

Freshwater Biosecurity Guardians

Teacher Guide

Welcome to 'Freshwater Biosecurity Guardians', a learning resource designed for students in senior primary, intermediate, or junior secondary school levels. Through this resource, we aim to provide an accessible and enjoyable exploration of the vital concept of freshwater biosecurity.

In Aotearoa New Zealand, our freshwater ecosystems are central to our ecological, cultural and societal vitality. They are also facing increasing threats from invasive species and other environmental stressors. Through following this resource, students will embark on a journey to understand the importance of maintaining the health of our freshwater environments, and be empowered to take action to protect them.

This resource is designed to capture the attention, interest and creativity of students while fostering an understanding of why freshwater biosecurity matters. Through interactive activities, engaging content and real-life case studies, students will discover the impacts of invasive species such as the notorious Koi Carp on our freshwater ecosystems. They will learn how individual actions can make a meaningful difference in safeguarding our precious freshwater environments, and by the end of the journey they will be equipped with the knowledge, motivation and practical skills needed to actively contribute to freshwater biosecurity efforts. This resource is designed to be practical and meaningful for educators, offering a tool to enrich student learning in a way that aligns with multiple areas on the New Zealand Curriculum. Get ready to dive in and explore the fascinating world of freshwater biosecurity!

Session 1 - Introducing freshwater biosecurity

Learning objectives

- Understand what biosecurity is in Aotearoa New Zealand
- Understand what freshwater biosecurity is

Session 2 - Case Study Koi Carp

Learning objectives

- Understand the impacts that invasive species and pests can have on freshwater ecosystems, and why this is a problem
- Investigate Koi Carp as an example of a freshwater pest

Session 3 - Taking Action

Learning objectives

- Know how to take action to support freshwater biosecurity
- Explain what to do if you encounter a suspected invasive species
- Identify key messages regarding freshwater biosecurity, and share these messages with others



Session 1 - Introducing freshwater biosecurity

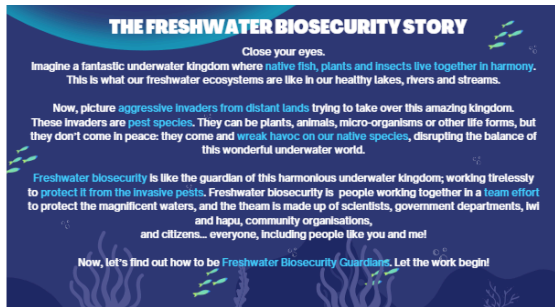
Learning objectives

- Understand what biosecurity is in Aotearoa New Zealand
- Understand what freshwater biosecurity is

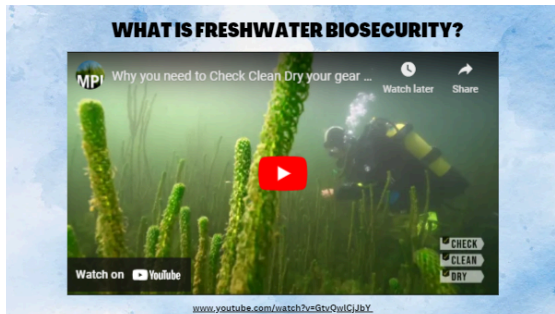
[Click here for Session 1 Slides](#)

Some activities have accompanying resources that require printing. These will be **highlighted in blue** and the page number requiring printing will be included.

Facilitation notes:



Facilitator encourages listeners to close their eyes and then reads the story on the slide slowly.



Play the video.



Divide students into small groups (3-5 students). Each group explores one of the main questions (black questions in the water splashes), using the smaller questions as prompts.

Printable pages to accompany this activity can be found on pages 3-5 of this document. Multiple copies may be needed, depending on class size.



Access the Kahoot! Quiz by pressing 'play' and/or consider reflection questions, to support student learning, retention and preparation for the next session.



**Why do we need
to protect our
lakes, rivers and
streams?**



**What do we know
about freshwater
pests?**



**How are we connected to
different waters?**

Session 2 - Case Study Koi Carp

Learning objectives

- Understand the impacts that invasive species and pests can have on freshwater ecosystems, and why this is a problem
- Investigate Koi Carp as an example of a freshwater pest

[Click here for Session 2 Slides](#)

Some activities have accompanying resources that require printing. These will be **highlighted in blue** and the page number requiring printing will be included.

