

ENHANCING BIODIVERSITY IN YOUR GREEN SPACE

Education resource



Bee on manuka. Photo: Shan Walker

Department of
Conservation
Te Papa Atawhai

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A. Introduction



What is biodiversity?

Biodiversity is the variety of living things in a place. Increased biodiversity reflects a healthy and ecologically richer environment. This resource provides ideas and learning experiences to enhance the native and endemic biodiversity in your green space.

What is an ecosystem?

An ecosystem includes the living (e.g., animals and plants) and non-living features (e.g., soil, sun, water) of the environment. Living things in a green space ecosystem interact and rely on each other and the environment to keep the flow of energy and cycle of nutrients going, for their health and survival. It is like a big natural system: hence the name 'eco-system'.

The introduction of plant and/or animal pests can harm or alter the natural balance within an ecosystem.

Healthy green space ecosystems

Clean, stable environments with plenty of native biodiversity can produce healthy ecosystems. Healthy ecosystems provide a range of services (important for our wellbeing), such as: nutrient filled soils, clean pure water, oxygenated air, storage of carbon, reduction of climate change, and waste management.

Healthy ecosystems are sustainable- they can function well over long periods of time and can bounce back from small problems.

Why enhance native biodiversity?

New Zealand's plants, animals and ecosystems are unique and special. In many parts of the country, green space ecosystems become threatened, damaged or lost due to increased human use. The loss and damage of ecosystems over time has caused many native animals and plants to become threatened or endangered.

Planting, creating habitat or controlling pests and weeds will increase biodiversity and attract more native animals (including birds, lizards and invertebrates) to your area, improving their chances of survival. Enhancing biodiversity will also improve the overall health, functioning and appearance of your local environment.

The big picture

You are a part of the biodiversity in your local environment. All living things including plants, animals and people are connected. What you do makes a difference and can contribute to a future where our native biodiversity is healthy and plentiful.



It's all connected

In the previous IN the environment resources (**Resources 1-6**) you explored the native birds, invertebrates, trees, animal pests and pest plants living in your green space. This resource explores the relationships between these living things and how you can enhance the health of your green space.

Key concepts

Using this resource, students can:

- come to conclusions about which plants and animals are living in their green space
- gain an appreciation for how plants and animals interact with each other in an ecosystem
- plan to enhance native biodiversity in their green space

Key vocabulary

• **biodiversity** • **conservation** • **ecosystem** • **healthy** • **kaitiaki**,
• **kaitiakitanga** • **manaaki** • **mauri** • **restoration**

Biodiversity The variety of life on Earth. The huge range of all living things including: plants, animals (such as birds and invertebrates), fungi, bacteria and microorganisms.

Conservation Protecting natural resources such as plants and animals.

Ecosystem An ecosystem is all of the plants, animals and other living and non-living things, interacting with each other in a particular place.

Healthy A state of wellness. Not sick or unwell.

Kaitiaki Tangata whenua who have been given responsibility to protect and look after an area's resources. They act to restore ecosystems through a holistic approach, recognising that all things are interconnected.

Kaitiakitanga Kaitiakitanga is a way of thinking about and looking after the environment in order to help maintain the balance of everything within it. It can be loosely translated into English as protection or guardianship.

Manaaki To look after and care for resources so that we have them for the future.

Mauri The essence or life force in all aspects of nature.

Restoration Helping a disturbed ecosystem to become balanced and healthy through human actions such as planting and pest control.

Symbols used in this resource



This symbol represents New Zealand Curriculum links included in the resource.



This symbol represents hands-on, outdoor learning experiences. These experiences encourage student connection to a local natural environment.



This symbol represents student activities to learn about enhancing biodiversity and reflect on their hands-on, outdoor learning experiences.



This symbol represents inquiry-based learning experiences.



This symbol represents learning experiences around Mātauranga Māori (Māori knowledge and perspectives).



Curriculum links

Science

Planet Earth and Beyond: Earth systems

L1 & 2: Explore and describe natural features and resources.

Living World: Life processes

L 1 & 2: Recognise that all living things have certain requirements so they can stay alive.

L 3 & 4: Recognise that there are life processes common to all living things and that these occur in different ways.

Living World: Ecology

L 1 & 2: Recognise that living things are suited to their particular habitat

L3 & 4: Explain how living things are suited to their particular habitat and how they respond to changes, both natural and human-induced.

Nature of Science: Investigating in science, Communicating in science, Understanding about science, Participating and contributing.

Science capabilities: Gather and interpret data, use evidence, critique evidence, interpret representations and engage with science.

Health

Healthy Communities and Environments: Community resources

L2: Identify and use local community resources and explain how these contribute to a healthy community.

Healthy Communities and environments: People and the environment

L3: Plan and implement a programme to enhance an identified aspect of their (classroom or) environment.

Minor links

English: Listening, Reading and Viewing.

B. Suggested learning sequence



1. IDENTIFY A LOCAL GREEN SPACE in your school or community.
Explore the local green space using the **Exploring your local environment resource**



2. EXPERIENCE BIRDS IN YOUR GREEN SPACE
Explore and investigate birds living in your green space using the **Experiencing birds in your green space resource**



3. EXPERIENCE INVERTEBRATES IN YOUR GREEN SPACE
Explore and investigate invertebrates in your green space using the **Experiencing invertebrates in your green space resource**



4. EXPERIENCE NATIVE TREES IN YOUR GREEN SPACE
Explore and investigate plants and trees in your green space using the **Experiencing native trees in your green space resource**



5. INVESTIGATE ANIMAL PESTS IN YOUR GREEN SPACE
Explore and investigate animal pests in your green space using the **Investigating animal pests in your green space resource**



6. INVESTIGATE PLANT PESTS IN YOUR GREEN SPACE
Explore and investigate plant pests in your green space using the **Investigating plant pests in your green space resource**



7. ENHANCE BIODIVERSITY and come to conclusions about issues in your green space using this resource:

Reconnect with your green space. Reflect on learning during your inquiry throughout the previous resources.

Come to conclusions about the biodiversity in your green space. Develop conclusions about what is living in your green space and its health.

Learn about the connections in your green space. Learn about the interactions and connections of living things in your green space.

