

Education Modules

LEARNING ACTIVITIES PART 2:

Diving deeper into the world of marine pests

Learning outcomes

- **Demonstrate an understanding of the impacts that marine pests can have and describe why this is a problem**
- **Identify common features of marine pests which makes them successful at invading new places**
- **Describe the pathways that enable marine pests to be transported around the world, to New Zealand and around New Zealand**

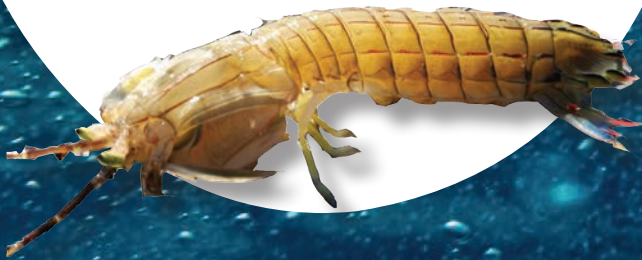
Time to complete: 60-90 minutes

In this section:



Read together:

**What makes a marine pest,
a marine pest?**



Watch:

Meet our marine pests

**Find out what Kina
is so angry about!**



Activities:

Profile a marine pest

Make your own marine pest

Spot the marine pest pathways

Make your own comic strip

Create a graph: NIMs



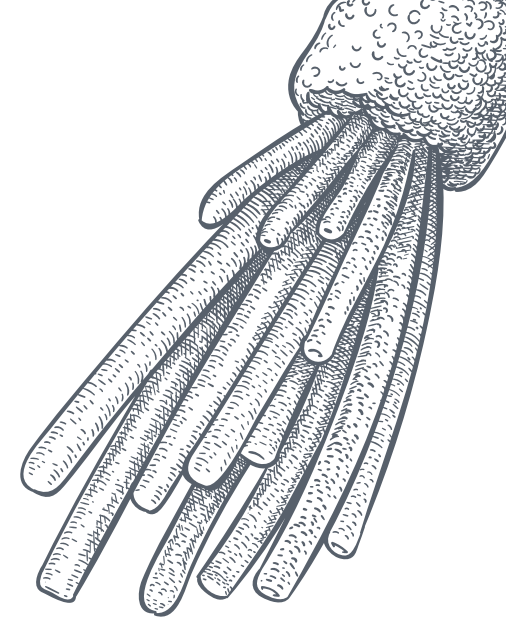
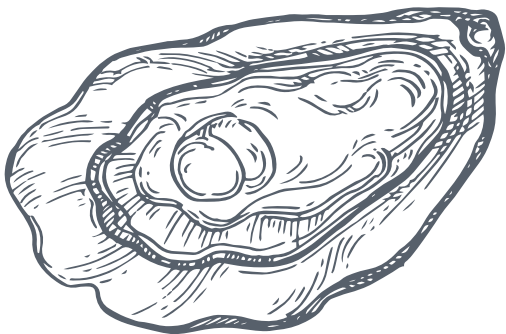
What makes a pest, a pest?

A pest isn't always a pest. Often creatures that can be a pest in a new environment are not a pest in their home habitat.

'Non-indigenous marine species' (NIMS) are species that are not native to a place. We also call them introduced, invasive, or alien species.

There are many '**Non-indigenous marine species**' present in New Zealand waters but only a few of them are considered **marine pests**. They are only considered a marine pest if they have a harmful impact on our environment.

Let's find out more!



Marine pests have a lot of babies, fast!

Marine pest species often reach reproductive maturity quickly and can produce a lot of babies at once and can do so multiple times a year.

- The Asian paddle crab *Charybdis japonica* is a marine pest. It produces up to 4 million eggs over its three-to-four-year lifespan
- The native paddle crab *Ovalipes catharus* only produces 2 million eggs in its lifetime

The marine pest crab produces twice as many babies as the native crab.