Facilitation notes:

THE FRESHWATER BIOSECURITY STORY

Close your eyes.

Let's dive deeper into the murky depths of our freshwater world. Picture a serene landscape, where the flows of the rivers and streams whisper tales of native life thriving in their watery homes. But lurking around the bend are the invaders, ready to disrupt this delicate balance. These invaders, known as pests, come in various forms - plants, animals, microorganisms - each posing a threat to the harmony in our freshwater ecosystems.

Let's uncover the secrets of these invaders and understand their tactics, so we can prepare to take action to stop them! It's time to delve into the world of pests, and discover how they wreak havoc upon our native species. Using the example of the notorious Koi Carp, we'll find out the intricate web of threats posed by invasive species, shedding light on the urgent need for vigilance and action in protecting our freshwater realm.

Freshwater Biosecurity Guardians, prepare for discovery and empowerment as we continue our journey to become stewards of our freshwater environments.

Facilitator encourages listeners to close their eyes and then reads the story on the slide slowly.

WHAT IS A PEST?

A non-indigenous species is an animal, plant or other organism that isn't originally from a certain place. They can also be called introduced species or invasive species. They might arrive here by accident, like hitching a ride on a boat or plane, or sometimes people bring them here on purpose.

In Aotearoa, we have lots of non-indigenous animals, but not all of them cause problems. The ones that mess up our environment are called pests. They threaten our native species and disrupt our ecosystems. So, it's important to keep an eye on them and see how they're affecting our special places!

Illustrations: Koi Carp, Golden Clam, Hornwort.

Screen solely with title appears first.

Facilitator can ask students their thoughts on the question. Slide contents will appear on click.

HOW EXACTLY DO PESTS CAUSE HARM?

Here are some areas they can impact. Can you match the impact type with its definition?

Ecological Impacts	When pests spread diseases or pose health risks to people who rely on their environment for food, water and other resources
Social Impacts	When pests damage their environment and the ecosystem they are in, affecting the health of other species in the ecosystem
Cultural Impacts	When pests cause a financial/money loss for industries, businesses and communities
Human Health Impacts	When pests damage or disrupt cultural traditions, practices, and connections to the land and water
Economic Impacts	When pests affect how people use and enjoy the streams, rivers and lakes, such as recreation, relaxation and cultural activities

Students read impact types and try to match them with their definition.

Answers will appear on click.

Once answers are revealed, ask students if they can think of an example for each.

If they cannot, let them know they will discover some in the next activity.

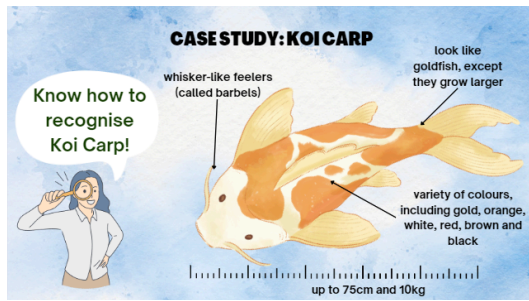
PEST THREATS AND IMPACTS

- Get into pairs or small groups
- Share the PEST THREAT AND IMPACT cards among the groups
- Take a couple of minutes to think about the questions below and sketch the impact of your threat
- Share your sketch and answers with the rest of the class

What is the threat?
What kind of threat is it?
(Ecological? Social? Cultural? Economic? Human Health?)
Why is this threat a concern?
What are the impacts of this threat?

Read aloud and then follow the instructions on the slide.

Printable pages to accompany this activity can be found on pages 8-9 of this document.



Ask students if they have seen a Koi Carp before. Read the key identifying features from the slide. Are there any other descriptors they can think of?



Play the video and/or distribute the Koi Carp Fact Sheet.

The fact sheet can be found on page 10 of this document.



Read aloud and then follow the instructions on the slide. **Printable page to accompany this activity can be found on pages 11 of this document.**

Students might need support developing their initial idea, either from the teacher or by designating a 'group leader'.

Before each group begins their performance, give the prompt '3, 2, 1... Action!'

Encourage applause after each performance.



Access the Kahoot! Quiz by pressing 'play' and/or consider reflection questions, to support student learning, retention and preparation for the next session.