Extend thinking about green spaces and future focussed thinking. Explore Māori perspectives. Add to big picture knowledge about your green space.

Form a plan to enhance biodiversity. Choose an endemic/native species to bring back or enhance in your green space.

Share knowledge and take the next steps. Share findings and take steps to enhance biodiversity in their green space.



YOU ARE HERE



8. FORM AN ACTION PLAN
for your green space using the **Tools for action resource**

C. Reconnecting with biodiversity in your green space



Establish prior knowledge of students and reflect on prior learning with these learning experiences



Animal observations

Look and listen for native animals in your green space. Students can choose an animal (e.g. native bird or invertebrate) to observe over time. Plan how students will observe these animals at different times of the day.

What do students notice about their chosen animal? (For example: what is it doing at different times? Where has it been seen? How many have been seen?)

Take photos and record any observations.



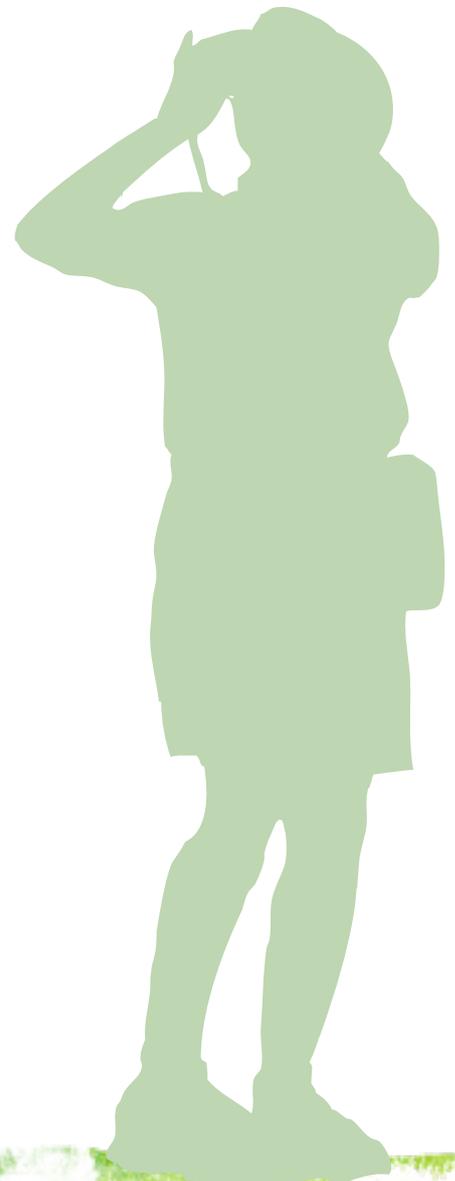
Making sense of observations

After making your observations, reflect on your photos, data and notes to answer these questions:

- Why would this animal choose to live in your green space? How does this animal meet its needs? What are its food and water sources?
- Where does it shelter from the weather, live and/or nest?
- How does what you have observed fit with what you know about this animal? What questions does this bring up?



Bellbird on Harakeke (flax). Photo: Andrew Walmsley





Animal role play

Role play being an animal in your green space. Include your observations in your role play to show what this bird or insects' life might be like.



Observing the role of trees

Students can choose a tree or group of trees to observe over a period of time.

What animals do they notice in and around this tree? Record any interactions between animals and the tree.

Look closely for birds and invertebrates on the branches, trunk and in surrounding soil.

Students can consider:

- What reasons would the observed animals have for visiting or living on this tree?
- Try to imagine what the role of this tree could be in the ecosystem. What connections does this tree have with other (unseen) living and non-living things in the green space?
- What else do you notice about this tree?

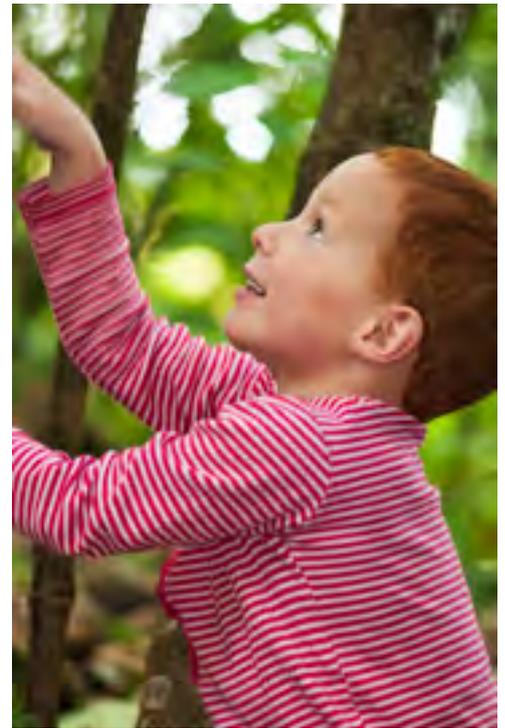


Photo: Nicole Portner



D. Reflecting on findings from previous resources



Look back at your results from the following resources (if working through the learning sequence on page 6):

- Bird survey from the **Experiencing birds in your green space resource** (pages 10-12)
- Invertebrate survey from the **Experiencing invertebrates in your green space resource** (pages 15-18)
- Native tree survey (Identifying native trees- gathering data) from the **Experiencing native trees in your green space resource** (pages 15-17)

Discuss which native birds, invertebrates and trees you have found in your green space. What foods, habitat, conditions and other factors make your green space suited to the animals/ trees observed there?

Also reflect back on which pests were found from your previous results (if working through the learning sequence on page 6):

- Animal pest monitoring (Gathering data: tracking tunnels and animal pest monitoring) from **Investigating animal pests in your green space** (pages 11-14)
- Weed survey from **Investigating plant pests in your green space** (page 12)



Recording your biodiversity

Record a combined summary of your data on **Results and conclusions about life in your green space.**

Using your summary create a detailed map or drawing of biodiversity in your green space.

