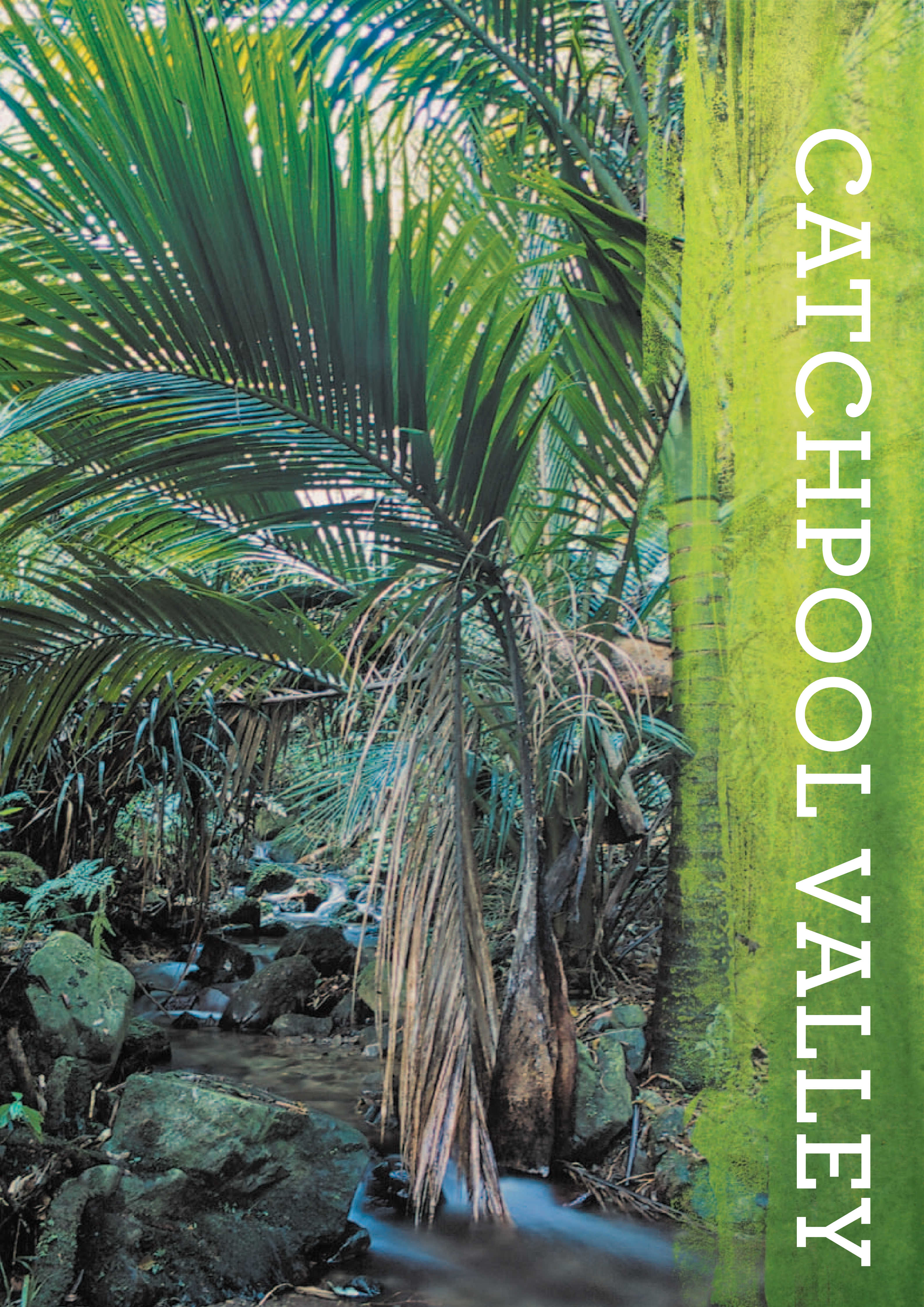
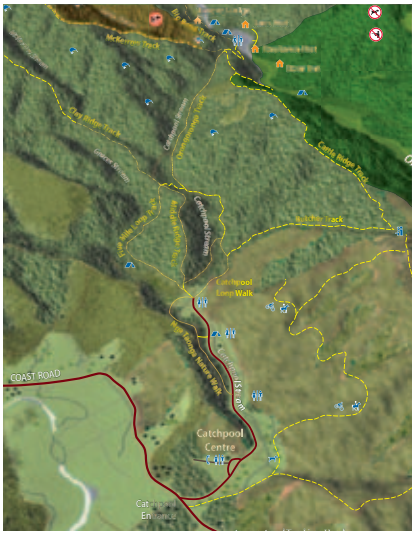
CATCHPOOL VALLEY