PEST THREAT AND IMPACT CARDS 1

Threat:

**Outcompete
native species
for resources**

Threat:

**Degrading
water quality**

Threat:

**Disrupt cultural
practices and
traditions that rely
on native species**

Threat:

**Introducing
diseases that
affect native
species**

Threat:

**Disrupting
food webs**

Threat:

**Impacting recreational
activities (e.g. fishing,
swimming, boating) by
degrading water
quality**

Threat:

**Contributing
to habitat
degradation**

Threat:

**Disrupt spiritual
connections to
freshwater
environments and
the natural world**



PEST THREAT AND IMPACT CARDS 2

Threat:
**Increasing costs
for pest
management
and control**

Threat:
**Reduced
tourism due to
degraded
environment**

Threat:
**Health risks
through spread
of diseases or
parasites**

Threat:
**Disrupting ecosystem
services that support
human health and
well-being (e.g. water
filtration)**

These cards are for use alongside
the slide pictured below:



PEST THREATS AND IMPACTS

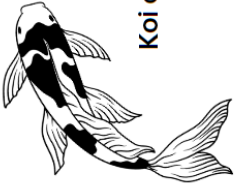
- Get into pairs or small groups
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- Take a couple of minutes to think about the questions below and sketch the impact of your threat
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What is the threat?

What kind of threat is it?
(Ecological? Social? Cultural? Economic? Human Health?)

Why is this threat a concern?

What are the impacts of this threat?



KOI CARP FACT SHEET

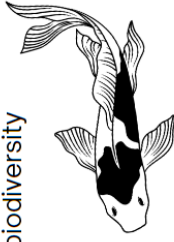
(TO ACCOMPANY CASE STUDY VIDEO)

Koi carp are a fish originally from Asia and Europe. They were accidentally brought to New Zealand in the 1960s, and since then, they've become a big problem in our freshwater habitats.



Problems with Koi Carp:

- When koi carp feed, they use their mouths like vacuums: sucking up anything and everything in their path. This disruptive feeding behaviour churns up the sediment at the bottom of the waterway, turning the water murky and making it difficult for other creatures to see or find food.
- Not only are koi carp messy eaters, but they feast on a wide variety of food, including insects, fish eggs and young, and even plants. This voracious appetite has devastating consequences for native species, as koi carp outcompete them for resources and disrupt the delicate balance of the ecosystem.
- Koi carp also reproduce really quickly. As their numbers multiply, they further exacerbate the problems they create, leading to widespread habitat destruction and loss of biodiversity in our precious freshwater environments.



What can we do?

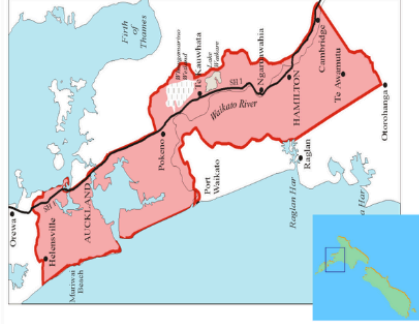
A special area called the Containment Zone has been set up to try and stop koi carp from spreading too far.

If you spot a koi carp outside of these zones, report it to the Biosecurity hotline: 0800 80 99 66

Also, remember to Check, Clean, Dry!

It's a simple yet effective way to help protect our waters from invaders like koi carp. Whether you're fishing, boating, or just enjoying the water's edge, take a moment to check and inspect your gear for any unwanted guests. Clean off any dirt, plants, or debris, and be sure to dry everything thoroughly before moving to a new spot.

By following these simple steps, we can all help protect our waters and stop invasive species from spreading.



Create a short skit, play, song or performance
with the key message:

**WHEN YOU GO SWIMMING OR BOATING, IT
IS IMPORTANT TO CHECK, CLEAN, DRY!**

Make sure everyone has a role. Your classmates
will try to guess your key message.

Create a short skit, play, song or performance
with the key message:

**KOI CARP ARE DESTRUCTIVE BECAUSE THEY
EAT NATIVE SPECIES AND THEIR FOOD
SOURCES, AND DESTROY THE HABITAT.**

Make sure everyone has a role. Your classmates
will try to guess your key message.

Create a short skit, play, song or performance
with the key message:

**IF YOU SPOT A PEST SPECIES, YOU NEED
TO REPORT IT TO BIOSECURITY OFFICERS.**

Make sure everyone has a role. Your classmates
will try to guess your key message.