Alternatively, create a digital representation of your data through results recorded in **iNaturalistNZ** or on the **iNaturalist app.**

For tips on how to use iNaturalistNZ, see **Exploring your local environment resource** (page 17) and **blog.core-ed.org**

E. Learning about connections in your green space



Curriculum links

Science: Nature of science:
Investigating in science,
Communicating in science

Living world: Life processes

Planet Earth and Beyond: Earth system

Minor curriculum links: English:
Reading, viewing and listening, Ideas

Science capabilities: Interpret representations, Engage with science

Learning outcome

Students are learning to:

Understand how the living things in their green space rely on each other to survive

Success criteria

Students can:

Describe how animals rely on plants to live, feed and survive

How plants and animals meet their feeding needs

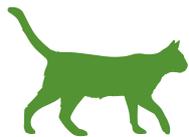
Plants produce their own food using the sun's energy: they are known as producers. Animals consume other sources of food to survive (they are known as consumers). Plants and animals are connected in the ways they gain energy and feed. Animals are dependent on plants for their survival.

Producers Trees and plants are producers: they make their own food and energy

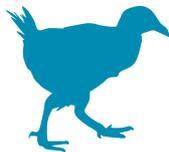
Consumers Consumers eat producers or other consumers to survive



Herbivores These animals eat only plants e.g., grasshopper.



Carnivores These animals eat mostly meat (other animals), by predation or scavenging, e.g., cat, dog.



Omnivores These animals eat both plants and meat (other animals), e.g., tūī and weka.



Insectivores Insectivores eat only insects, e.g., grey warblers and fantails.



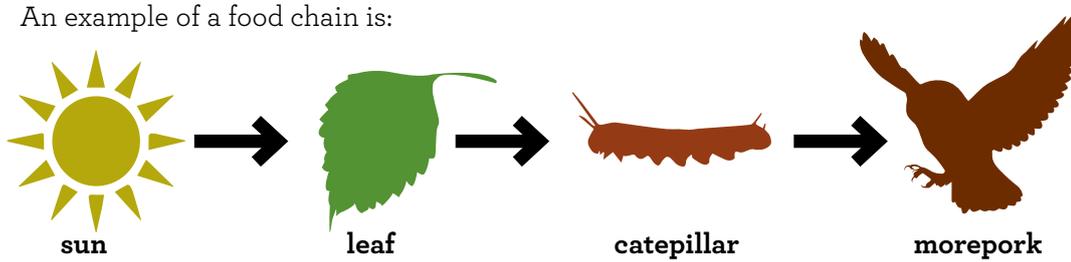
Top predator These carnivores eat only other consumers. They have no predators of their own, e.g., morepork, harrier hawk.

Food chains and food webs

Food chains

Food chains show how energy is passed from plants to animals in an ecosystem.

An example of a food chain is:



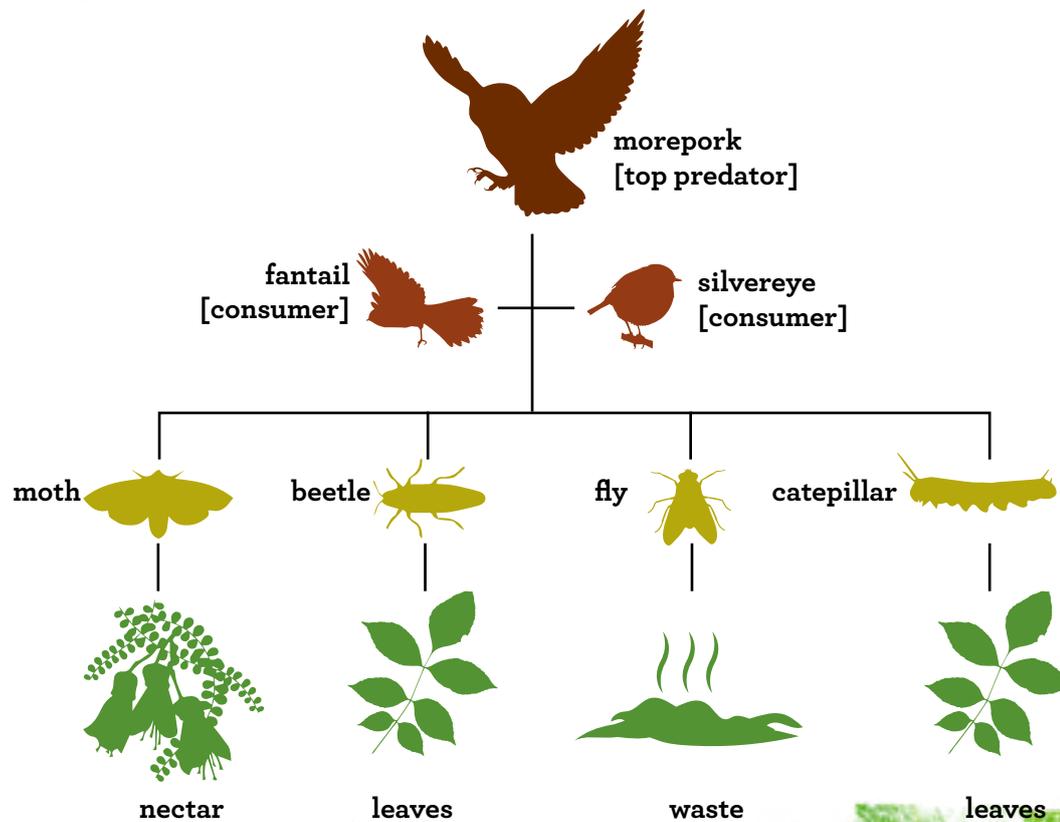
Arrows represent energy moving from one source to another. Above, the leaves in a plant use the sun's energy and other resources to make it's own food. The leaves are then eaten by the caterpillar which is then eaten by the morepork. Energy moves from the sun to the leaves to the caterpillar and then to the morepork.

Food webs

Food chains can be connected together to make food webs.

Food webs show the feeding relationships between plants and animals. They can be complex.

Example of a green space food web:





Students can then draw an example of a food chain or food web that could occur in their green space, considering which plants and animals have been found there.

For more ideas and activities about food chains and webs, see: Science Learning Hub's food web bucket on: pond.co.nz

How do plants and animals rely on one another?

Some plants rely on animals for transporting pollen between plants (enabling pollination- the reproduction of plants). Animals also help with seed dispersal, nutrient cycling and the production of carbon dioxide used in photosynthesis.