Overview



Catchpool Valley is the most popular entrance to the Rimutaka Forest Park. Within the valley there are short walks, a campground, and picnic and free barbecue facilities. There is also a function building—the Catchpool Centre—toilets, and a 24-hour emergency telephone.

Catchpool Valley is undergoing a transformation as pine trees have been removed to enable the return of native forest. The Rimutaka Forest Park Trust spearheads a community campaign to give this regeneration process a helping hand by planting natives and removing pest plants and animals.

At Catchpool Valley students can:

- Observe the structure of a native forest and investigate the range of plants and animals (biodiversity) that sustain it
- Investigate changing land use as pine forests have been harvested and communities work to restore the native forest
- Compare the process of natural forest regeneration with planned restoration projects
- Consider how they could plan similar projects in their local/school environment

The following pages contain curriculum links, suggested activities, activity templates, and supplementary information. Several of the on-site activities are intended to be used with the Catchpool Valley activity cards that are available in the resource kit or to download from www.doc.govt.nz/getting-involved/for-teachers/field-trip-resources.

CONTENTS

Forest structure

Curriculum links

Students can:

- Learn about the structure of a native forest and the relationships that exist within it.
- Develop an appreciation of walking in the bush as a recreational activity.

Links can be made to:

Science – Living world – ecology

Students can:

L1-6 – investigate special features of some native forest plants and how these help them to stay alive.

L1-6 – use simple food chains to explain the feeding relationships in Catchpool Valley.

L3-6 – investigate and classify closely related plant species (tree ferns, beech trees or podocarps in the Catchpool Stream area) on the basis of easily observable features.

L7-8 – describe and explain the biogeographical reasons for the special characteristics of New Zealand's plants and animals.

English

Links can be made to a range of oral, written and visual language objectives.

Mathematics

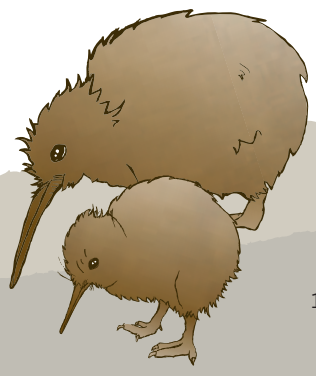
Statistics – Students can gather information about bird numbers in the forest.

Technology

Students can design a nesting box to meet specified criteria.

The Arts

Students can use visual art to show forest structure.



Forest structure – suggested activities

Pre-visit

Students can:

- Brainstorm ideas about 'native bush'
  - What is it?
  - Who lives in it?
  - How does it survive? (see Activity template: Native bush brainstorm, page 21).
- Find out about forest communities by visiting the Department of Conservation website (www.doc.govt.nz > Getting involved > For teachers > Themes > Native bush).
- Read about New Zealand bush (page 22).
- Investigate the origins of some of the trees (page 24) found in Rimutaka Forest Park, including introduced species.

On-site

Students can:

- Observe the forest structure—compare it to a house (See Catchpool activity card 1).
- Identify feeding relationships in the forest. Who feeds whom? (See Catchpool activity card 2)
- Survey the number of birds in a small area of the forest. (See Catchpool activity card 2).
- Compare the special characteristics of podocarps, beech trees and tree ferns. (See Catchpool activity cards 3 & 4).

