing, etc.
- pet supplies: food, dog leash, small cage



In the classroom

1. From the list below choose five things you would take with you in the event of a civil emergency. Explain why you have chosen them:
Blanket, canned food, bed, TV, video, torch (plus spare batteries), PlayStation, computer, favourite toy, bottled water, car, soccer ball, stereo, hand-held radio, fridge (plus magnets), change of clothes, kitchen sink, hot-water bottle, tent, toothbrush, toilet paper, passport, sleeping bag, first aid kit, bike, sunglasses, raincoat, swimming togs, straw, hand pump, inflatable boat.
2. Look up the very back page of the yellow pages and then fill in the table, listing at least three things you should do in each event.
3. Homework: Take a copy of the disaster survival kit list home, and discuss with your family. Decide which items are essential. Work out which items you have at home already and which you would need to buy to complete your kit. Make a kit and store it in a safe place that is easy to reach.

Flood

Earthquake

Tsunami

Storm

It's already happening over there!

Across the world, the term community resilience is becoming more familiar and many organisations and groups are discussing how and why it should happen. The examples listed below are just a taster of community resilience in a few countries.

The power of community in Cuba

Like many other countries in the world, Cuba's economy and way of life relied on the use of oil and other fossil fuels. Its major use of fossil fuels was for food production. In 1990, Cuba's economy crashed. Oil imports were cut by more than half; buses stopped running, factories closed and electricity blackouts were a daily event, often for up to 16 hours a day! Food was also scarce – people were desperate and near starving. They had to make serious changes to their lifestyles and start growing their own food.

Cuba's response to its oil crisis is a great example to the rest of the world of how to cope with the reality of peak oil.

Getting back to basics

Communities began cleaning up vacant areas of land and creating vegetable plots and roof-top gardens. While international experts assisted in this process, local communities were also educated about permaculture and organic gardening methods. Adopting these methods over much of the country has meant farming systems are no longer dependant on fossil fuels and now provide communities with 80-100 percent of their fruit and vegetable needs.

This has led to both improved health amongst Cuban people and stronger relationships between neighbours and between local communities.



Crisis equals creativity

Increasing facilities – such as schools, recreation areas and work places – so that they were closer to people's homes meant people didn't have to travel to the city anymore and smaller communities were better supported. The government also imported 1.2 million bicycles and made half a million more. These were distributed around the whole country.



Communities also increased their use of energy alternatives as their oil supplies diminished, for example solar and wind energy, especially in schools.

What the...?

Farmers are now among the highest paid workers in Cuba, and people from all professions have been inspired to retrain as farmers.



For more information visit www.powerofcommunity.org or www.communitysolution.org

Did you know?

The term **peak oil** means a situation where oil extraction and production reach a peak, then start to decline. It doesn't mean the oil supply has run out – this is unlikely – although shortages may become more common as supply fails to meet demand and world oil prices rise significantly.



Activity

Watch a movie!

The Power of Community: How Cuba Survived Peak Oil is a film which tells of the hardships and struggles as well as the community spirit and creativity of the Cuban people during this difficult time.

One of the key messages of this movie is to think globally but act locally! Experiencing crisis or change can trigger sustainable alternatives; it is a way of adapting to change but at the same time a way of helping to ensure both our and the world's survival.

Do you think something similar could happen in other countries or communities – not just with regard to food but with all the other aspects of life today?

Let's get started

We need to create sensible plans to manage disasters now, so that an approach like Cuba's can take effect and help guide communities in a direction that will help make them more sustainable in the long term.

Black Saturday bushfires

On and around Saturday 7 February 2009, bushfires burned across the Australian state of Victoria. These bushfires, known as the Black Saturday bushfires, devastated 78 communities. More than 200 people died and around 500 were injured.

The fires destroyed over 2000 homes and damaged thousands more. Many towns were badly damaged or almost completely destroyed. This left an estimated 7,500 people homeless.

