



NIWA
Taihoro Nukurangi



KŌURA

WHAT DOES SCIENCE TELL US ABOUT
NEW ZEALAND FRESHWATER CRAYFISH?



CONTENTS

KŌURA SPECIES	2
KŌURA DISTRIBUTION	4
WHERE DO KŌURA LIVE?	5
LIFE CYCLE	6
HOW DO KŌURA BEHAVE?	8
WHAT DO KŌURA EAT?	10
WHAT ARE THE THREATS?	11
HOW CAN WE HELP KŌURA?	12
NIWA/TE KŪWAHA	13

Taonga species such as tuna (freshwater eel), kōura (freshwater crayfish) and kākahi (freshwater mussels) are central to the identity and wellbeing of many Māori.

For generations these species have sustained communities and helped transfer customary practices and knowledge from one generation to the next.

However, many communities are reporting that both the abundance and size of these freshwater taonga are declining.

Te Kūwaha, NIWA's National Centre for Māori Environmental Research has been working with whānau, hapū and iwi for more than a decade to co-develop methods for the protection, restoration and economic development of these species.



KŌURA SPECIES

Kōura (also known as kēwai) are freshwater crayfish endemic to Aotearoa. There are two species of kōura in Aotearoa:

1 ***Paranephrops planifrons***

2 ***Paranephrops zealandicus***

The two species have subtle differences and distinct distributions (they occupy different areas). *Paranephrops zealandicus* are generally larger and have very hairy pincers, while *Paranephrops planifrons* are slightly smaller and have less hairy pincers.



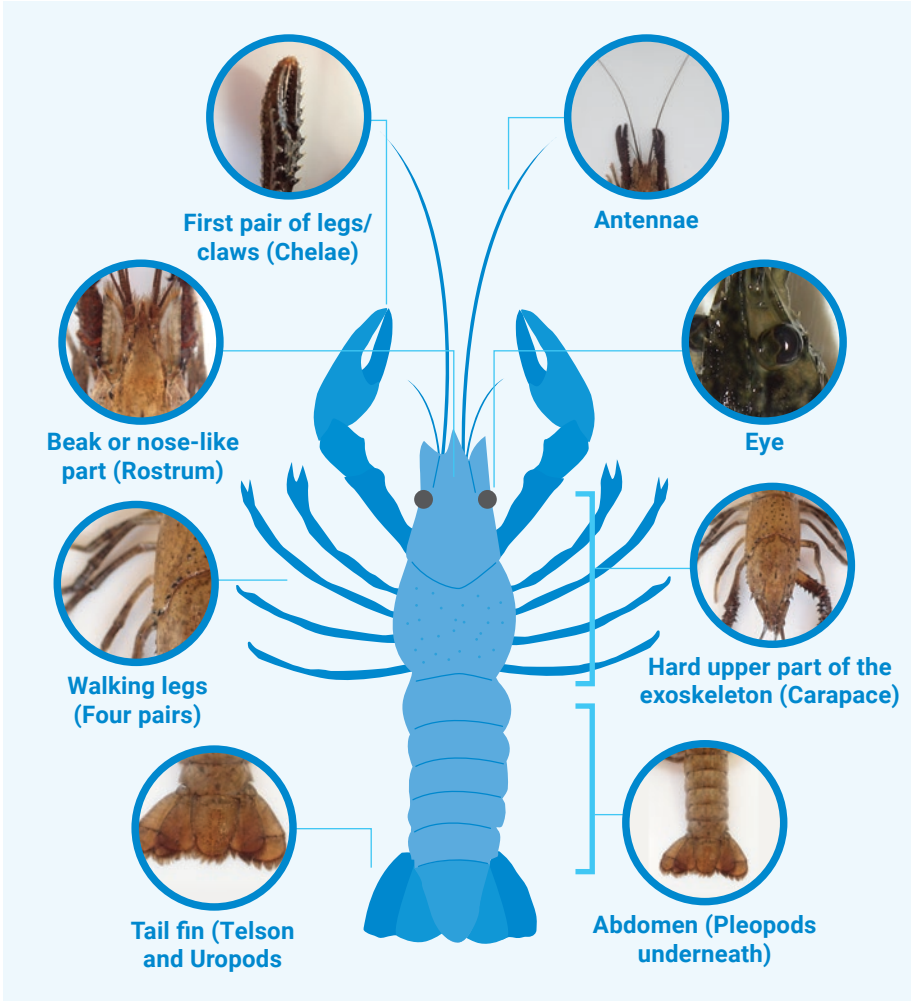
Endemic means that these species are only found in Aotearoa