Post-visit

Students can:

- Identify an area of local bush in or near your school:
  - Observe the structure of the bush and the life that it supports.
  - Use the Activity template: Bird monitoring at your school to collect data on what birds are present at you school or local bush area (page 28).
  - Write a report about the current state of the bush that you have studied. Consider invertebrate and lizard habitats (See Gardening for Lizards pamphlet in the kit, or on the DOC website: www.doc.govt.nz/publications/)
  - Decide what native plants you could plant to attract native birds all year round. (See Plants for native birds, page 29.)

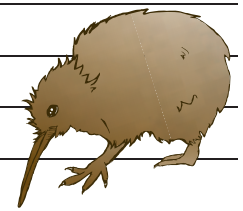
Activity template: Native bush brainstorm

Spend 10 minutes writing as many ideas as possible to answer the questions below.

What is native bush?

What lives in native bush?

How does native bush survive?



The New Zealand bush

New Zealand was once part of a large landmass called Gondwanaland. As the land, that was to become New Zealand, drifted away from Gondwanaland, it carried plants and animals with it.

In the late Triassic Period (208–192 million years ago), it is thought the ancestors of modern podocarps and ferns came to the early New Zealand landmass. As it lay close to the South Pole, it was probably too cold to allow reptiles to colonise at that stage. The warmer climates allowed dinosaurs to occupy most of the planet.

Over the next 30 million years the climate became warmer as Gondwanaland slowly rotated, taking New Zealand further north. Previously, it had been a tiny landmass because of rising sea levels created by ice caps melting. Due to major tectonic uplift, New Zealand then became part of an extensive landmass from north of New Caledonia to the Chatham Islands in the east and Campbell Island in the south. Land bridges with Gondwanaland allowed reptiles and amphibians to cross over.

New Zealand now had some of the plants which were to give rise to modern podocarps as well as the ancestors of native frogs, peripatus, native land snails, native earthworms, tuatara and some insects such as the wētā.

Peripatus. Photo: Diane Gleeson.

Early birds, developed from their dinosaur ancestors, were now occupying Gondwanaland and crossed to New Zealand. These were the ratites (flightless birds with flat breast bones) that gave us the moa and kiwi. They lived in the forests dominated by cone-bearing trees, ferns, mosses and horsetails.

In the early Cretaceous Period (144–110 million years ago), a rift began to form where the Tasman Sea was to develop. This is the first stage of what was to become the great isolation of New Zealand. This would allow many forms of life on New Zealand to survive for many millions of years without competition and predation from mammals.

The land was also eroding and being cut up by rivers and the sea. At this stage the ancestors of rewarewa and toru trees came to New Zealand. The planet was clothed in vast forests that, over the next 100 million years, would create the vast coal deposits that provide us with fuel today.

It is suggested that 100 million years ago, beech trees entered New Zealand from South America, where their close relatives survive today. To get to New Zealand, colonisers had to be blown or be able to swim.

During this time New Zealand came very close to the South Pole. The cool climate favoured dense beech forests.

Hard beech forest, Five-Mile Track.

By 85 million years ago New Zealand's isolation was complete. After a further 20 million years of evolution, disaster struck. It is thought that an asteroid crashed into the Caribbean putting so much dust into the atmosphere that the sun was blocked for months. This caused many plant and animal extinctions over the whole planet.

Because of its growing isolation, the great extinctions affected New Zealand's plant and animal life differently from other parts of the world. Birds were already filling niches that would have been occupied by dinosaurs and mammals. Birds, insects, snails, amphibians and reptiles were not greatly

Emergent rimu in the Orongorongo Valley. Photo: Les Molloy.

affected by the cretaceous extinctions. As these are our main animal groups, there was little change for New Zealand's plant and animal life.

Land movements 60 million years ago made it possible for the short-tailed bat and early representatives of our wrens, native thrush, wattle birds and ancestral pōhutukawa to get to New Zealand.

During the Eocene Period (54–33 million years ago) Antarctica moved to the pole and became covered with ice. This meant the end of the vast beech forests and the emergence of a family of birds (penguins) suited to the cold. New Zealand had its own giant penguin, which stood a massive 1.62 metres tall. Ancestors of whales and dolphins were also taking to the water.

By the Oligocene Period (33–23 million years ago), because of continual erosion, New Zealand had become a few remnants in a shallow sea. The competition for land and the loss of habitats caused many land species to be lost. Some ancient podocarp species became extinct. Kahikatea and rimu survived and were joined later by miro and tōtara and, later still, mataī. Kauri finally replaced its ancestor and began to form the magnificent kauri forests that were to clothe the north of New Zealand.

At this time, activity along the plate boundary between the Australian and Pacific tectonic plates began piling up sediments and volcanic activity added to the growing landmass. There was now space and many more ecological niches to fill.

During the Miocene Period (23–5.3 million years ago), the unique fauna and flora we know today evolved. The takahē and kākāpō ancestors appeared about this time. Without large predators, many of our native birds became larger and lost the ability to fly. Others, like the robin and kererū, got bigger but still retained some flying skills.

During the last 2.2 million years there have been 12 ice ages. These caused changes in sea levels that greatly enhanced the rate of evolution of new species. During the ice ages, the sea level dropped joining offshore islands to the mainland by land bridges. This allowed plants and animals to spread but then they would become isolated as the sea level rose during the interglacial periods. During isolation, populations on different islands developed different habits and food preferences that they retained, when they next came together during the next ice age. As a result, new subspecies and species developed.

The sea and rivers had worn the land around the south Wellington coast into broad beaches. However, we can now see these beaches or wave platforms high above the coast road because of continuing uplift caused by tectonic forces in the last 100,000 years.

Kererū.

Trees

Podocarps

Podocarps—rimu, tōtara, kahikatea, miro, mataī—are the grand old patriarchs of the forest—the original children of Tāne. Ancestors of mosses and ferns made it to New Zealand first, but none were destined to stand 60 m tall like the mighty kahikatea, our tallest native tree.

Podocarps are easily worked with stone tools, so they were useful for carving, canoes and housing. The podocarps have soft fibres that allow the wood to be worked both across and with the grain.

The French and English discovered the same thing, in the early 19th century, when both countries were desperate to find timber resources for building warships for the Napoleonic wars.

Top: rimu; above (from left): rimu, tōtara, kahikatea.

From top: mature miro tree, miro foliage, mataī foliage and male cones.

Beeches

At one time, a large portion of Gondwanaland was covered in beech forests. As Gondwanaland broke apart, ice wiped the forests from Antarctica. All that remained of the beech forests were remnants in New Zealand and South America. When the ancestors of beech trees were evolving, there were no insects, reptiles or birds to spread their pollen and seeds. They relied on the wind to spread pollen, and wind and water to spread their seeds.

Top: Beech forest. Above: (left) hard beech, (right) black beech.

Rewarewa

The ancestry of the rewarewa can be traced back 100 million years when New Zealand was still part of an extensive landmass. It is a member of the protea family and has many close relatives in Australia and South Africa. Rewarewa's ancestor must have relied on reptiles to carry its pollen, as birds did not appear until the dinosaur died out 65 million years ago.

Kaikōmako

Kaikōmako, like many other New Zealand trees and shrubs, have a twiggy (divaricating) growth habit when they are young. This habit probably reduced the damage browsing birds (moa) could do. When the trees grow past moa height the larger mature leaves form and the branches spread out normally. The black fruit are a favourite of the bellbird. Kaikōmako were used by the earliest Polynesian settlers for fire-making.

Pukatea

The ancestry of pukatea can be traced back 40–50 million years. This makes pukatea a fairly recent arrival on our shores. New Zealand was isolated from other land masses by this time. Each seed has a parachute of hairs to catch the breeze, so seeds were probably carried here by the wind. Westerly winds probably brought seeds around the globe from Chile where its two closest relatives live.

Nīkau

Nīkau is the most southern naturally growing palm tree. Nīkau and the vine kiekie give the bush a lush tropical feel. Along with some of the tree ferns, these plants invaded when ancient New Zealand had links with New Caledonia and other tropical land masses.

Northern rātā

The rātā belongs to the myrtle family. It has characteristic flowers that lack showy petals, but instead the stamens make a grand show to attract pollinating birds and geckoes.

Northern rātā, commonly begins life as an epiphyte, high in the branches of another tree. Once established it sends down vines, which take root in the forest floor at the base of the host tree. These vines then begin to grow into thick trunks, which supply the developing crown with water and nutrients.

The host tree then has a problem. It is harder to get nutrients and water, and its leaves are shaded by those of the rātā. Eventually the host gives up and dies. The original tree will, in time, decay but the rātā will not fall. Its own trunks are by now well able to support it.

When you come across a grand old rātā you may be able to stand in the space between its trunks.

Introduced species

Gorse

Gorse was imported from Scotland to be a hedge plant. It flourished in the New Zealand climate. It has two flowerings each year, which greatly increases its ability to multiply. Some pests have been introduced to help stop the spread of gorse but this hasn't been very effective.

Recently, gorse has been accepted as a valuable nursery plant that helps the regeneration of native bush. The gorse gets established much more quickly than the native nursery plants, mānuka and kānuka. Gorse is also a nitrogen fixing plant and has a short life. After about 20 years, it has grown to full size and begins falling apart and lets light reach the ground. The native seedlings, waiting below the gorse, then race skywards. This blocks the sun from the gorse, which then dies.

However, gorse thrives on fire. Fire cracks the hard gorse seed so that after a fire there will be thousands of seedlings competing for space.

Pines

Pines are natives of North America. They also find the New Zealand climate very suitable for their growth. However, pines produce a thick mat of pine needles which are very acid and not suitable for the growth of many natives. Our canopy trees are too short to compete with pines so a pine forest provides little food for native wildlife.

For more information, see *New Zealand Geographic*, Oct–Dec 1993, No. 20.

Activity template: Bird monitoring at your school

Record whether the species is seen or heard. s = bird seen; h = bird heard.

Location: **Dates:** **Start time:** **Finish time:** **Weather:**	**tūī**	**silvereye**	**fantail**	**grey warbler**	**kererū**	**bellbird**	**rifleman**	**whitehead**	**kākāriki (red crowned)**	**kākāriki (yellow crowned)**	**kingfisher**	**pūkeko**	**kākā**	**welcome swallow**			
Mon																	
Tues																	
Weds																	
Thurs																	
Fri																	

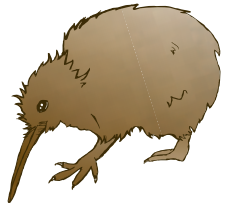
Method

Photocopy and use the table above to record native bird species you see or hear at your school over a 10-minute period.

1. Continue regular monitoring to see if the number of species changes.
2. You can choose to monitor every day of the week, four times a year or just one day each month. This depends on what you want to find out. You may want to see what birds are present in different months, or you may want to know if more or less species are visiting your school at the same time each year.
3. Aim to set up about 6 monitoring points at your school with approximately a 100m radius (make sure they don't overlap). If the area you are monitoring is small you can set less monitoring points, and if big, you can do more. Mark the monitoring points and always stand at this site to do the monitoring.
4. Monitor early in the day, always at the same time and when it's nice and quiet (i.e., not at break times!)
5. Always record what the weather is like.

Visit the following websites for information on native bird identification:

www.whatbird.co.nz/
www.doc.govt.nz/conservation/native-animals/birds/land-birds/