Create a short skit, play, song or performance
with the key message:

**LEARN HOW TO RECOGNISE PEST SPECIES, SO
YOU CAN RECOGNISE THEM & TAKE ACTION.**

Make sure everyone has a role. Your classmates
will try to guess your key message.

Create a short skit, play, song or performance
with the key message:

**IT IS ILLEGAL TO SELL, BREED OR PURPOSELY
SPREAD PEST SPECIES (YOU COULD BE FINED
\$100,000 OR FACE 5 YEARS IN PRISON!)**

Make sure everyone has a role. Your classmates
will try to guess your key message.

Create a short skit, play, song or performance
with the key message:

**IF YOU SPOT A PEST SPECIES, YOU CAN REPORT
IT ON THE BIOSECURITY HOTLINE:**

0800 80 99 66

Make sure everyone has a role. Your classmates
will try to guess your key message.



Session 3 - Taking Action

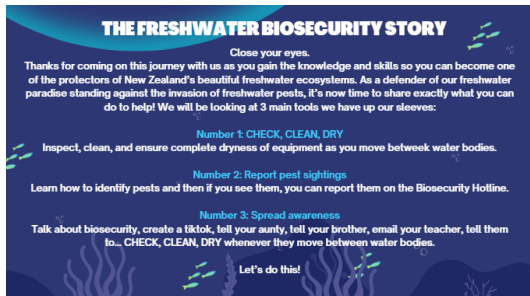
Learning objectives

- Know how to take action to support freshwater biosecurity
- Explain what to do if you encounter a suspected invasive species
- Identify key messages regarding freshwater biosecurity, and share these messages with others

[Click here for Session 3 Slides](#)

This session does not have additional resources requiring printing. However, there is a creative action project where some resources or equipment may be required, depending on what students would like to create (e.g. video, poster, play, presentation, etc).

Facilitation notes:

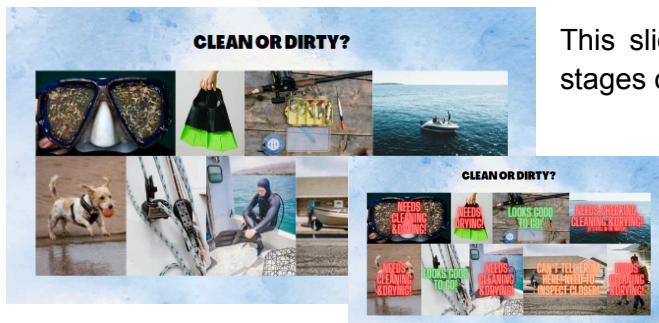


Facilitator encourages listeners to close their eyes and then reads the story on the slide slowly.



Watch the video.

Who had already heard about 'check, clean, dry'?



This slide contains images of equipment at various stages of the 'check, clean, dry' process.

Ask students whether items need cleaning or are 'good to go' for each item. **When ready, click forward to reveal answers.**



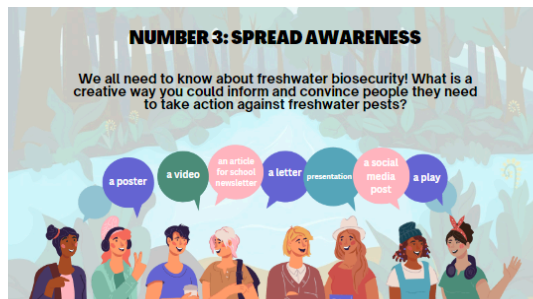
This slide requires audio. If audio is unavailable, while the phone image is moving, facilitator shares:

0800 80 99 66 is the biosecurity hotline and it can be called when a pest or suspected pest is spotted. The number is free to call. What kinds of information do you think they will ask for?



Slides lists information that might be asked for.

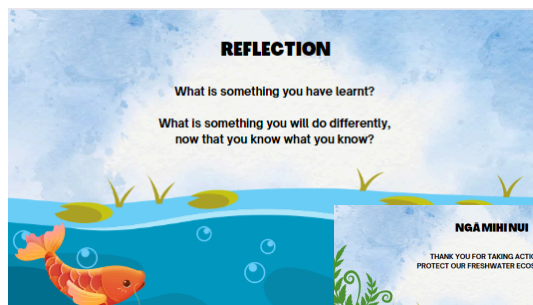
Optional activity: in pairs, students role-play calling the hotline number after spotting a pest or suspected pest.