Working together

The people of Victoria demonstrated bravery and resilience throughout the time of the bushfires. More than 4,000 firefighters battled the fires. Military personnel and firefighters came from across Australia, including Tasmania, as well as New Zealand.

Support and help also came from national and international governments, businesses and aid agencies. The Red Cross co-ordinated the biggest fundraising appeal of its kind in Australia and Victoria's school communities raised nearly \$1 million to help victims of the bushfires.

Many hundreds of animals were also affected by the bushfires.



Preparedness

While the Black Saturday bushfires were an extreme event, the people of Victoria are not strangers to bushfires. Because Victoria is one of the most bushfire-prone areas in the world, a variety of community training programmes had been set up. Some communities had worked and trained with local and regional authorities so they knew how to best respond to a fire.

Programmes included educating and empowering communities which live with fire – helping them prepare for, and respond to a fire, as well as supporting them in recovery after major fires.

Community training helps communities work together and become strong and resilient – both empowered to take action and fully supported in the recovery process.

Recovery and repair

The Victorian Bushfire Reconstruction and Recovery Authority was set up to work with communities, businesses, charities, local councils and other government departments to help rebuild the communities affected by the bushfires.

Every community has different needs so each one is supported to help it recover and rebuild in the way it wants. Local rebuilding plans will be developed to ensure each community's economy, infrastructure and transport; environmental, and health and wellbeing needs are met. The authority will work with communities to develop these plans.

For more information visit www.wewillrebuild.vic.gov.au

The strength of community

Six weeks after the fires that claimed at least 45 lives in their community, people from Marysville were allowed to return to their homes. There was a strong community leadership reaction within the region. A small group met during the first week and formed a group to liaise between the Marysville-Triangle community and the government and private agencies providing help. The group has been extremely thorough in ensuring it represents the entire community and its needs.

The resilience of a community and its ability to respond to and help victims of these kinds of events is a major part of any disaster, be it a devastating fire, flood, poverty or illness.



Resilience in New Zealand

Kaikoura's worst Christmas

On Christmas Eve 1993 a memorable and miserable storm hit Kaikoura. The Kowhai River burst its banks and channelled a route along Lyell Creek through the centre of town, flooding shops and severely damaging four dairy farms in its path. Kaikoura and St Joseph's schools were extensively damaged. Thirty families' homes were unliveable for at least a month, with \$8 million worth of damage to property.

Industrial fridges weighing 300 kg were sucked "like torpedoes" through shop windows by the force of the water racing towards the sea, said Kaikoura's chief fireman.

On one dairy farm 90,000 cubic metres of river shingle was spread over pastures. Since then, a recording rain gauge has been installed in the Kowhai River catchment, and the broken stopbank has been completely rebuilt with new stopbanks to make it stronger and a flood wall at Lyell Creek. Designed to protect Kaikoura town from flooding, these developments are part of a ten-year plan to provide better protection for the local community.



Above: the main street of Kaikoura in flood.

Right: the new flood wall at Lyell Creek in Kaikoura.



In the classroom

1. Find out where the closest rivers to you are and which ones could cause major flooding.
2. Look up www.ecan.govt.nz and go to 'river flows' and to 'rainfall'. Find your closest river and write down the flows and the rainfall and see if there is any correlation. You could plot this over the next week or two.
3. Things to find out...
 - a) What are stopbanks?
 - b) What are groynes?
 - c) How safe are these flood protection methods? Where are the closest ones to you?
 - d) How else could we protect ourselves from flooding? (Hint: how would we avoid having to protect ourselves from flooding?)



Activity

Survival stories

Share a story or article about what might happen after a disaster. After an initial class brainstorm, students could discuss this in pairs or small groups. Some possible questions for discussion:

- Who would look after you? Would you need to look after anyone else?
- What might be some of the problems? For example water and food, injuries or problems getting home.
- What could you do to help?



Canterbury



Fact!

June 2006 was the coldest in over 50 years!