Paranephrops planifrons



Paranephrops zealandicus

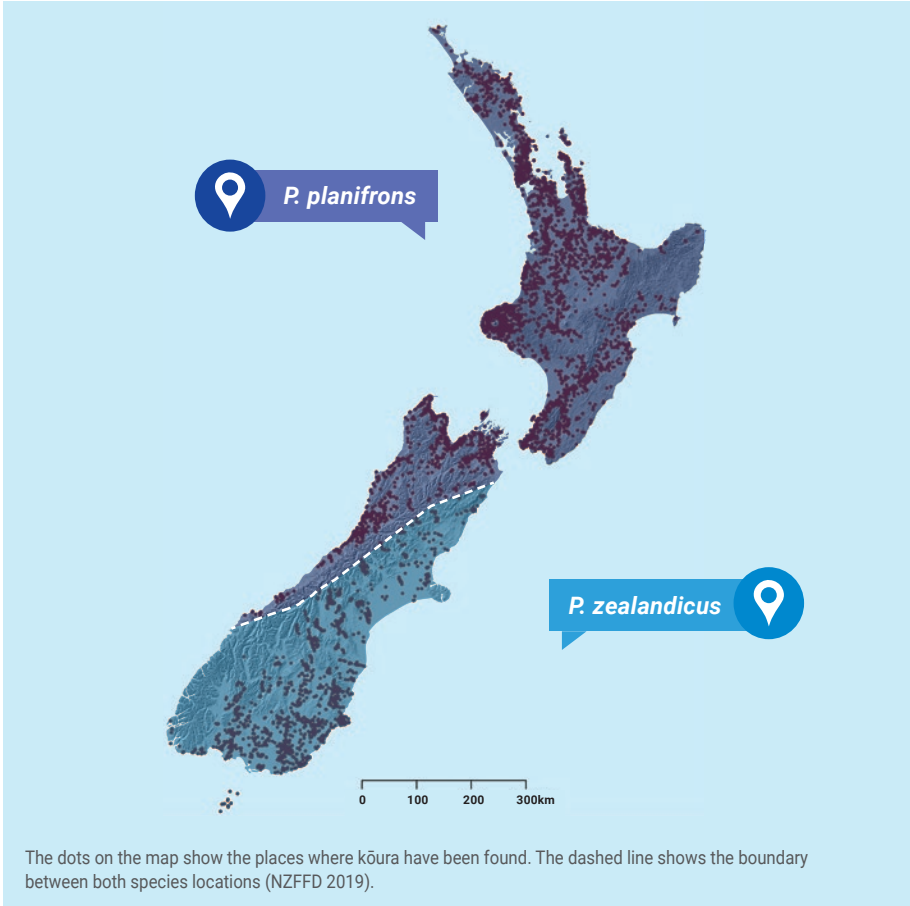


Kōura have their skeleton on the outside, this is called an exoskeleton, which they moult (shed) as they get bigger in size. During moulting they become soft for a short time as the new outer shell hardens.

Kōura can grow back limbs they have lost through a series of moults.

Kōura move by walking along the lake or stream bottom or flicking their tail to swim rapidly backwards.

KŌURA DISTRIBUTION



Our two kōura species are found in distinct locations that don't overlap.

P. planifrons is found in the North Island and in the northwest of the South Island, while *P. zealandicus* is found along the eastern side of the South Island and on Stewart Island. The two species are separated by the Southern Alps.