Plants for native birds

Gardening suggestions for the lower North Island

COMMON NAME	BOTANICAL NAME	2+	❋	J	F	M	A	M	J	J	A	S	O	N	D
Akatea	*Metrosideros fulgens*					N	N	N	N	N					
Astelia	*Astelia nervosa*			N	A	F	F	F							
Cabbage tree / Tī kōuka	*Cordyline australis*			F	F	F	F							N	
Fivefinger / Whauwhaupaku	*Pseudopanax arboreus*	2+			F	F	F	F							
Flax (mountain) / Whaririki	*Phormium cookianum*			N									N	N	N
Flax (lowland) / Harakeke	*Phormium tenax*			N										N	N
Hīnau	*Elaeocarpus dentatus*			F	F	F	F	F							F
Kahikatea	*Dacrycarpus dacrydioides*					F	F	F							
Kaikōmako	*Pennantia corymbosa*	2+		F	F	F	F							N	N
Kanono	*Coprosma grandifolia*	2+			F	F	F	F							
Karamu	*Coprosma lucida*	2+		F	F	F	F								
Karamu	*Coprosma rhamnoides*	2+			F	F	F								
Karamū	*Coprosma robusta*	2+			F	F	F	F							
Kawakawa	*Macropiper excelsum*		❋	F	F										
Kohekohe	*Dysoxylum spectabile*							N	N	N	N				
Kōhūhū	*Pittosporum tenuifolium*			N	F	F	F	F					N	N	N
Kōtukutuku	*Fuchsia excorticata*	2+		F	F	F					N	N	N	N	A
Korokio	*Corokia cotoneaster*				F	F	F					N	N	N	
Kōwhai	*Sophora microphylla*											N	N	N	
Kōwhai 'Dragon's Gold'	*Sophora molloyi*							N	N	N					
Māhoe	*Melicytus ramiflorus*	2+	❋		F	F	F								
Māpou	*Myrsine australis*					F	F	F	F	F	F	F	F		
Miro	*Prumnopitys ferruginea*					F	F	F	F						
Northern rātā	*Metrosideros robusta*			N	N	N	N								N
NZ blueberry / Tūrutu	*Dianella nigra*			F	F									F	F
Patē	*Schefflera digitata*		❋			F	F								
Pigeonwood / Porokaiwhiri	*Hedycarya arborea*	2+	❋	F	F	F	F							F	F
Putaputāwētā	*Carpodetus serratus*					F	F	F							
Rewarewa	*Knightia excelsa*											N	N	N	N
Rimu	*Dacrydium cupressinum*	2+				F	F	F							
Tarata	*Pittosporum eugenioides*	2+				F	F	F					N	N	N
Taupata	*Coprosma repens*		❋	F	F	F									
Tawa	*Beilschmiedia tawa*					F	F								
Tītoki	*Alectryon excelsus*		❋	F	F								F	F	F
Toropapa	*Alseuosmia pusilla*										N	N	N		
Tōtara	*Podocarpus tōtara*					F	F								
Wharangi	*Melicope ternata*		❋		F	F									
Wineberry / Makomako	*Aristotelia serrata*	2+		F	F	F									

N Nectar

F Fruit and seeds

A Fruit, seeds and nectar

2+ Species for which several individuals may have to be planted to ensure fruiting

❋ Frost tender (especially when young)

Forest succession

Curriculum links

Students can:

- Find out how a forest attempts to grow back again after it has been cleared.
- Identify and carry out actions to restore native bush in local areas.

Links can be made to:

Science – Living World

Students can:

L2-6 – investigate the forest succession that follows environmental changes such as earthquake, fire, or logging.

L2-6 – investigate special features of plants that help survival into the next generation.

Social Sciences- Social Studies

Students can:

L1-5 – Students will gain knowledge, skills and experience to understand how places in New Zealand are significant for people; how places influence people and people influence places; how people view and use places differently; and how different groups interact with the environment.

English

Links can be made to a range of oral, written and visual language objectives.

Forest succession – suggested activities

Pre-visit

Students can:

- Find out how your local environment has changed over the last 100 years. Was it once covered in bush? If so, why/how was it cleared?
- Part of Rimutaka Forest Park was cleared for a pine plantation in the 1970s. Those pines have recently been logged and the native forest is regenerating. Find meanings for the words regeneration, revegetation.

On-site

Students can:

- Observe how a new forest grows. (See Catchpool activity card 5)
- Identify the successional stages evident in the Catchpool Valley forest. (See Catchpool activity card 5)
- Investigate the special characteristics of plants in different successional groups.