The big chill

Heavy snow began falling in Canterbury on the night of 11 June 2006 and continued until the morning of 12 June. The snow storm affected a large part of the Canterbury region. Worst affected were the Ashburton, Timaru, Mackenzie and Waimate districts. In inland regions of the Ashburton district, about 2000 homes lost power supplies.

The snow storm is referred to as a 'weather bomb' because of its unexpectedly severe impact. Large snow storms in the Canterbury region have occurred before. Similar significant events took place in 1945, 1967, 1973, 1992, 1996, and 2002 – and can be expected to occur again. Snowfall usually varies within the Canterbury region and the impacts of previous snow storms varied according to location; however, the 2006 event is regarded as the most severe on a regional scale since 1945, and snow depth in Ashburton was the greatest ever recorded.

The storm caused considerable damage to electricity supplies, and loss of phone services and communications followed. In some areas electricity and phone services were not restored for more than three weeks. Road networks were disrupted for periods from a few hours to several days. Frosts that followed in the days and weeks after the storm froze the snow so that it lay in some areas for up to seven weeks!



Power lines were downed by snow in the Mackenzie country during the big snow of 2006.

Did you know?

The 1992 snow storm killed over one million stock in Canterbury and damaged buildings in the Christchurch and surrounding areas, with damage to property estimated at between \$50-100 million.

Preparedness

Farmers in the Canterbury region who were interviewed after the storm believed they were quite well prepared as most of them had experienced at least one extreme event before the 2006 snow storm. They had done things like organising extra feed and shelter belts, as well as stocking up on survival essentials such as food, cooking equipment, candles, torches, batteries and camping gear.

The Ashburton Emergency Response Trust (AERT) also helped the region to cope with the 2006 snow storm. AERT was set up in response to 'The Big Snow' of 1992.

Has it always been like this?

Some might say the increase in extreme events, such as coastal storms, is related to our changing climate. In 2008 Canterbury experienced two big flooding events within three weeks. The region has never really been affected in this way before as the change in weather from a nor'wester to an easterly wind is quite unusual.

Impacts of such extreme events are also evidence of the changing landscape. Across the Canterbury region the population is increasing as more lifestyle farmers move to rural areas. This may also have an effect on the communities and social networks within these areas as new people may not know their neighbours or how to cope with this kind of event. This risk of threat events in these areas can increase, as development occurs in places that are more vulnerable, e.g. near fault lines and flood plains. This increases the impacts of extreme events because more people are affected and the changes are more noticeable.

The March '07 Northland floods

On 28–29 March 2007, over 400 mm of rain fell in hill catchments of eastern Northland. Buildings, homes and roads were flooded, and even washed away. Stock were drowned. There was large-scale flooding as well as serious disruption to businesses and everyday life.

Severe weather warnings had been issued, but the total rainfall greatly exceeded expectations. The heaviest rain fell for over 8–10 hours. The Wairua River rose 3.5 m in two and a half hours. Low-level flood protection schemes were overwhelmed; floodwater covered more than 5000 hectares of farmland, and large areas of pasture were destroyed. Many rural communities were badly affected, and some homes were flooded beyond repair.

Numerous landslides occurred; the most serious engulfed buildings, damaged roads and closed tourist attractions. The estimated cost to individuals, businesses and the Far North District Council for the March (and later the July floods) is \$85 million.



Photos courtesy of Ministry of Civil Defence & Emergency Management

Going a step further

NIWA and GNS Science are working together to develop new ways to help increase the resilience of New Zealand communities to the impacts of floods and other natural threats. Part of this work involves better understanding the damage and impacts on communities.

Talking to people after a major disaster helps find out why certain communities are vulnerable to threat events and the costs of such events, as well as helping to develop new ways of increasing community resilience to these events.

For more information visit www.naturalhazards.net.nz



Action, action – it is all

Resilient Organisations

Resilient Organisations is a six-year research project designed to assist New Zealand organisations in recovering economic competitiveness after threat events, by improving their resilience.