WHERE DO KŌURA LIVE?

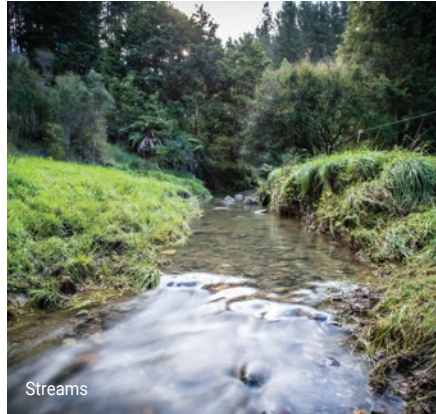
Kōura live in lots of different types of freshwater environments.

They are found in streams, rivers, ponds, lakes and wetlands in native forest, exotic forest and pastoral waterways.

In some wetlands, during the dry summer months when water levels get very low, kōura can burrow deep into the mud and then come out again when the water returns.



Kōura are less common in urban streams than rural streams.



LIFE CYCLE

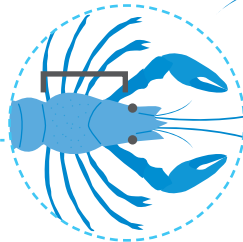
Kōura are found in streams, rivers,

Breeding

Kōura that live in lakes are thought to have two breeding seasons per year, one in late Autumn and one in Summer. Male kōura attach a packet of sperm on the underside of the female. When the female lays her eggs, they pass through the packet of sperm and become fertilised.

Adults

It can take kōura between two and four years to become an adult – seasonality and water temperature have an effect. *P. zealandicus* is slower growing. A fully-grown kōura averages 12 – 15 cm in length when measured from behind the eye to the end of the carapace (called the OCL measurement)



Female with eggs and attached sperm packet



BREEDING

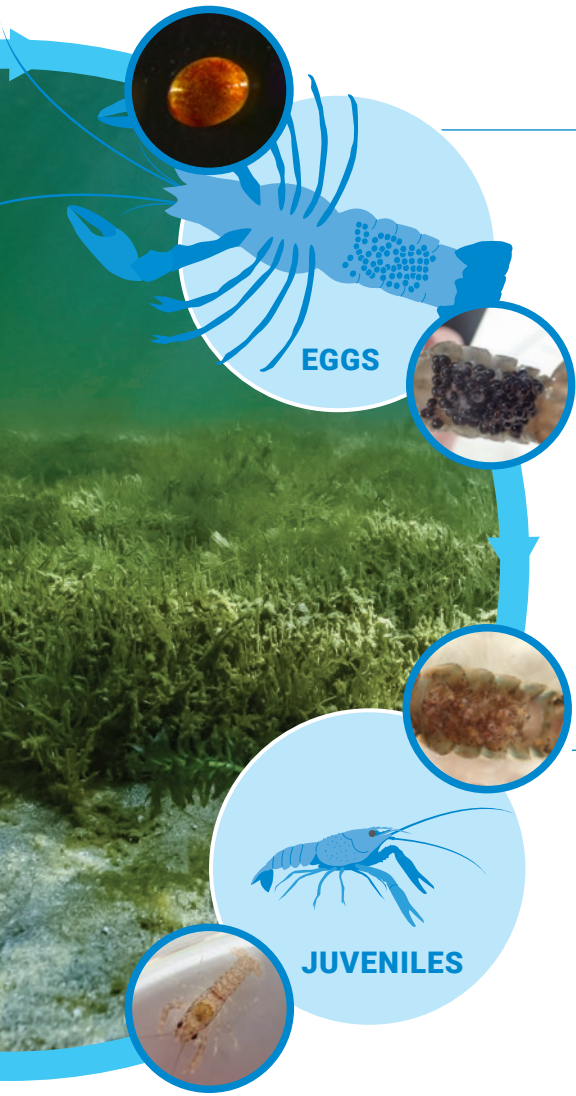


Male with sperm packet

ADULT



ponds, lakes and wetlands throughout Aotearoa.