Post-visit

Students can:

- Research the history of native bush in your local community – interview locals, access photo collections.
- Research how schools are working to restore native ecosystems in their communities and write an action plan for improving an area of native bush in your school or community. (See the Action Plan template, page 32).

Action plan template

(Taken from the *Guidelines for Environmental Education in New Zealand Schools*, 1999, page 74.)
The following diagram shows how you can start to think about an action-orientated approach to environmental education. This process should always be evaluated as you work through it, to check that you are headed towards your decision.

Choose an issue or topic

(This could be local, national or global.)

Identify the skills required

These could be:

- research and investigation
- monitoring
- using different media for communication
- analysing information
- generating solutions
- problem solving

Identify the roles and processes within decision-making

These could include:

- knowing about law reforms
- establishing role responsibilities
- identifying the most effective decision-making process
- knowing how to influence the decision
- knowing the role of the media
- knowing the role of lobby groups

Action

(Individual or group.)

Explore different attitudes and values by *identifying people's:*

- feelings
- ideas
- opinions

to:

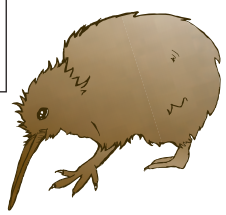
- clarify values
- understand conflicts
- achieve consensus about possible action

Develop awareness *through:*

- personal experiences
- visits
- videos
- visiting speakers
- audiotapes
- visual aids

Identify and enhance knowledge and understanding

through the essential learning areas where appropriate



Restoring the forest

Curriculum links

Students can:

- Investigate how people are taking action to restore a native forest after the logging of a pine forest.
- Use this knowledge to guide a revegetation project of their own.

Links can be made to:

Science—Planet Earth and Beyond

Students can:

L1–2—investigate the response of the native plants to habitat changes caused by fire and logging. (See Revegetation and regeneration at Catchpool, page 35)

Science—Living World

Students can:

L2–6—investigate the response of the native plants to habitat changes caused by fire and logging. (See Revegetation and regeneration at Catchpool, page 35)

L1–8—justify their involvement in a revegetation project.

L3–8—carry out an extended investigation of the implications of allowing natural regeneration or using revegetation techniques in the Catchpool area.

Social Sciences- Social Studies

L5—students will gain knowledge, skills and experience to understand how people's management of resources impacts on environmental and social sustainability.

Social Sciences- Geography

L6–8—students will gain knowledge, skills and experience to understand how people interact with natural & cultural environments and that this interaction has consequences.

English

Links can be made to a range of oral, written and visual language objectives.

Restoring the forest – suggested activities

Pre-visit

Students can:

- Investigate the process of natural regeneration and how it can be modified by a revegetation programme.
- Identify any areas in their community where revegetation projects are in progress. Who is responsible for them and how can people become involved?
- Find out about the native plants in your area (www.nzpcn.org.nz)

On-site

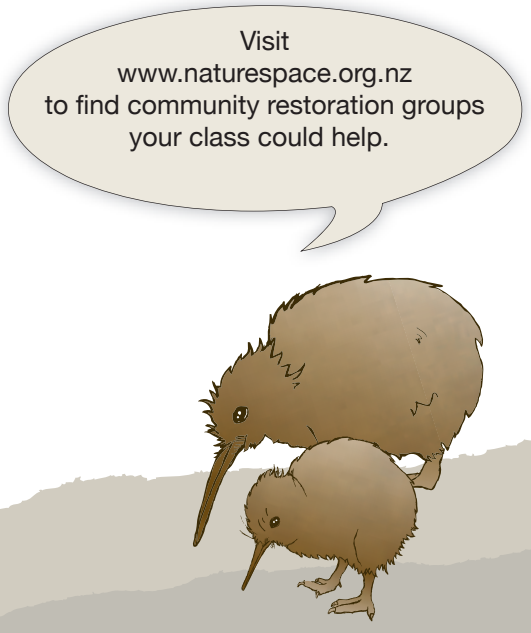
Students can:

- Apply understanding of natural succession in order to understand the regeneration process in action at Catchpool Valley. (See Catchpool activity card 6.)
- Identify signs of people's past interactions with the environment at Catchpool Valley and consider the views of today's managers and users of the park.
- Compare areas of natural regeneration with an area that is part of a revegetation project.