Tūi feeding on flax. Photo credit: ©Janice McKenna



Find out more about seed dispersal in plants through the Science Learning Hub's pollination pairs activity: beta.sciencelearn.org.nz

Animals rely on plants for many things including food, habitat, shelter and air to breathe.

Decomposers

Energy and nutrients are passed along the food chain. Decomposers feed on waste from plants and animals. This returns nutrients back into the soil. Decomposers are mainly fungi, soil bacteria and some invertebrates.



White fungi growing on dead tree branches. Photo: Tony Wills on iNaturalist



Exploring the connections of trees, animals and pests

Use the following resources to explore possible food chains and food webs that may exist in your green space. These sheets can be used as an integrated literacy or research activity.

Animal connections sheets

[Fantail / pīwakawaka connections](#)

[Tūi/ koko connections](#)

[Kererū/ kūkupa connections](#)

[Grey warbler/ riroriro connections](#)

Other connections sheets

Tree connections sheets

Invertebrates information sheets

- Using the information on these connections/ information sheets, students can create a representation of the possible links between plants and animals in the green space. This could be done using a template like this one: [Connections between plants and animals in a green space](#) or in an appropriate digital format
- These connections could also be expressed outdoors in your green space through actions, speech or drama to reinforce learning.

F. Extending thinking about people and the green space



Curriculum links

Social Sciences: Social Studies

Science: Nature of science:
Participating and contributing

Science capabilities: Use evidence,
critique evidence, Engage with
science

Learning outcome

Students are learning to:

Understand how people use and
have used their green space in the
past and present

Success criteria

Students can:

Describe how people have changed
the green space over time

How have people changed the landscape of the green space over time?

Changing habitats

People have changed many native habitats over time as they have come to New Zealand to live and work. Habitats have been altered to suit people. People often want to clear the land of trees to farm the land and/or build places to work and play. Unfortunately native animals have been affected as their habitats have been altered, turned into fragments or destroyed. As introduced animals, plants and structures like roads and buildings change the landscape, there are fewer habitats available for native animals and plants.



A history of our green space

What changes have happened in your area and green space over time? What can students find out about the history of your area and green space?

- Find images or records of changes in your green space (e.g., old photographs or recordings)
- How do you think these changes have affected the biodiversity in your green space? (e.g. the clearing of trees for farmland in the early 1900's in the area changed the landscape and made the area more suitable for introduced animals than for native birds).

It is likely that your green space has undergone some changes to the landscape. New Zealand was once 80% forest- see interactive from Te Ara (encyclopaedia of NZ) teara.govt.nz



Māori perspectives in your green space

Ecosystems in a Māori world view

Māori acknowledge that people have a responsibility to maintain balance in the natural world and ensure ecosystems are healthy. They use complex systems to manage resources that have been passed down through generations over thousands of years. These systems are holistic and incorporate physical, environmental, spiritual and traditional perspectives.

It is understood that relationships between people, animals, plants and the environment are complex and a balance must be kept between the different elements. Māori use concepts such as whakapapa (connections and relationships between elements), and ritenga (customs, protocols and laws) such as: rahui (a temporary restriction) and tapu (sacredness) to help effectively manage resources for future generations.

For more information see: landcareresearch.co.nz, teara.govt.nz,
teara.govt.nz, teara.govt.nz

This video from the Science Learning Hub ‘The food of the Ngahere’ further explores the way traditional Māori understandings can inform modern scientific thinking: sciencelearn.org.nz

Values linking people to the environment

Manaakitanga and aroha

View this DOC webpage for links to videos about manaaki and aroha from Joe Harawira: doc.govt.nz.

Manaaki means ‘to look after and care for’. It is our responsibility to be guardians for our natural world. If we don’t look after and care for the resources, then we will not have them in the future.

Manaakitanga is caring for and looking after each other and the environment. This value is important when working with kaitiaki (guardians).

Aroha means ‘love’ but it actually refers to a lot more than that. It is about compassion for the environment and understanding the environment. We are all connected to the natural world. I am the tree- the tree is me. The tree provides for us. We must show aroha for everything within our natural world. We must have compassion for it, so that we build and grow into the future, not just for other people but for plants, animals and the world around us.

Mauri

Mauri is the ‘life essence’ or ‘life force’ present in all living things. All plants, animals, soil and water have mauri. Mauri connects these elements together. A place with plenty of mauri feels energised, vital and alive. A place where mauri is depleted feels stagnant, without life and low in energy.

The mauri of the natural world has been weakened by us not taking care of it as we should, however, we have the power to restore the mauri for the benefit of all living things.

Kaitiakitanga

Kaitiakitanga is a way of thinking about and looking after the environment in order to help maintain the balance of everything within it. It can be loosely translated into English as protection or guardianship. It can be compared to the concept of ecological sustainability. Tangata whenua in a particular area are given responsibility to protect and look after an area's resources by kaumatua and senior iwi members. These tangata whenua are recognised as kaitiaki. They act to restore ecosystems through a holistic approach, recognising that all things are interconnected. School students can support kaitiaki in their roles.

How can you contribute to kaitiakitanga in your green space?

Tangata whenua in your local environment/ rohe (tribal area)

Ask in your community or contact your local council for information about engaging with local iwi. You can also find your local iwi, marae and/or hapū using this website: maorimaps.com

- How have local iwi been involved over time in your green space or local area?
- How have they monitored the health of this environment over time?
- What traditional knowledge and observations of plants and animals have they used to help them make sense of the natural world? What cultural/ traditional or spiritual ways of knowing have also been used to understand the health of the environment?
- What are the iwi perspectives about any recent changes to the local environment?



Francis Haenga planting in the traditional maori medicine garden to support the kaupapa at Pokai marae, East Coast Bay of Plenty. Photo: Trudi Ngawhare

G. Reflecting on the health of your green space



Introducing a healthy green space

A healthy ecosystem

An ecosystem with a lot of biodiversity will have stronger networks and connections. A diverse, healthy ecosystem can deal with any changes and problems more easily.

To begin to understand what makes a healthy ecosystem, view the clip about 'The Big Picture'. Ruud 'The Bugman' Kleinpaste talks about the big picture of conservation:

doc.govt.nz.