Eggs

A female can have anywhere between 20 – 320 eggs at a time, which are attached to hairs on the underside of her tail. The eggs can stay on the female anywhere between 4 and 15 months until they are fully developed into juvenile kōura – the time it takes can vary depending on the water temperature and species.

Juveniles

Juvenile kōura cling to their mother’s abdomen using their rear legs until they are large enough to defend themselves and live alone.



HOW DO KŌURA BEHAVE?

Kōura are more active at night and usually seek cover from predators during the day. They are highly territorial and need places to hide from each other as well!

They will find shelter almost anywhere including under stones, boulders, logs and aquatic plants. They are also able to make little burrows for themselves in the mud.

In some of our lakes, kōura take predator avoidance very seriously, especially in areas of the lake that are sandy and where they don't have many places to hide.



Kōura sheltering in a native plant community.



Lake Taupō

Lake Taupō

For example, at some beaches around Lake Taupō-nui-a-Tia, every night the kōura travel to the shallower areas near the shore (called the littoral zone) to find and eat food. As dawn approaches, they move back to the deeper waters of the lake to take cover.

The daily migration of these kōura has probably evolved to protect themselves from fish - like perch, catfish, trout and tuna, birds like shags and kingfishers, as well as rats.

KŌURA FOR KAI! (What eats kōura?)



Tuna (eel)



Catfish



Shags

WHAT DO KŌURA EAT?

Kōura are opportunists and eat a wide variety of food. Kai for kōura include fish, plants, snails, mayflies and mayfly larvae – live or dead!

Kōura use their strong claws for cutting and catching prey. Their walking legs have small pincers on the end which can be used to sort and pick up small pieces of food.

Where there are lots of kōura (high densities), they have also been known to eat each other.

KAI FOR KŌURA! (What kōura eat)



Invertebrates



Fish



Other kōura

WHAT ARE THE THREATS?



Across Aotearoa kōura populations are exposed to a range of environmental impacts including things like the removal of native bush, the drainage of wetland areas, too much sediment, eutrophication in lakes (too many nutrients), and the introduction of pest species to our waterways.

Introduced fish species trout, catfish and perch all prey on kōura.

High water temperature, low calcium concentrations, and low oxygen concentrations can all negatively affect kōura populations. Kōura may also be affected by pollutants such as heavy metals or toxins from harmful algal (blue-green) blooms.

Internationally some freshwater crayfish species are being impacted by fungal infections.



The latest New Zealand Threat Classification System assessment has classified *P. zealandicus* populations as 'At Risk-Declining'

HOW CAN WE HELP KŌURA?

Kōura are an important taonga species in our freshwater ecosystems. Some ways you can help our kōura populations include:



Protect, restore and create kōura habitat

For example, fencing and planting our waterways provides protection, shading, in-stream habitat and food for kōura populations.



Provide good water quality



Remove pest fish species and aquatic weeds



Stop the spread of pest fish and plants between waterways by making sure boats and other equipment are thoroughly cleaned.



Follow harvest regulations and any rāhui in place

Photo credits: Stuart MacKay, Dave Allen, Tracey Burton, Mary de Winton, Rohan Wells, Sue Clearwater, John Clayton, Ian Kusabs and Karen Thompson



NIWA

National Institute of Water & Atmospheric Research Ltd (NIWA) is New Zealand's leading provider of climate, freshwater and ocean science. We deliver the science that supports economic growth, enhances human well-being and safety, and enables good stewardship of our natural environment.

Te Kūwaha o Taihoro Nukurangi

Te Kūwaha, NIWA's National Centre for Māori Environmental Research strives to deliver on Māori research aspirations in a way that reflects Māori values and respects both Māori and scientific knowledge systems. We are working with whānau, hapū and iwi across Aotearoa.

We recognise that whānau and hapū across Aotearoa have an extensive range of names for their freshwater taonga species. In this resource we have drawn on the most commonly used names, but please check with your local hapū for the te reo that is relevant to your area.



For more visit www.niwa.co.nz/te-kuwaha/koura



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