For more information visit www.resorgs.org.nz



Transition Towns

Transition Town initiatives bring people together to explore how communities can respond to the twin challenges of climate change and peak oil. We know we don't have all the answers but we believe we have the innovation to create those solutions.

Each transition group networks with their local community on a co-ordinated range of projects, designed to transition from high-energy to low-energy lifestyles in a positive and creative manner. The aim is to re-localise our communities, making them vibrant, resilient and truly sustainable.

A substantial number of towns (islands, suburbs, communities, regions) are working on peak oil and climate change education. Localisation initiatives in New Zealand include Lincoln in Canterbury, Nelson, Hanmer Springs, Oamaru and Dunedin.

For more information visit www.transitiontowns.org.nz

Leading the way in Lincoln

The Lincoln Envirotown Trust is dedicated to fostering a community-owned process for sustainability in Lincoln. It works with the community on projects that look at building and development, waste, energy and environment, planting and food, and education. The trust works in partnership with the district and regional councils, Lincoln University, Landcare Research, Waihora Ellesmere Trust, HortResearch, local schools, businesses and other organisations.



The trust's objectives are:

- To promote the long-term environmental sustainability of Lincoln township with the understanding that this is also the basis for social, cultural and economic sustainability in the future.
- To educate about and raise awareness of environmental sustainability issues and to provide information about how to achieve environmental sustainability.
- To provide appropriate opportunities for personal and community decision making to ensure that the environmental, social, cultural and economic sustainability of the Lincoln township is promoted.
- To act as a role model for other communities wanting to progress towards environmental sustainability.

For more information visit www.lincolnenvirotown.org.nz



about taking action!

Want more?

These are just some examples of community resilience; there are many others available online.

A basic internet search on 'community resilience projects' should provide you with a good starting point.

Some other ideas for research projects:

- 1931 Napier earthquake
- 1992 'The Big Snow' in Christchurch
- 2000 Friday storm hits Christchurch and Banks Peninsula
- RESET (resilience project started by students at the Centre for Alternative Technology in Wales, UK)



Are you up for the
'action' challenge?



Activity



Create your own garden!

1. Brainstorm with the students about what food they have at home and where it comes from, e.g. milk, bread, fruit and vegetables – supermarkets, farms, gardens of friends and/or family. Extension: students could identify where this food comes from on a map of Canterbury, New Zealand or the world.
2. Ask students to think about what food they could source themselves and how, i.e. vegetable garden, fruit trees. Think about the following questions:
 - Where could they start a garden?
 - Is there anywhere in the school or local community where this could take place? Students could look at a map of the local area or school to help get them started.
 - Who could help them get started? Think about local community groups, gardening centres, local council etc.
 - What vegetables can be planted when? Students will need to have access to a gardening guide or the internet for help with this.

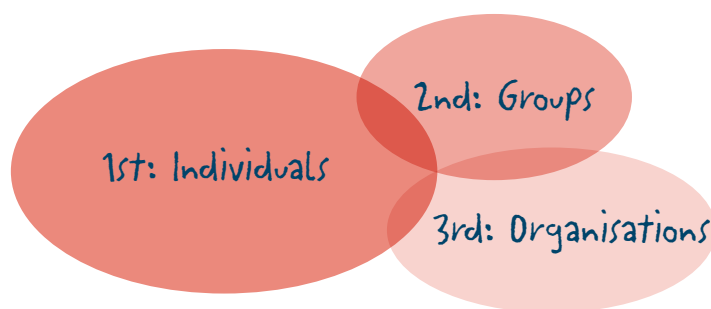
Remember, you don't need to make a huge garden; in fact you can grow many vegetables in pots or planters. Cherry tomatoes, capsicums, and zucchinis all grow easily and provide some quite quick results. If you have room, pumpkins also grow with very little help.

It starts with you!

There are many things we can do everyday to become more prepared. Some of these have been discussed already like putting together a survival kit, getting to know your neighbours and wider community, and becoming more self sufficient. We can also learn from others, such as Transition Towns and Project Lyttelton.