This clip explores the following concepts:

- Everything is connected
- Water, cycles with insects, animals and us
- No waste- recycling nutrients and waste by invertebrates
- Every creature has a function- is eaten by another creature
- Diversity of life (biodiversity) makes up the big picture – provides us with balance and looks after our wellbeing. Do we look after it?

How healthy is your green space?

The health of your green space will affect how healthy the plants, animals and other living things are within it.



Assessing the health of your green space

Observe your green space and reflect on your previous findings.

Discuss the health of your green space, taking into account observations made and data collected using previous resources. Use the checklist and illustration on page 19 to help inform your decisions.

Also see: doc.govt.nz for ideas about what to look for in a healthy forest.



Healthy green space

- A wide variety of insects, invertebrates, birds and other animals living in and visiting the area
- Lots of endemic and native animals and plants are in the green space (lots of biodiversity)
- Soil is rich, dark, damp (looks like compost)
- Leaf litter is a thick layer
- Fresh, clean air
- Clean, unpolluted, cool water
- The green space is noisy at most times- with insect and bird calls often heard
- A natural habitat with few signs of human impacts
- Weeds not seen or hardly seen
- No sign of animal pests (droppings/ browsing)



Unhealthy green space

- Few insects, birds or other animals living in or visiting the area (Very little biodiversity)
- Soil is hard and/ or dry. Looks like clay or grey in colour.
- Not much leaf litter
- Air smells bad or unhealthy
- Few native plants/ trees, or unhealthy plants
- Dirty or polluted, warm water
- The green space is quiet at most times (during day and night)
- Human impacts such as rubbish/ litter
- Lots of introduced animal pests and weeds present
- Or signs of animal pests such as droppings and leaves, fruit and flowers eaten seen
- Lack of native seedlings



Mauri and a healthy green space

Reflect on the cultural indicator of mauri (see māori perspectives section, page 16). How does the mauri feel in your green space? (does it feel vital and alive or depleted and low?) This also relates to the health of the ecosystem.



Thinking about the health of your green space

How can you improve the health of your green space? What issues are influencing the health of your green space? What other questions do you have about the health of your green space? How could you answer these?

H. Coming to conclusions about biodiversity in your green space



Coming to conclusions about biodiversity

Review your reflections, data and observations from the previous exercises. Remind students of the definition of biodiversity (the variety of life).



Biodiversity in your green space

- Is there a lot of native and endemic biodiversity in your green space? Why do you think this is? If there are not many endemic or native living things what are the reasons for this?
- Is your green space part of a healthy ecosystem? How do you know?



Report writing: Conclusions about biodiversity

Students can record their findings through writing a report about the current situation and biodiversity found in the green space. Include:

- An introduction
- The body of text, including paragraphs about:
 - the various groups of animals and plants found in your green space, i.e., birds, invertebrates, trees, animal pests and plant pests found in your green space. You could include photographs, maps and/or illustrations you have taken.
 - the interactions the animals and plants/ trees could have
 - the health of your green space
- A concluding paragraph summing up your perspectives about biodiversity in your green space.

For more information about report writing, see: englishonline.tki.org.nz

I. Future focussed thinking



Future focussed thinking in your green space

Now students have come to conclusions about what is currently living in the green space and which animal and plant pests are present, they can start to make choices about which species they would like to see more of in future.

Learning sequence for enhancing biodiversity



Choosing native/ endemic animal and plant species to enhance

- Which native/ endemic animal (species) do you want to encourage into your green space or community? Why? (ensure this species is found naturally in your local area and could meet its needs in your green space)
- How can you encourage this species? (which foods, habitats or environments did you learn about during your inquiry that would attract these birds/ invertebrates/ lizards?)
- Identify which foods, habitat and other factors are preferred by this animal or plant. Are these already found in your green space? Is there enough food/ habitat/ shelter/ water/ light?
- What could the future look like for this species in your green space? Imagine a bright future for this species. What part could your students and community play in this future?
- Form a **Plan to enhance biodiversity** to help create this future

Targeting a focus issue

During your inquiry and investigations, what issues/ concerns have you come across in your green space? What is getting in the way of your preferred species living in your green space?

- Which animal pests are present?
- Which plant pests are there?

- How do these plant and animal pests influence your focus species?
- Looking at the pests and issues present- which is the most concerning?
- Why is this issue the most important/ concerning?
- Which issue are we passionate to do something about?

Select a focus issue for your green space. This should be the most threatening issue that you can do something about e.g., a plant or animal pest.

- How could we learn from other's experiences around this issue in the past? Imagine a future where this issue does not exist.
- How could your staff, students and community assist this best possible future to happen?
- Carry on to resource **Tools for environmental action** to plan how to target this issue.

J. Enhancing biodiversity: Forming a vision and goal



Curriculum links

Health: Healthy communities and environment

Science: Nature of science:
Participating and contributing

Science capabilities: Engage with science

Learning outcome

Students are learning to:

Plan to enhance biodiversity and the health of the local environment

Success criteria

Students can:

Form a plan to enhance biodiversity

Forming a vision for the future

Do you have a goal for your green space? Which species are you trying to encourage? (see pages 21-22). What is your future vision of your green space? (how would you like it to look in future?)



As a result of working through the learning sequence on page 6: the previous 'IN' resources, students should now have an understanding of some of the connections between plants, animals and the environment in your local green space.

- Create a best possible future map or drawing of your green space
- Envisage the best possible future for native animals and plants.



Taupo Primary School students sharing the vision for their green space. Photo: Kids Greening Taupo programme

Looking at the big picture of restoration in your environment

- Are there any other restoration projects happening in your area?
- Does your local environmental community have larger environmental goals, e.g., wildlife corridors, bringing back a certain species, targeting a certain pest?
- Does your vision link to other visions for your region or for New Zealand? (e.g. Predator Free 2050 doc.govt.nz)

Working with others

- Which people/ groups are aligned to what we are doing? Who can help us?
- How can we work with Tangata Whenua/ kaitiaki in this area?

Work through the questions on [Plan to enhance biodiversity](#) with your students and community to help identify how you will enhance biodiversity in your green space.