Marine pests are very adaptable, so they get established quickly

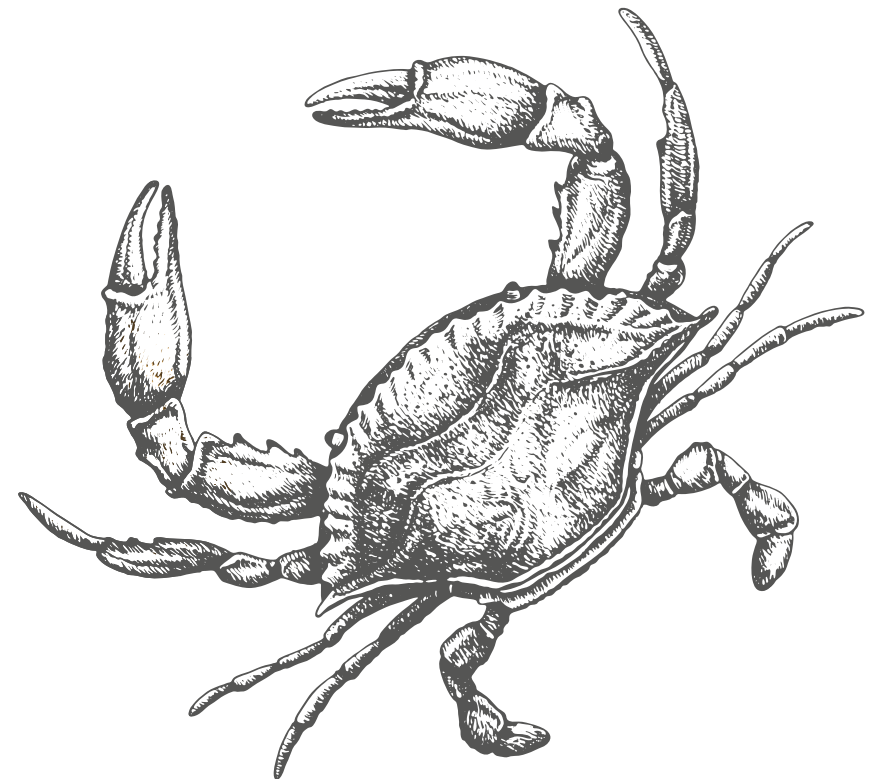
While native species are very specific about where they can live, marine pests can exist on a range of different surfaces. Once they get space they breed fast and quickly colonise an area. These species are often omnivorous, eating a range of different foods – sometimes they are aggressive and will eat native species.

Marine pests can lie dormant for a very long time

A highly invasive species is often able to be dormant (having normal physical functions suspended or slowed down) for long periods of time.

- The spores of Asian kelp Wakame or *Undaria pinnatifida* can be dormant for several years if conditions aren't suitable for them (for example, if the water is the wrong temperature). Then, when conditions are suitable for growth, they revive and start growing and reproducing!

This is a useful adaptation that allows marine pest species to survive long journeys to new places on ships or attached to plastics floating across the ocean.



Marine pests can tolerate a wide range of environmental conditions

Is it too hot? Too cold? Is the water too salty, or not salty enough? Is there enough oxygen? While our native species need conditions to be just right to thrive, marine pests are adaptable and can often survive in a wide range of conditions.

FACT:

The Asian paddle crab can survive in very hot and very cold temperatures from -1 to 34 degrees Celsius, and larvae can survive three to four weeks in the bilge water of a boat.

FACT:

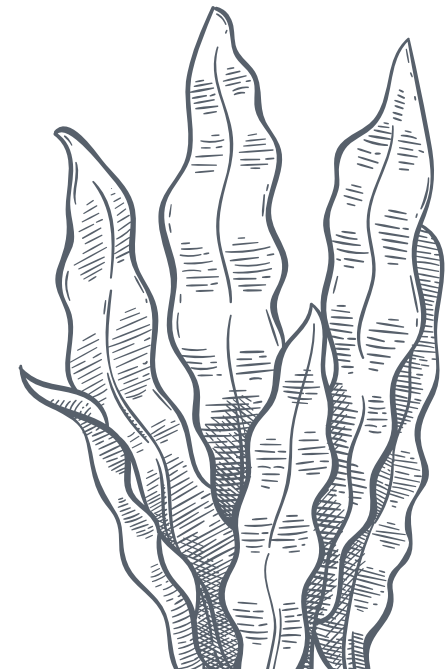
Ballast water is seawater that many ships suck into big tanks. The water helps to keep the boat balanced when it's on a voyage. Because marine pests are so adaptable, they can often survive inside the ballast water tanks for weeks at a time. This means that if they are sucked up into a ship, they can be carried all around the world. Fortunately, the global shipping industry is working on a solution to this.

Marine pests don't have natural predators

When marine pests make it to a new environment, there are often very few predators keep them under control.