Where do I start?

There are so many things to think about and do, and a large number of support organisations and agencies out there. It can get confusing just thinking about where to start. The below diagram outlines three key steps to becoming more prepared and/or being ready for change.



Activity

1st: Individuals

You are your own first aid!

As an individual and family

Right here, right now!

Education, education, education – knowing what the risks are and what you can do is the first key step towards being prepared.

Threats to your household

What are the most likely threats to your household/school? Think about the threat level (none, low, medium, or high) and how best to reduce the potential damage.

- **Geographical hazards**, i.e. earthquakes, tsunami, and landslides
- **Biological hazards**, i.e. human and/or animal disease pandemic
- **Climate-based hazards**, i.e. flooding, drought, extreme temperature, wind and/or snow storm
- **Technological/human-induced hazards**, i.e. water supply, waste water, electricity or phone failure; civil unrest.

Location of your emergency supplies

Emergency supplies are basic items that members of a household need in the event of an emergency. This is often referred to as your Survival Kit. This should include food, communication devices such as a radio, torch/candles and matches, water, first-aid kit, medications, a portable cooker, and extra clothing and bedding.

Your household plan

You don't always know where you are going to be when disaster strikes so it is a good idea to have a plan for yourself and your family. Things to think about...

- **An evacuation plan:** This is a rough sketch of your house identifying where the mains are for water, power and gas, emergency meeting place and escape routes.
- **Meeting places** – as a family, you need to have alternative meeting places. One at home and one for when you are not at home.
- **Emergency contacts** – such as neighbours, family, work and doctors.



In the long run

As you know, some environmental change is over a longer period of time and, therefore, we have more time to adapt to the potential change. Adapting over time can help reduce the impact of change but taking positive action NOW can too!

Being more self-sufficient by not having to rely on outside sources for the basics not only feels good but prepares you for when things become temporarily unavailable.

- Have a water tank or other alternative water storage
- Make friends with your neighbours — they may have skills and resources you don't
- If space allows, get some chickens
- Have more than one way of getting around, such as a bike
- Reduce, reuse, recycle your waste
- Energy — insulate your home and monitor your power use
- Create your own vegetable garden and/or orchard

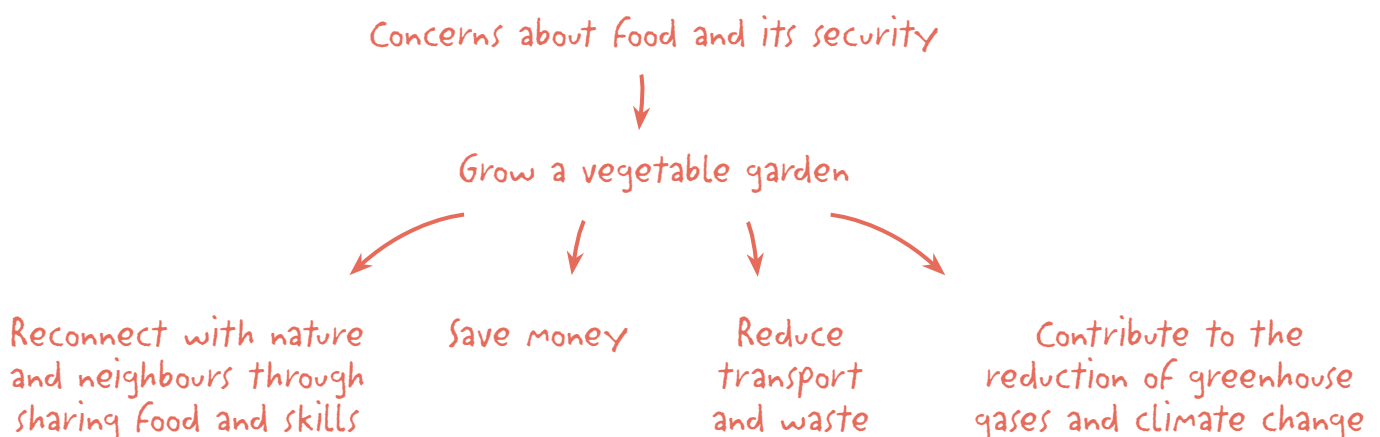
Did you know?