Planting natives to attract NZ birds, invertebrates and other animals

Getting restoration right for your area

The best choices for which species of native trees and plants to enhance biodiversity in your area will depend on a variety of factors, including the climate, geography, soil types, sun exposure and water available. Planting an unsuitable species will probably mean it will not survive. Choosing the right species will ensure you have minimal maintenance for the restoration and your planting will thrive.

Are there experts in your community who could help with restoration?

Having expert advice about what to plant and how to enhance biodiversity in your unique local environment is important for the successful restoration of your green space. Involve your wider school community: you may have whanau/ families who include landscape architects, botanists, ecologists, gardeners or wildlife enthusiasts.

Often there are knowledgeable people in your community who can assist you in making good choices for planting and restoration in your location, and this can save a lot of time. Try approaching your local council, environment groups, environmental organisations or DOC (the Department of Conservation) for assistance in your planning.

For information about suitable plants for restoration in certain areas in NZ, see:

- Southland community nursery website and information sheets:
southlandcommunitynursery.org.nz
- Auckland Council -Native forest restoration guide:
aucklandcouncil.govt.nz

- Greater Wellington restoration planting guide: gw.govt.nz
- DOC Protecting and restoring our natural heritage- a practical guide: doc.govt.nz
- Plant me instead booklets: weedbusters.org.nz

See **Tools for environmental action** resource for details on how to plan your environmental action.

Encouraging native New Zealand birds to green spaces

Our endemic and native birds (e.g, tūī and grey warbler) are often in competition with introduced birds such as sparrows and mynas for food and resources.

Our native birds prefer native flower nectar, fruits, seeds, insects and other foods rather than grains or bread to eat. Therefore a successful way to encourage native/ endemic birds is to plant a variety of native trees.

Below is some information about foods for endemic birds that you may want to attract into your green space.

Preferences of endemic NZ birds

Species	Fruit	Foliage	Nectar	Insects	Other
Bellbird	x		x	x	
Fantail				x	
Grey Warbler				x	
Kaka	x		x	x	Seeds and tree sap
Kereru	x	x			Flowers
Kingfisher				x	Lizards, small rodents
Shining cuckoo				x	
Ruru/morepork				x	Small rodents, birds, lizards
Tui	x		x	x	
Wax/white/silvereye	x		x	x	

For more information about what to plant to attract different native animals, see: doc.govt.nz

For more information on birds links to trees and preferred foods see: doc.govt.nz

See also: [Animal connections information sheets.](#)

K. Resource list: Enhancing biodiversity



Websites

Attracting NZ butterflies to your green space forestandbird.org.nz

DOC's A-Z of animal pests: doc.govt.nz

Predator Free NZ: predatorfreenz.org

Pest detective: pestdetective.org.nz

War on Weeds: www.doc.govt.nz

School Journals

Lost in the bush, School Journal L2, Nov 2015

New Zealand Birds, Bronwen Wall, Ready to read series

Tūi, Junior Journal 49, Level 2, 2014

The parapara detectives, School Journal Level 3, October 2013

Kaupapa Kereru, School Journal Level 3, June 2012

Books

The house that Jack built, Gavin Bishop

Other resources

Planting for NZ bees treesforbeesnz.org

Forest and Bird: Creating a garden for insects forestandbird.org.nz

Attracting lizards to your garden: doc.govt.nz

Foods for birds table Which native trees and plants provide foods for native birds?

See: doc.govt.nz

Landcare Research- Garden Bird Survey's 'Where do birds feed?' presentation:

www.landcareresearch.co.nz

I. Sharing knowledge and taking next steps



Citizen science

Citizen science enables students to participate in the scientific community and contribute to increasing our knowledge about New Zealand's biodiversity. It connects students with experts in biology. Using citizen science, students can increase knowledge of their green space biodiversity and record information in a digital format. This participation contributes to the big picture of our biodiversity knowledge and conservation in NZ.

For citizen science projects suitable for NZ primary students see: pond.co.nz

iNaturalistNZ

Record observations of biodiversity via this well-known citizen science hub. Students can enter their observations onto the website to share information with science communities. You can also enter results for iNaturalistNZ on the **iNaturalist** app. Teachers will need to register at **iNaturalistNZ** before uploading observations.

If you have recorded your findings and observations from the resources through the iNaturalist app or on the iNaturalistNZ website, you will now have built up a comprehensive record of the bird, invertebrate and tree biodiversity in your green space. You can create your own 'place' (your green space) on iNaturalistNZ and make virtual borders around the area. An excellent feature of the app/ website is that experts can comment on your photos and observations and confirm or correct plant and animal identification.

For more information on how to use iNaturalistNZ, see the **Exploring your local environment resource** (page 17), and blog.core-ed.org

Sharing other findings

Students can create presentations, speeches, assembly items, newsletters or blogs to share information about the variety of biodiversity found in their green space, including their conclusions about how to enhance it.