In Auckland we have experienced this with Mediterranean fanworm – *Sabella spallanzanii* – which now grows densely in many parts of our harbours because there is no other species in the harbour to eat it.

Because there are no natural predators for marine pests, marine pests continue to grow, reproduce and spread more quickly than native species which usually have natural predators.





Meeting our marine pests/kīrearea

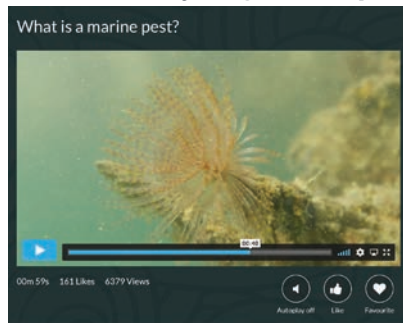
Identifying a marine pest can be tricky...you need to know what to look for!

This short video by Young Ocean Explorers explains what marine pests are and identifies a couple of the ones we have in Auckland



Watch Now!

www.youngoceanexplorers.com/yoe/video/786401566886#cplayer



Why are we worried about marine pests?

What are some of the marine pests we are worried about in our area?

Help 'kina' fight marine pests! Kina busts out fireball fists of fury in this fun video from Ministry for Primary Industries, all about marine pests.



Watch in Māori

www.youtube.com/watch?v=vc00y6ABqVw



Watch in English

www.youtube.com/watch?v=3Q0bzVnK1uE



Teacher note: When your class is ready, try these quizzes on the Young Ocean Explorers website.

Check it out here - Young Ocean Explorers

www.youngoceanexplorers.com/yoe/content?filter=true&tag_title=Biosecurity#filter



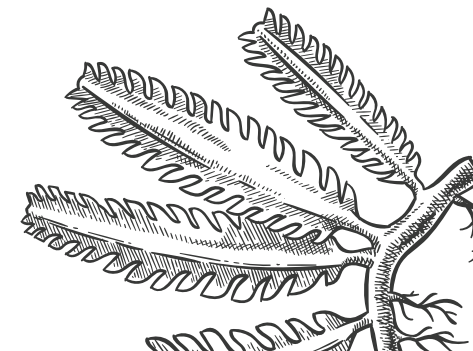
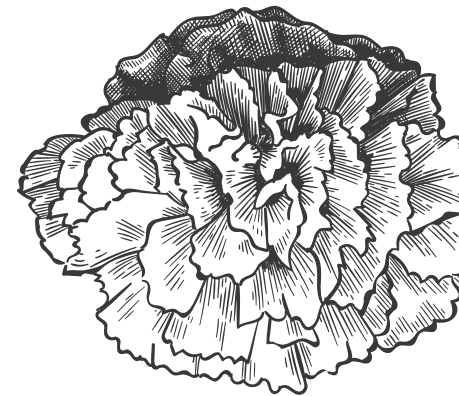
ACTIVITY

Use the MPI Marine Pests guide and choose a marine pest that you are worried about or interested in and use it to complete our marine pests profile below.

Some information you may want to research about your marine pest is:

- Where is your marine pest from?
- Is it found all over New Zealand or just in a few places?
Is this pest on your local shore?
- What are some key identifying features of your marine pest?
- Spot the difference: are there some ways to tell your chosen marine pest apart from a similar native species?
- How does your chosen marine pest impact the marine environment?
- Are there any management strategies in place for your chosen marine pest?

Teacher tip: Need a helping hand? Use the 'Marine Pest Profile' sheet on the next page as a template to help you answer these questions.



Marine Pest Profile

Profile a marine pest that has been found in New Zealand

Name:

Animal or Plant:

It is related to:

Draw your animal or plant. Label the parts.

Habitat: highlight where it was found

OPEN OCEAN

How did this species get into New Zealand?

LOW TIDE

What **impacts** does this species have on the Marine environment?

MID TIDE

What are some **key features** that make this species recognisable?

HIGH TIDE



Make your own marine pest

Using the template and your imagination to design a marine pest. Draw a picture and label its attributes/body parts which you think will make it a successful species when it arrives at your local beach.

What are questions you might need to think about?

- Where will it live?
- What will it eat and how will it catch its food?
- How does it find its food?
- How does it move? Does it move at all?
- How does it protect itself?