Useful websites to help you with your planning are www.getthru.govt.nz and www.pandemicroadshow.org.nz.



How does that help?

Preparing for food shortages is a good example of where resilience planning can not only prepare you for long-term environmental change, such as climate change, but also help reduce the impact of that change.



Canterbury

2nd: Groups

Together we can do it!

Some things are best achieved in groups. There are some great examples of how communities can work together to become not only more resilient but a great, friendly and safe place to live.

Did you know?

A pot luck 'apple pie' party is a great way to reconnect with your neighbourhood. Don't be shy!

Design an invitation, pop it in the letter box and watch those relationships form!



- Get to know your neighbours – they be great company and can also have skills and resources to share. A connected community is a strong community.
- There may already be a group such as Transition Towns in your community. Go along to a meeting and see what it is all about.
- If there isn't a group, find one that you are able to attend around your town, district or city. Learn from it and take the ideas back to your own community. Seek like-minded people to get your own group established. Remember, every success story had to start somewhere!
- Establish a working group for the purpose of formulating a Community Resilience Plan. The size of the group will depend on who is available and motivated, and on the size of the community. It will be helpful if the individuals involved have experience with organising and are already trusted, active members of the community.
- Identify organisations, businesses, and individuals in your community that have skills to share and are willing and able to contribute.

Helpful groups to refer to when getting started are:

- Project Lyttelton – www.lyttelton.net.nz
- Lincoln Envirotown – www.lincolnenvirotown.org.nz
- Transition Towns NZ – www.transitiontowns.org.nz

3rd: Organisations

We are here to help

Being ready as a family and as a community ensures we are putting our best foot forward when it comes to being resilient. But we don't have to do it entirely alone. It is great to know there are organisations able to assist us when disaster strikes. The thing to remember is that they won't always be able to respond straight away and they are limited as to how far their resources can stretch.

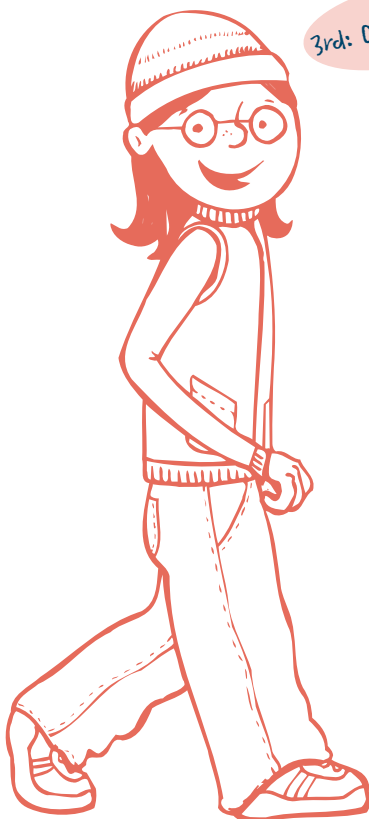
A good rule of thumb is:

- First — me
- Then — you
- Last — them

If a civil defence emergency is declared it means the threat is likely to become a natural disaster and the Civil Defence headquarters will spring into action.

Canterbury's Civil Defence Emergency Management Office is located on the ground floor of the Environment Canterbury building at 58 Kilmore Street, Christchurch. In the event of an emergency it is important that you find out where and how to contact your district and city headquarters. For this information contact your local council.

Other agencies may also assist you and your family. These include emergency services such as Fire, Police, St. John, Red Cross, Salvation Army, Ministry of Social Development, health professionals and other groups. If the emergency is significant, then all these organisations and groups work together to assist the public, with coordination provided by Civil Defence. At a local level, Civil Defence can provide coordination and welfare services.