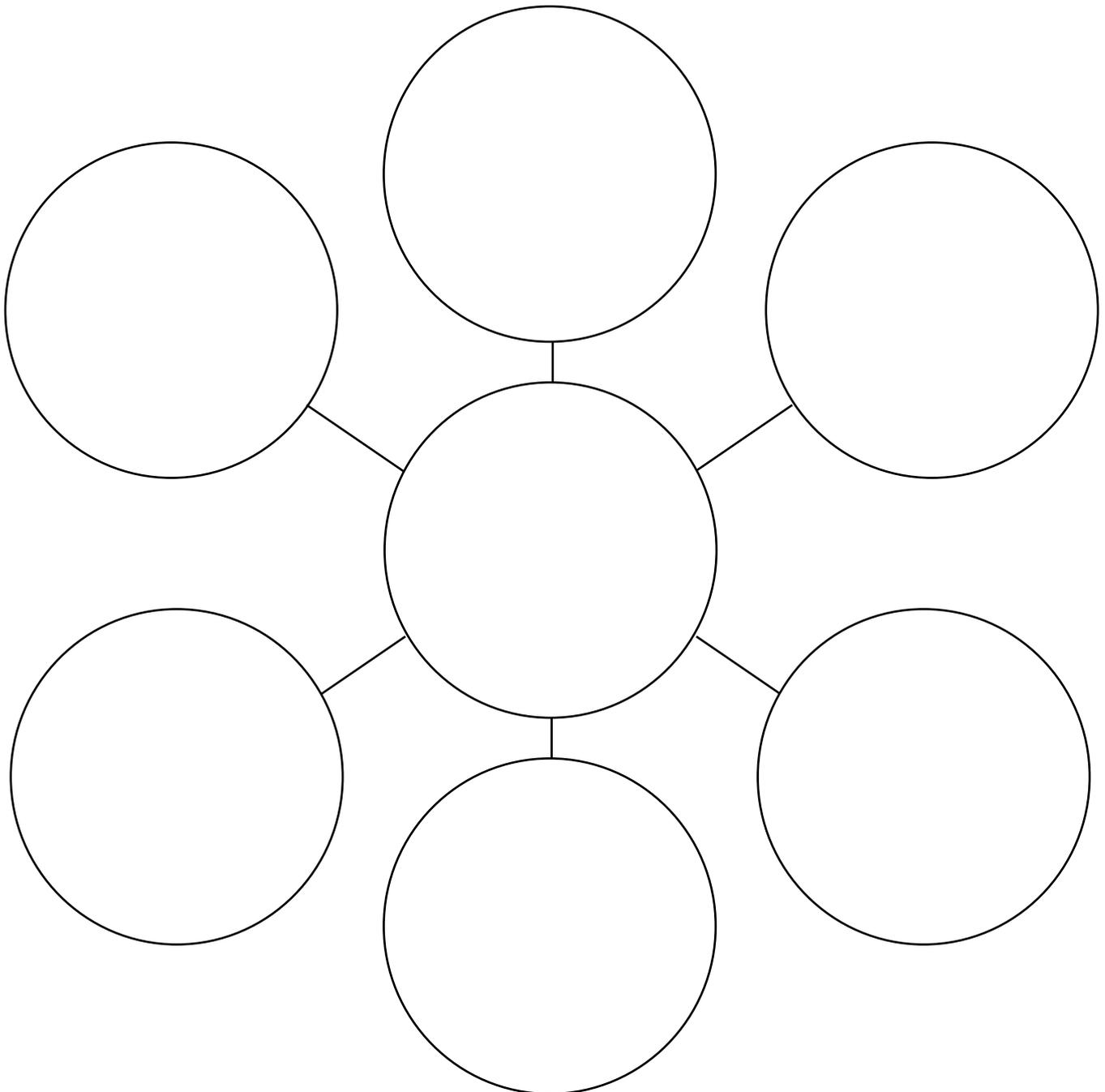
They may want to contact specific groups in the area and share information. Contact the Department of Conservation (DOC)'s education team at conserved@doc.govt.nz to share findings and ask questions. Sharing findings can lead to new opportunities for insight and environmental action.

Take the next steps and form an action plan

Use the **Tools for environmental action** resource to help students organise and plan an environmental action which could enhance the native animal and plant life in your green space. This could include planting to provide habitat, food or shelter in your green space and/ or dealing with introduced pests that may harm native animals. Continue learning about biodiversity. Network with others who are involved with restoration and conservation in your local area for inspiration and continued collaboration.

Connections between plants and animals in a green space

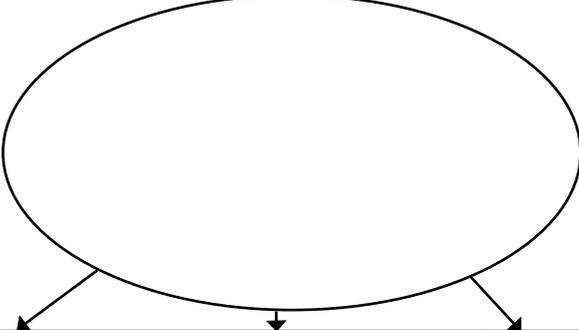
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Plan to enhance biodiversity

Download an editable version of this table from www.doc.govt.nz

<p>What is your goal for your green space?</p>	<p>Which plants and animals would suit the conditions in your green space?</p>	<p>Who owns/manages the green space? <i>*Public green spaces are usually managed by local councils</i></p> <p>Who needs to be asked about any possible changes?</p>
<p>Which native/ endemic animal do you want to see more of in your green space?</p> <div style="text-align: center;">  </div>		
<p>What do you know already about this animal?</p>	<p>What connections to trees or other animals does this animal have?</p>	<p>Which issue will you target for this animal?</p>
<p>How can you attract more of these animals to your green space?</p>		
<p>How will this help the big picture of restoration/ conservation in your area (or in New Zealand)?</p>		

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Results and conclusions about life in your green space

After completing your inquiry and the surveys in resources 1–6, use this guide to reflect on your findings and come to conclusions

Download an editable version of this table from www.doc.govt.nz

Living things observed in your green space	
Birds (types/ species)	Number of birds
Total number of birds:	
Invertebrates (types/ species)	Number of invertebrates
Total number of invertebrates:	
Plants/ trees (types/ species)	Number of plants/trees
Total number of plants/trees:	
Animal pests (types/ species)	Number of animal pests
Total number of animal pests:	
Plant pests (types/ species)	Number of plant pests
Total number of plant pests:	
Coming to conclusions about biodiversity in your green space	
What were the most common living things you found?	
What native animals/ plants were not found in your green space?	
Why do you think this is?	
What questions do you have?	

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Nesting

Fantails build nests in trees using mosses, spider webs, grasses, wood fibres, hair, and pieces of wood and fern. They have up to five chicks at a time.



Adult fantail feeding chick in nest. Photo: David Mudge



Foods

Fantails eat invertebrates such as moths, flies, beetles and spiders. Small fruit is sometimes eaten.

Fantail on Tiritiri Matangi Island. Photo: Johnathan Astin



Fantail / Pīwakawaka connections

Habitat

Fantails live in a wide range of habitats from parks and gardens to farms, orchards and forests.



Predators

Ship rats are great climbers. They eat fantails, chicks and eggs. Other pīwakawaka predators include cats, stoats and mynas. Mynas and magpies have been known to eat fantail eggs and chicks. Cats and stoats will also eat adult birds. Of all the eggs and chicks fantails produce, only a few survive and grow up to be adult birds.