Name: _____

Class: _____

Designer Marine Pest

Link the text boxes to describe the 6 key attributes that will make your pest successful

What is your marine pest called? _____



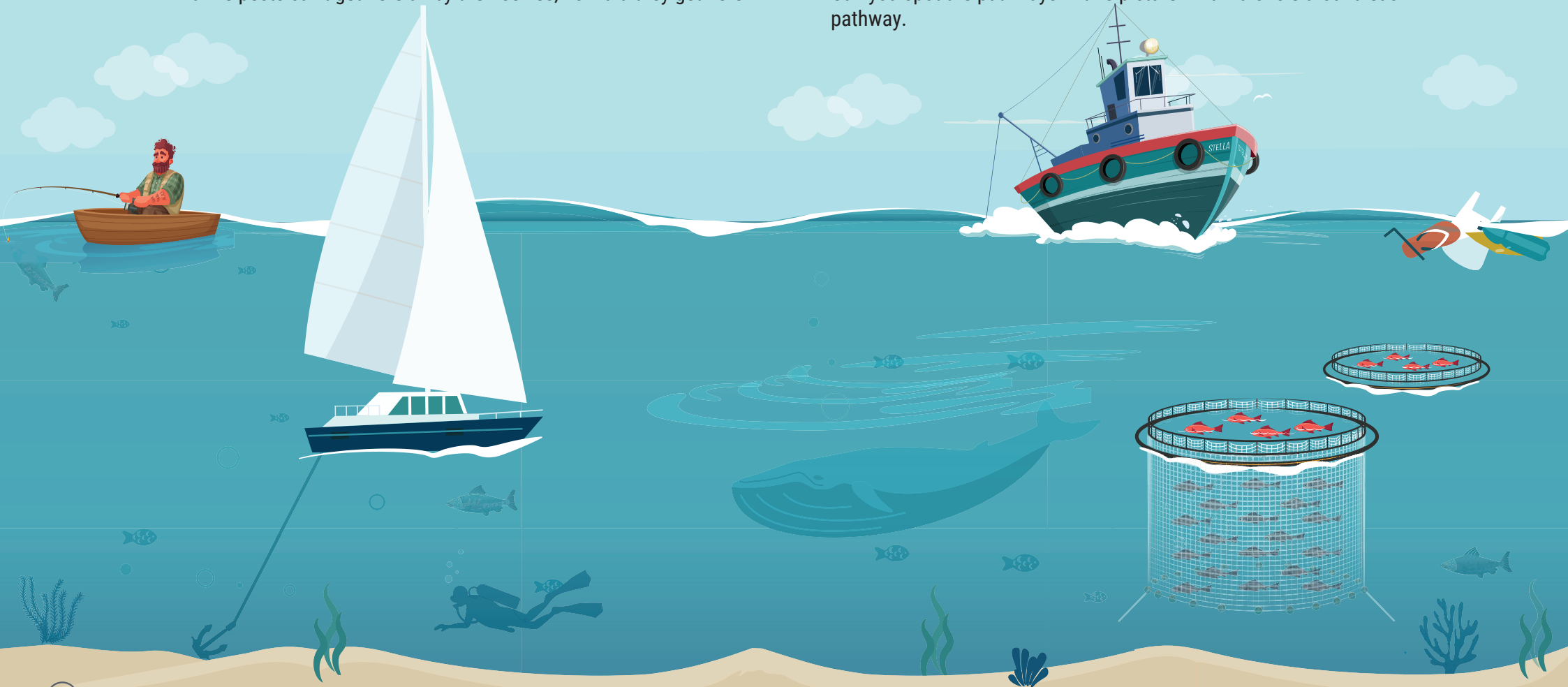
Pest pathways – the journey pests take to get to New Zealand

Marine scientists call the ways pests hitch a ride or spread 'pathways'. Human activities are considered the primary cause of the spread of pests around the globe. Marine pests mostly travel on boats but there are other ways they can travel too.

If marine pests can't get here all by themselves, how did they get here?

There are many ways marine pests can be spread. Marine pests and their larvae can catch a ride on boat hulls, in ship's ballast water, sea chests, and can be moved around on equipment such as that from aquaculture farms or fishing/diving gear or even attached to floating debris such as plastic.

Can you spot the pathways in this picture? Draw a circle around each pathway.