Activity

Locate your town on this map of Canterbury. What is the name of your district/city/regional council? Choose one person in the class to phone the council and ask where your closest sector post would be in the event of an emergency.

Draw a map of your own town or suburb and show the route you would take from your school and from your home to get to your nearest sector post.

Ashburton District Council
(03) 307 7700

Christchurch City Council
(03) 941 8999

Environment Canterbury
(03) 365-3828

Hurunui District Council
(03) 314-8816

Kaikoura District Council
(03) 319-5026

Mackenzie District Council
(03) 685 9010

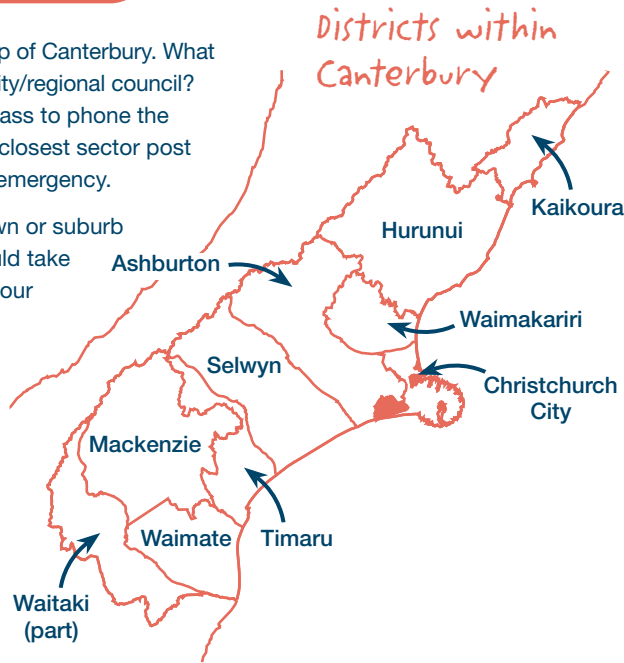
Selwyn District Council
(03) 347 2800

Timaru District Council
(03) 687 7200

Waimakariri District Council
(03) 313-6136

Waimate District Council
(03) 689-8079

Waitaki District Council
(03) 433 0300



Important organisations and things to be aware of are;

- Civil defence – Ministry of Civil Defence and Emergency Management - www.mcdem.govt.nz
- Welfare centre or sector post – where is yours?
- Your local regional, city/district council
- Emergency agencies such as your local District Health Board
- Ministry for the Environment – www.mfe.govt.nz
- Natural hazards - www.naturalhazards.co.nz



In the classroom

Who can help?

Make a collage of people who might help during an emergency. Students could cut pictures from magazines or draw pictures of people. Group them; then glue them to a large piece of paper. Groups could include parents, students, teachers, ambulance service, police, fire service, doctors, first aiders, civil defence, media and veterinarians.

In small groups, students select one of the groups of people who might help during an emergency and discuss what that group can do to help. Students role play how they help people and share their actions with others. Encourage the use of props such as a telephone or first aid kit.

The students could invite visitors from their community who help others, e.g. fire service or police, to talk about their job, or organise a class visit to their workplace.

Activity adapted from www.whatstheplanstan.govt.nz

Curriculum Links (Level 4)

Principals – Foundations of curriculum decision making

Future Focus

Environmental Education

Key concepts: interdependence, sustainability, biodiversity, personal and social responsibility for action

Social Studies

Understand how exploration and innovation create opportunities and challenges for people, places, and environments

Understand the events have causes and effects

Science

Life processes; Ecology; Evolution

Health

Rights, responsibilities, and laws; People and the environment

Technology

Nature of technology

Characteristic of technology

Mathematics and statistics

Statistics

- Statistics investigation; probability

Canterbury

Your Environment – Canterbury is free to all schools/teachers in the Canterbury region.