Post-visit

Students can:

- Learn about projects by other schools/ community groups by researching on the internet.
- Take action to improve your local bush.
  - Collect seeds and grow native seedlings.
  - Get support from your regional or local council.
  - Take photos to add to your records. Students can compare growth in 5 years/10 years time and be inspired to continue their project. (See photo points to monitor planting projects, page 36.)



Revegetation and regeneration at Catchpool

Pine trees have been harvested at Catchpool Valley. The native seedlings that survived the forestry operation grew quickly in the bare hillsides with so much light.

Regeneration is occurring naturally. The first to grow are the colonisers (plants that can grow quickly on disturbed ground), such as mānuka, kānuka, tutu, koromiko, rangiora, patē, and kanono. These plants provide shade and shelter for the next plants that will eventually overgrow their nursery and form the canopy of the bush.

Tutu is a coloniser of bare ground, and grows quickly to a shrub up to 6 metres tall.

The canopy species, such as tawa, māhoe, kohekohe, pigeonwood, karaka, tītoki will eventually be overtopped by taller, emergent trees such as rewarewa, rimu, kahikatea, mataī, miro and pukatea. Ferns, climbers and epiphytes (perching plants) will all find their places in the forest.

This sequence is a process called natural biological succession. Each new community of organisms changes the environment, making it suitable for other species to grow.

The new bush will not necessarily look like it was before humans destroyed it. This is because the soil conditions, climate and seed sources will all be different than they were before.

Sometimes regeneration is given a hand by planning a revegetation or restoration programme. The plan should include the following steps:

Plan of action

- Selection of site
- Assessment of site
- Preparation of site
- Plant selection
- Propagation of plants
- Planting
- Maintenance

(Taken from Revegetation Manual, Boyden Evans, published by the Queen Elizabeth II National Trust).

Revegetation projects now rely heavily on gorse to be the coloniser/nursery plant. Usually within 20 years of major disturbance, a canopy of native species can overgrow gorse. Mānuka can produce stands that last for 60 years or more before other native species overgrow them.

Revegetation work at Catchpool is being carried out by community groups, led by the Rimutaka Forest Park Trust and supported by the Department of Conservation.

Revegetation efforts at Catchpool Valley involve clearing weeds, especially wilding pines that have regenerated since the pine forest was harvested, planting suitable native species in selected areas, and ensuring that weeds do not reinvade and overwhelm the newly planted specimens. Photo: Matt Barnett.

Photo points to monitor planting projects

Photo points are photographs taken in exactly the same place at different times. Community groups, ecologists and schools use photopoints to monitor their planting projects. It is important to always label your photographs as you take them. For each photograph record the location, date and name of the photographer.

It's also important that you can easily find the exact spot you took the photo from when you return in the future to take another shot. Some people use GPS to do this accurately, but if you include one or two significant permanent features—such as buildings, streams, or large trees—you should be able to return to your point easily.

Catchpool Valley—100 m north of Catchpool Centre

August 2006

October 2011

August 2006

October 2011

Additional information to support Catchpool Valley activities

Books and DVD

New Zealand native birds of bush and countryside

Ralph Powlesland, Penguin Pocket Guides, 1996

Which native tree

Andrew Crowe, Penguin, 2009

Plant me instead

DOC, 2005

Nga taonga o te ngahere

Tom Paul, DOC, 1987

Native forest restoration

Tim Porteous, QEII National Trust, 1993.

Propagation of New Zealand native plants

Lawrie Metcalf, Godwit, 1995

Rimutaka Forest Park DVD

DOC

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Websites

www.doc.govt.nz

Department of Conservation

Navigate to Conservation > Native plants

www.rimutakatrust.org.nz

Rimutaka Forest Park Trust

www.nzpcn.org.nz

New Zealand Plant Conservation Network

www.naturespace.org.nz

Ecological restoration in Aotearoa