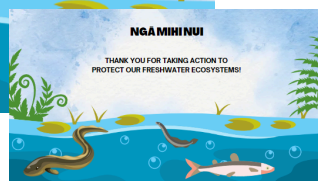
This slide introduces the creative activity. Read slide to students. **Clicking the slide reveals the next instructions.**

A suggested length of time for this activity is 1 hour.

Facilitator may wish to proceed to the final two slides before students complete the activity.



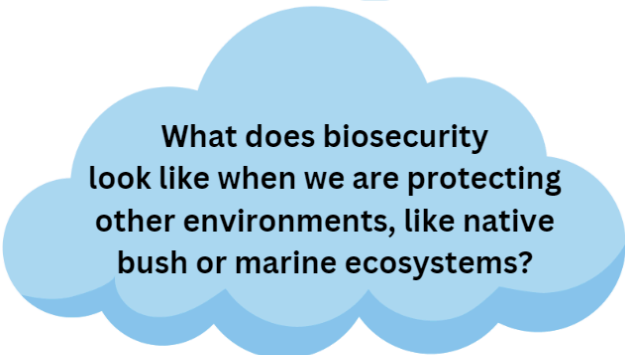
Final slides are reflections and close.



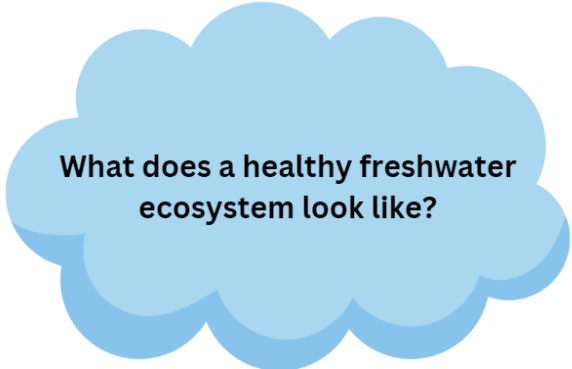
Wanting to go deeper?

Optional next steps

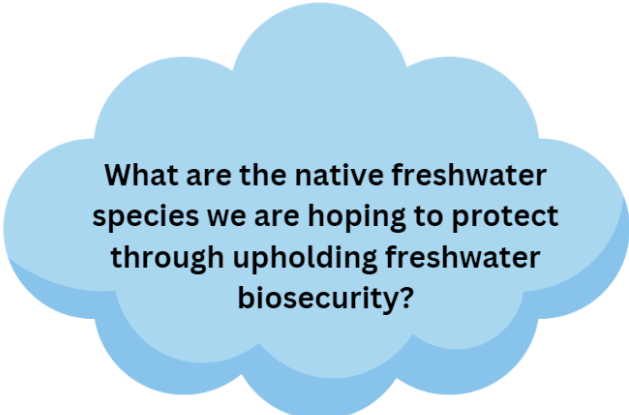
Here are some questions student may wish to explore:



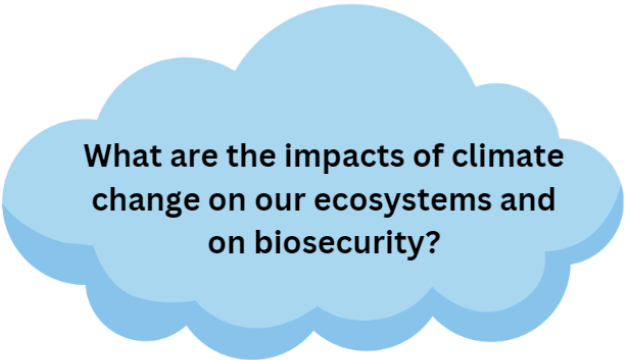
What does biosecurity look like when we are protecting other environments, like native bush or marine ecosystems?



What does a healthy freshwater ecosystem look like?



What are the native freshwater species we are hoping to protect through upholding freshwater biosecurity?



What are the impacts of climate change on our ecosystems and on biosecurity?

The 'Freshwater Biosecurity Guardians' education resource was made possible through contributions and support from the following:

Maeroa Intermediate School
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Waikato River Authority
Water of Life Encounters
Various creators on Canva