canterbury mudfish

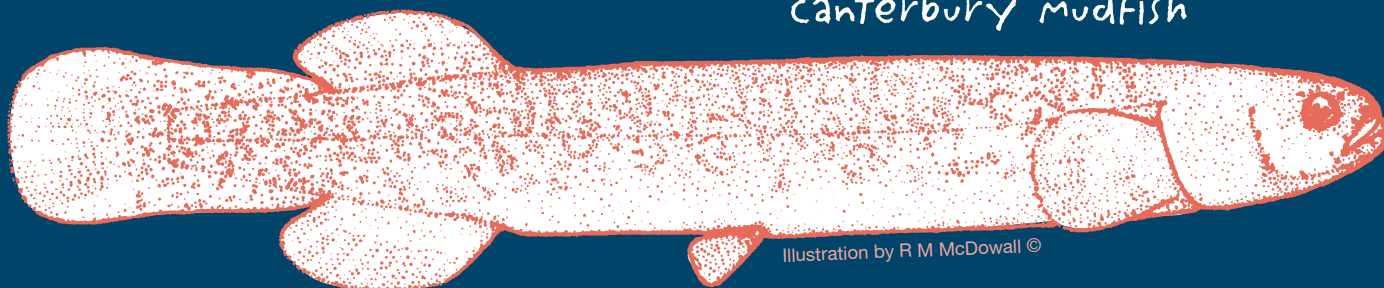
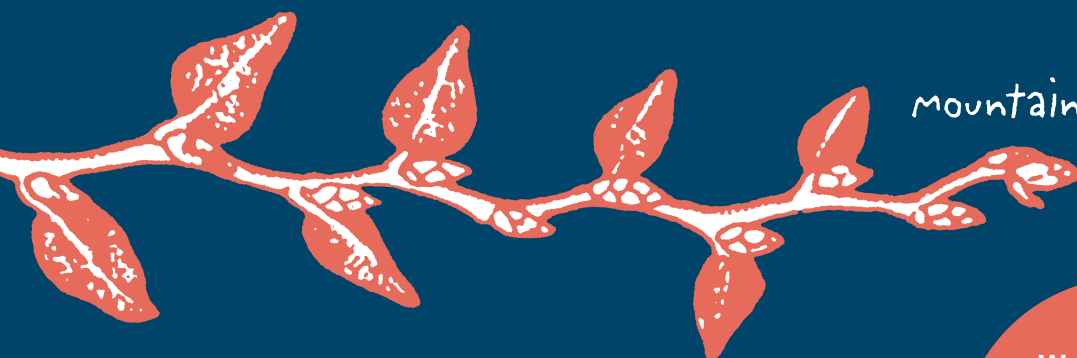


Illustration by R M McDowall ©

mountain beech



Resources and education services

We offer a range of facilitated school programmes and environmental education resources on natural resources and their sustainable management. Environment Canterbury also produce general information and resource material, such as pamphlets, brochures and booklets, many of which are free.

If you would like to receive a 'Key to Canterbury' environmental education pack contact:

Environment Canterbury education staff on 03 365 3828 or customer services on 0800 EC INFO (0800 324 636).

Environment Canterbury: what we do

Environment Canterbury is your regional council.

We manage 12 activities for the Canterbury region.

- Air quality
- Coastal environment
- Emergency management
- Energy
- Hazards
- Land
- Navigation safety
- Pests and biosecurity
- Public passenger transport
- Regional land transport
- Waste, hazardous substances & contaminated sites
- Water quality, quantity and ecosystems

We welcome your comments or suggestions for what you would like to see in future issues.

If you are not on the mailing list for Your Environment, Canterbury, or you would like to receive extra copies of this resource, please contact Environment Canterbury education staff at the Christchurch office.

Environment Canterbury offices

58 Kilmore St, Christchurch

Phone: 03 365 3828

75 Church St, Timaru

Phone: 03 684 0500

73 Beach Rd, Kaikoura

Phone: 03 319 5781



**Environment
Canterbury**
Your regional council