Ship rat at fantail nest. Photo: David Mudge



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Foods

Kererū are herbivores (they only eat plants). Some of their favourite foods are fruit of nīkau, miro, cabbage tree and mahoe trees.

Kererū are very important for trees with large berries as they are one of the only surviving native birds with a beak large enough to eat them and spread the seeds through their droppings.

Other foods of the kererū include the leaves and flowers of some native plants and trees e.g., mahoe and kōwhai. In most areas leaves are an important food for kererū during winter when there are fewer flowers and fruit available.

Habitat

Gardens, parks, farms and forests are all habitats of kererū. They are found in large numbers in healthy native forests. Their feet are suited to perching on branches.

Nesting

Kererū build messy large nests in native trees using sticks. They have only one chick at a time.



Kererū. Photo: AndreaEL Photography



Kererū in nest. Photo: Peter Morrison

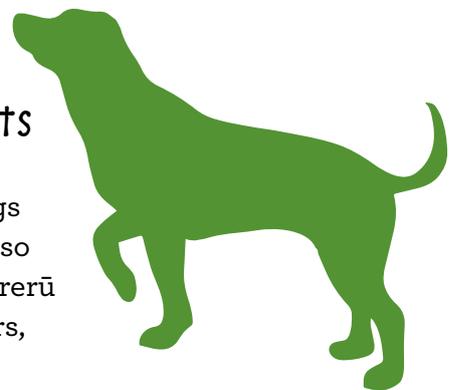


Kererū / KUKUPA CONNECTIONS



Predators/threats

Rats, stoats, cats and possums eat kererū eggs and young. Possums also compete with adult kererū for food (leaves, flowers, fruit).



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Foods

Grey warblers are insectivores. They feed on insects such as caterpillars, flies, beetles, moths and other small invertebrates.



Grey-warbler at nest. Photo: J.L. Kendrick

Predators/ threats

The shining cuckoo (an introduced bird) uses the grey warbler nests to lay its own egg in. When the shining cuckoo chick hatches it ejects all the grey warbler babies and is raised alone. Other predators include cats, stoats and mynas.

Grey Warbler. Photo: Tom Marshall



Grey warbler / hiroriro connections

Nesting

These birds have small hanging nests made from wool, sticks, feathers and moss. Grey warbler nests are usually found in thick trees with smaller leaves such as manuka and kanuka.

Shining Cuckoo. Photo: J.L. Kendrick



Habitat

Riroriro are found almost everywhere there are trees and shrubs, throughout New Zealand. They are often seen looking for food (insects) on the trunks and branches of trees.



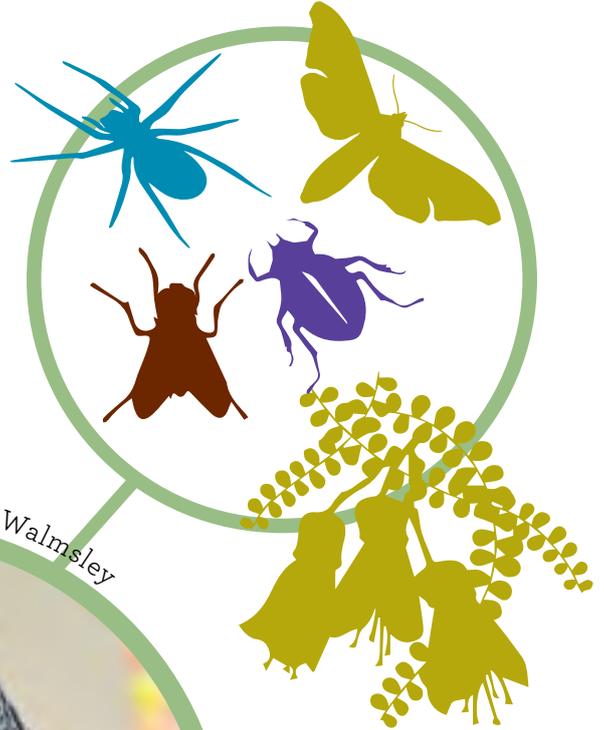
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Tūi feeding on kōwhai. Photo: Shellie Evans



Habitat

Tūi are common in native forests and areas nearby. They can live in a wide range of habitats as long as there is food available (nectar and insects from native trees).



Foods

Tūi are from the honeyeater family. Nectar is their favourite food. They drink nectar from flax, kōwhai, pōhutukawa, rata and other native flowers, using their long curved beaks and 'brush' tongues.

Tūi. Photo: Andrew Walmsley



They also eat invertebrates such as stick insects, cicadas and wētā, usually taken off trees.

Tūi will also eat fruit from trees such as kahikatea and mahoe.

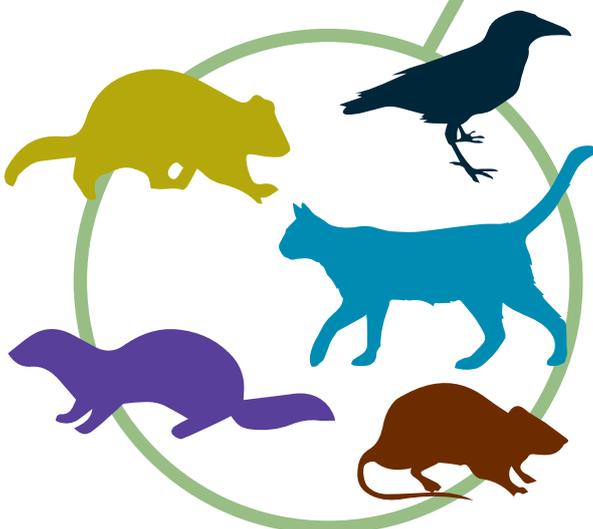
They spend their time visiting food trees, which they will defend from other birds.

Tūi/koko connections

Nesting

Female tūi build nests in native trees using mosses, grasses and twigs. They have two to four chicks at a time.

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Predators / threats

Since their introductions, possums, cats, rats, stoats, magpies and ferrets have affected tūi. These animals will eat tūi eggs, chicks and sometimes adults.