When a marine pest arrives

A new marine pest has arrived at your favourite beach. Create a comic strip of marine environment before the marine pest arrives and after it has been there for one year. What things have changed? What has stayed the same?

Before the marine pest arrived...

After marine pest has been here for one year...



ACTIVITY

Non-indigenous marine species (NIMS) are species that have found their way into New Zealand via the pathways that we have just learnt about. Fortunately, most of the species that arrive are not a threat to our native biodiversity.

EXAMPLE:

It's hard to imagine a time that Pacific Oysters were not here. But in the 1960s, they took over our shorelines, decimating the Rock Oyster in many places and creating shell reefs. But fast forward 50 years and the Pacific Oyster is part of our culture: we eat it, and accept that it's here to stay.

TALKING POINTS

If you are near a beach, what kind of oysters or shellfish are there?

How have Pacific Oysters changed our beaches?



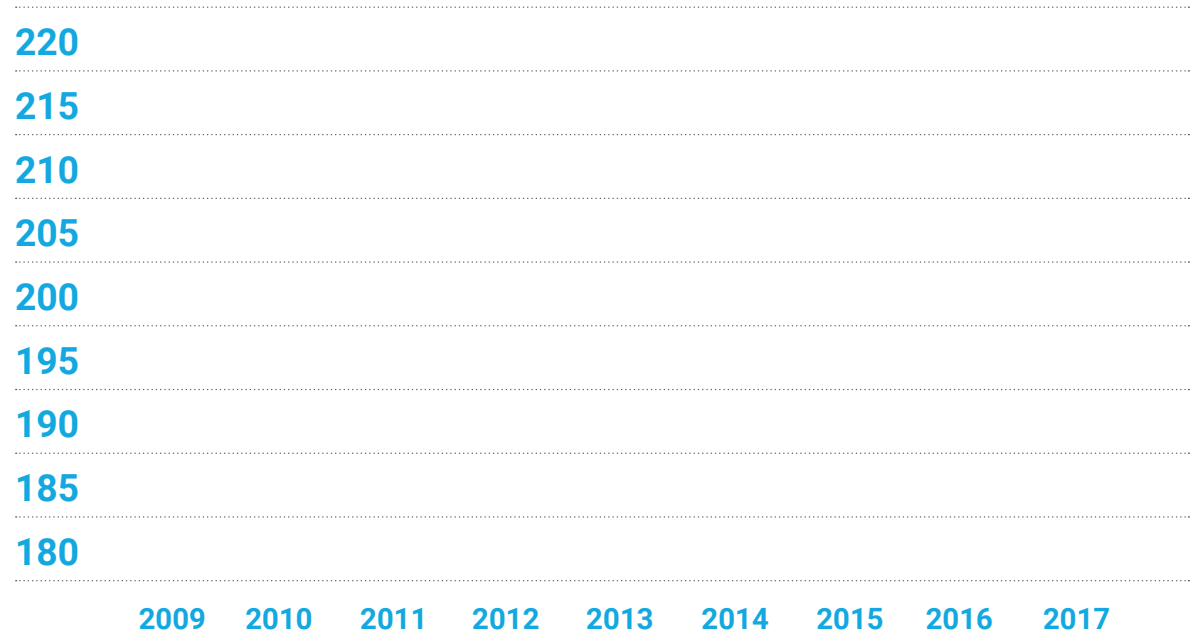


Create a graph - NIMS in New Zealand

Each year divers survey our harbour beds to find out how many non-indigenous marine species are present. Can you graph this data? What does it tell you?

Year	Number of non-indigenous species
2009	193
2010	195
2011	197
2012	200
2013	203
2014	206
2015	210
2016	212
2017	214

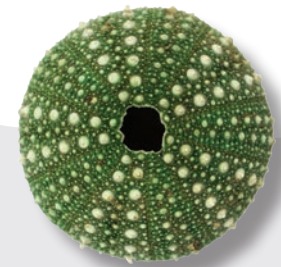
(Data is extracted from Marine non-indigenous species | Stats NZ)



Think about:

- When do you think there would have been number of NIMS would have been zero?
- How many of these do you think are marine pests?
- Are there more NIMS now?
- What sort of protections are in place to stop NIMS from entering New Zealand?

This Education Resource was developed by the following organisations to support marine biosecurity awareness in Aotearoa New Zealand:



WITH THANKS TO:

