



NIWA
Taihoro Nūkurangi

KŌURA

WHAT DOES SCIENCE TELL US ABOUT
THE NEW ZEALAND LOBSTER?

CONTENTS

KŌURA SPECIES	2
WHERE DO KŌURA LIVE?	4
DISTRIBUTION	5
LIFE CYCLE	6
KŌURA ANATOMY	10
IS THIS KŌURA MALE OR FEMALE?	12
WHAT DO KŌURA EAT?	13
HOW DO KŌURA BEHAVE?	14
WHAT ARE THE THREATS TO KŌURA?	15
HOW CAN WE HELP KŌURA?	16
NIWA/TE KŪWAHA	17

Cover photo: Red rock lobster with black coral
[Richie Hughes, NIWA]

ISSN 1174-264X
NIWA Information Series 106
May 2024

TAONGA SPECIES SERIES

Taonga species such as kōura (lobster), kanae (mullet), and pātiki (flounder) are central to the identity and wellbeing of many Māori communities.

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 the abundance and size of these taonga are declining.

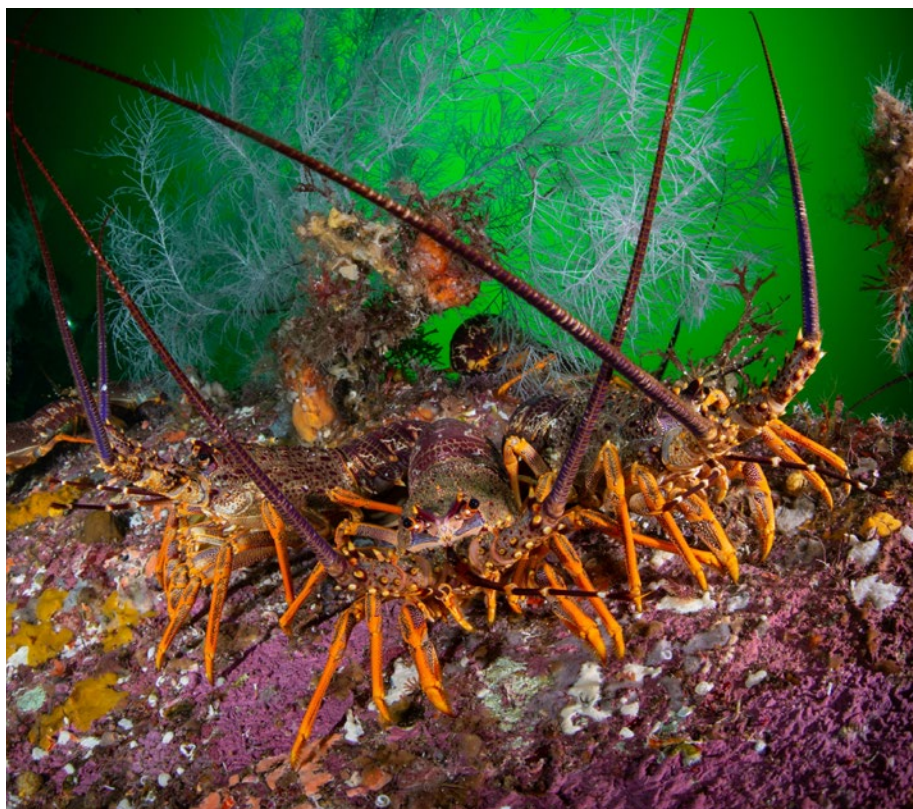
Te Kūwaha, NIWA's National Centre for Māori Environmental Research, has been working with whānau, hapū and iwi for more than a decade to co-develop methods for the protection and restoration of taonga species.

A series of booklets has been developed, sharing science knowledge to support species management strategy.

The Taonga Species Series includes tuna, kākahi, īnanga, kōura (freshwater and marine), pīharau, kanae, tuangi, toheroa and pātiki. Find out more about the series at niwa.co.nz/taonga-species



Both marine lobster and freshwater crayfish are known as kōura in te reo Māori.



KŌURA SPECIES

Kōura are decapod crustaceans, more closely related to slipper lobsters than to freshwater kōura. Two species are found in our coastal waters, both of which are endemic to Aotearoa and Australia.

- 1 Kōura papatea,**
Kōura matapara / red rock
lobster *Jasus edwardsii*



Kōura papatea

This kōura has moulted and the colour is not true. You would normally see more red/orange or red/purple tones.

Kōura papatea are reddish orange in shallower water and more reddish purple in deeper water. The tail surface is spiny and appears much more textured than the pawharu. Kōura papatea can grow to a generous size, and has been measured at 54cm in length and up to 8kg in weight.

- 2 Pawharu**
packhorse lobster
Sagmariasus verreauxi



Pawharu

Pawharu can be identified by the olive-green colour (brighter green in small individuals, to dull brown-green in larger individuals). Compared to the kōura papatea, the tail surface of pawharu is much more smooth in appearance and to the touch. Pawharu can grow to around 60cm in length and 15kg in weight.

WHERE DO KŌURA LIVE?

The kōura papatea and pawharu are found in coastal waters around the mainland and offshore islands up to 220-250m depth.

Kōura papatea live on rocky reefs and adjacent sand flats, and in most areas keep within a roughly 5km stretch of coastline during their lifetime. Kōura also undergo seasonal inshore-offshore movement creating groups on sandflats, gravel and rocky substrates. These migrations are related to moulting, reproduction and food gathering.



Although smaller on average, kōura papatea are more aggressive and dominant over pawharu when competing for food.



Rocky reef



Sand flat

DISTRIBUTION

Kōura papatea

Found from Rangiputa in the north to the Auckland Islands in the south, and to the Chatham Islands in the east at depths from 1m to 250m where suitable rocky outcrops occur.

Pawharu

Mainly occurs from East Cape to the far north on rocky reefs and adjacent sandy areas at depths from 1m to 100m+.

Kōura papatea distribution

Pawharu distribution



LIFE CYCLE

Kōura have one of the longest and most complex lifecycles of any kaimoana species.

Breeding

Adult kōura move inshore for breeding in autumn. Due to better fertility in larger females and aggression between males, larger individuals typically have more breeding success.

Adults

Depending on temperature, it generally takes around four years for kōura to become sexually mature. Adult kōura can live up to 30+ years.

Juveniles

Initially, juvenile kōura moult their exoskeleton once every 1–2 months, with moulting becoming less frequent as they develop into an adult.

Eggs

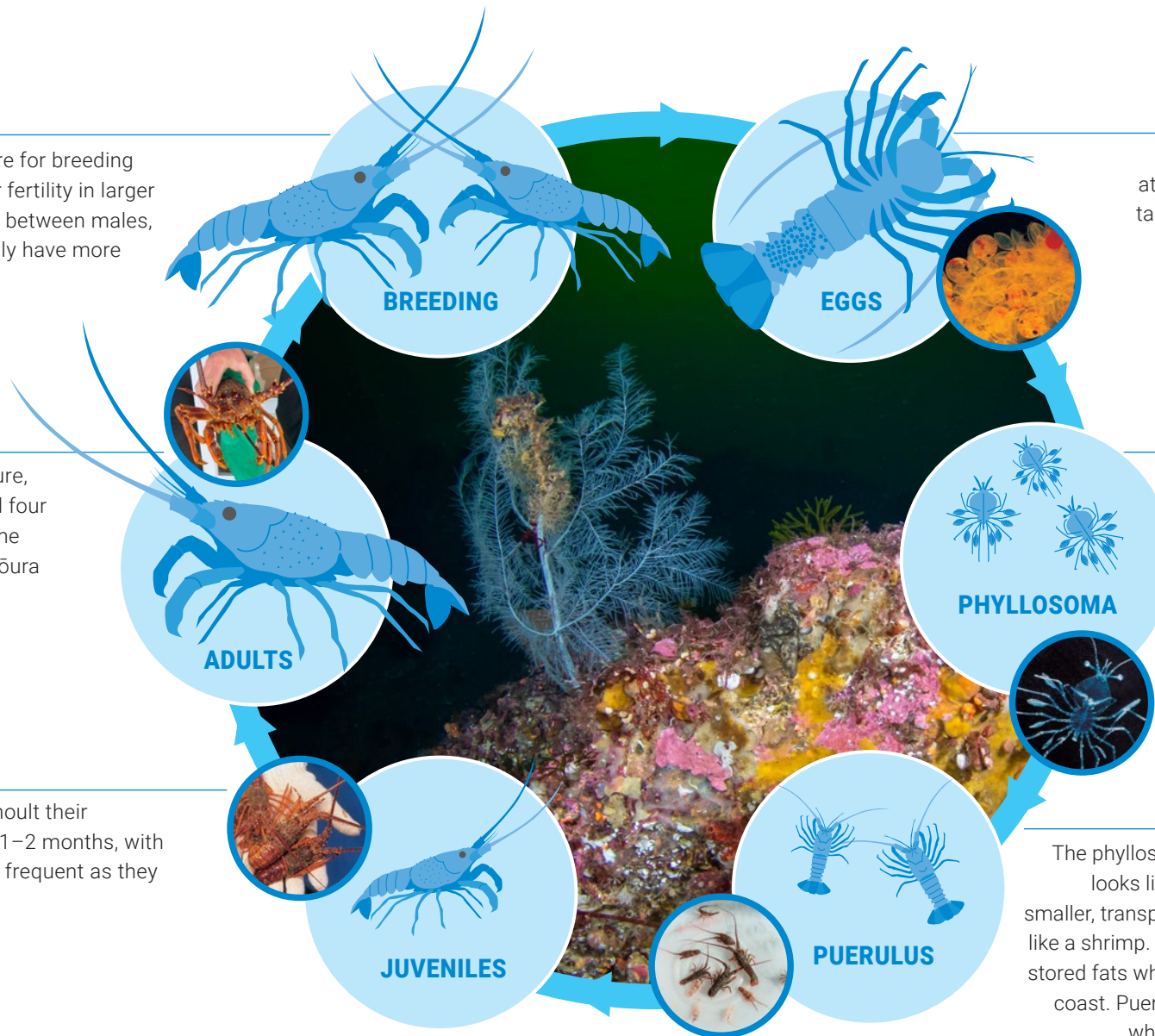
Female kōura carry fertilised eggs attached to hairs on the underside of her tail. The eggs are carried for 3–5 months while they develop into their first larval form. Once developed, the eggs start hatching over three days in spring.

Larvae

After hatching, tiny kōura larvae swim toward the surface where currents take them up to 1,000km out to sea. At sea, the tiny kōura larvae moult into a phyllosoma larvae. The phyllosoma larvae live offshore for 1–2 years, moulting up to 17 times and growing to the size of a small biscuit.

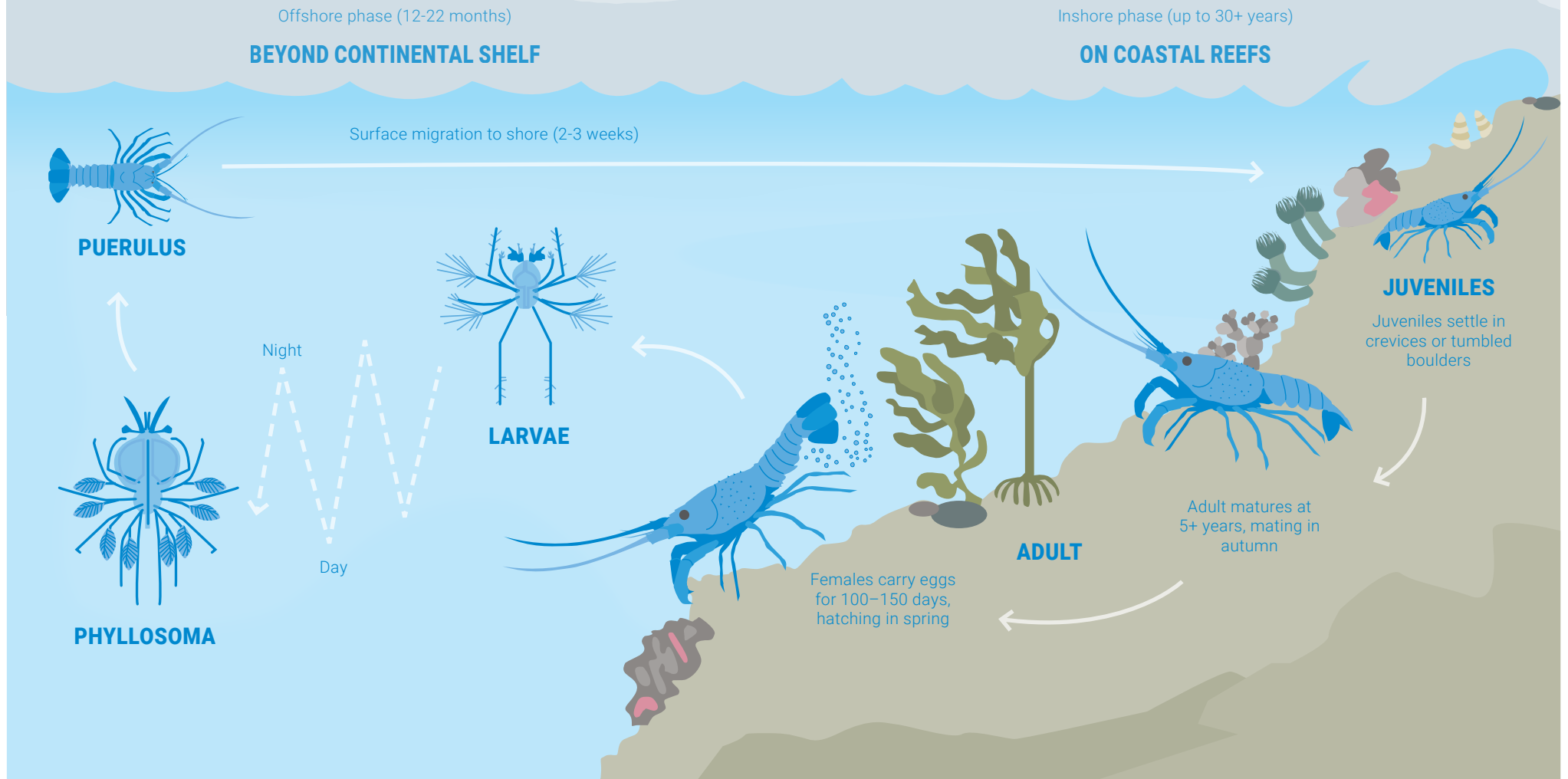
Puerulus

The phyllosoma larvae moult into a puerulus which looks like an adult kōura, except they are much smaller, transparent, do not eat and can swim forward like a shrimp. During the puerulus stage, kōura rely on stored fats while they focus on swimming back to the coast. Pueruli settle in small holes in the rocky reef where they moult into small juvenile kōura.

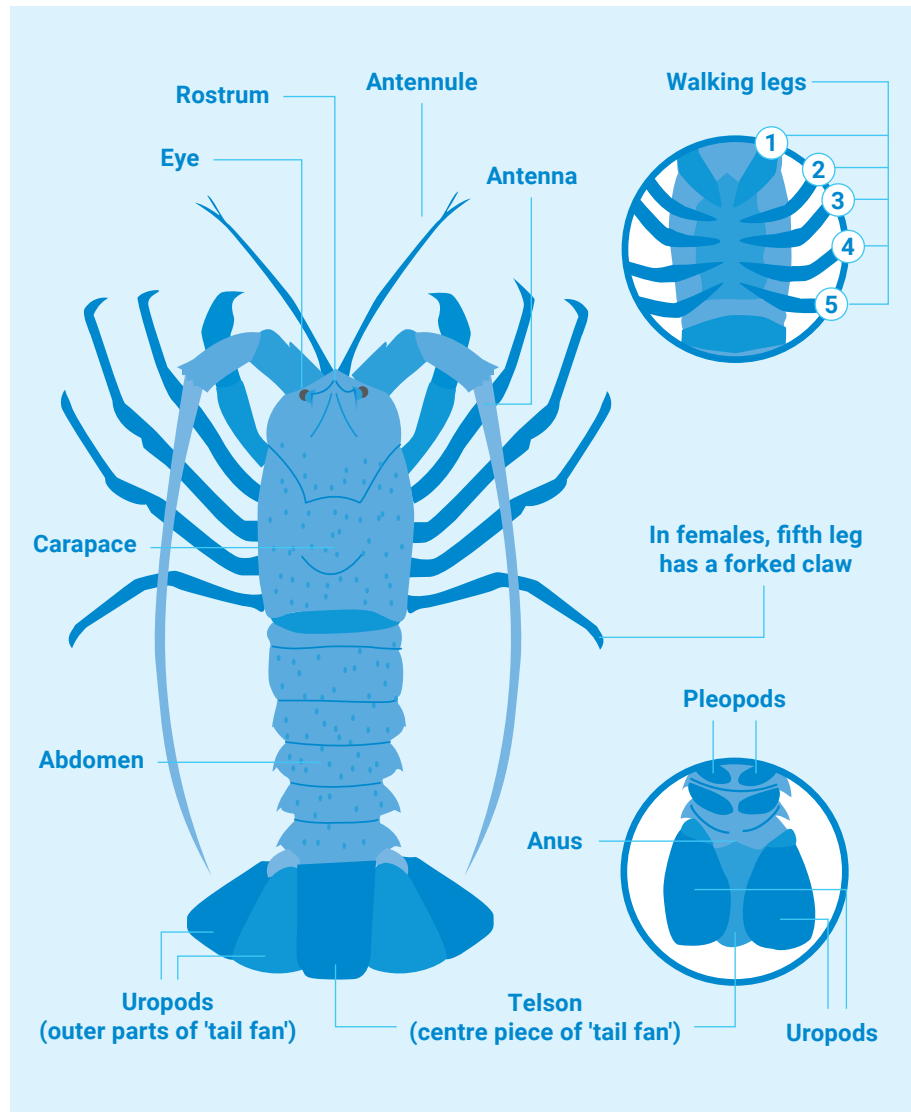


LIFE CYCLE

Kōura are found around Aotearoa and its offshore islands up to a depth of 250m



KŌURA ANATOMY



Eye

Compound eyes to visually aid in detecting predators, prey and their environment.

Rostrum

Protects the eyes and aids in general stabilisation.

Antennule

Multi-sensory organ detecting chemical, physical and many other environmental changes (temperature, oxygen etc.).

Antenna

Second pair of multi-sensory organs, primarily used for orientation and coordination.

Walking legs

10 walking legs used for climbing over substrates. In females, the last pair of walking legs has a forked claw.

Carapace

Hard outer shell (external skeleton) protecting the head and vital organs. Generally bearing many spines.

Abdomen

Hard outer shell protecting a large muscle. The shell is divided into 6 layered segments that allow bending of the abdomen which is used for swimming propulsion.

Pleopods

Projections from the underside of the abdomen are primarily used for swimming, sometimes referred to as swimmerets.

Males have single paired pleopods per segment (also used in mating), whilst females have two pairs per segment. (also used to brood eggs).

Uropods

Makes up the outer segments of the fan-like tail, used for swimming.

Telson

Is the centre segment of the fan-like tail, used for swimming.

IS THIS KŌURA MALE OR FEMALE?

Female kōura are identifiable by the small claws at the tip of each of the rear walking legs which are used to groom their eggs.

Sex can also be determined by the number of pleopods on the underside of the tail – females have two sets of pleopods per segment, males have one set per segment.

In general, pawharu can grow to a larger maximum size than the kōura papatea.



Single pleopods characteristic of a male kōura



Double pleopods holding eggs on a female kōura



Tail fan necrosis is a bacterial infection that has been found in New Zealand rock lobsters since 2000. This causes the uropods and telson to become blistered and black and can result in the loss of limbs.

WHAT DO KŌURA EAT?

Kōura are opportunistic feeders that actively forage at night, emerging from their daytime shelters to find slow-moving prey.

Their diet consists of shellfish, kina and starfish, but they won't pass up the opportunity if other slow-moving food crosses their path, such as worms and even bait! Kōura have strong mandibles or jaws that can crush thick shells such as the tuangi, or cockle!



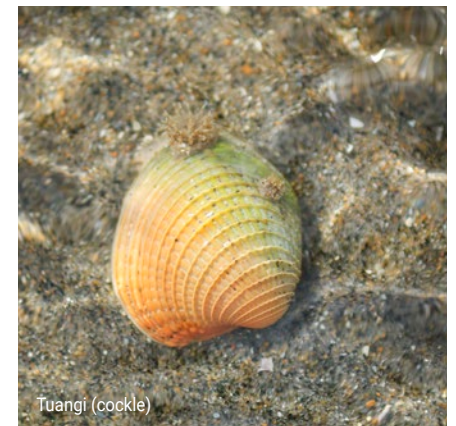
Kōura and snapper are some of the only known predators of the long-spined kina, which are becoming increasingly more abundant in parts of the North Island.



Starfish



Kina



Tuangi (cockle)

HOW DO KŌURA BEHAVE?

As kōura grow, they forage further and further from their daytime shelter. Newly settled juveniles keep foraging within a few metres of their shelter, while three-year-old juveniles forage up to 20 metres or so.

Some behaviours observed in kōura are unique to certain areas. For example, around the southern part of the South Island, larger juvenile kōura migrate south to Stewart Island then north and west toward Fiordland, and sometimes even further north to Milford Sound. This migratory behaviour hasn't been seen in juvenile kōura around the rest of Aotearoa,

possibly because they reach sexual maturity at a smaller size than those in the far south.

When kōura reach maturity most of their life is spent within a 3–5km stretch of coast. Adult kōura make short seasonal movements inshore to moult and mate, and offshore to feed.



WHAT ARE THE THREATS TO KŌURA?

Fishing pressures directly affect population density, size, age structure and male-female ratios.

When the population structures (density, size, age) are altered, effects such as decreased reproduction rates, emigration and reduced/increased size at maturity can occur. Overfishing on kōura populations can lead to low population numbers which reduces the role kōura play in the ecosystem.

Kōura also face habitat degradation through increased ocean temperatures which cause physiological stress and oxygen availability. Kina barrens also reduce the settlement of juveniles.

HOW CAN WE HELP KŌURA?

If gathering kōura, it is important to identify the species and follow the crayfish rules and guidelines:



New measurement method as at 1 April 2024: To harvest pawharu (packhorse lobster), males must have a minimum tail width of 84mm, and females must have a minimum width of 90mm. Measurements are taken across the second segment on the tail.



Some restrictions to harvesting kōura apply, these include:

- Kōura may not be brought to the surface if they are unmeasurable
- Harvesting is restricted to hand operated loops or lassos (no spring-loaded tools)
- Tools which can puncture the shell, such as spears, are prohibited
- Eggs and egg-bearing appendages cannot be removed from a kōura.



The daily catch/bag limit for kōura is three (both species combined).



Some kōura are protected, these include:

- Undersized kōura
- Kōura 'in berry' (females carrying eggs under the tail). Female papatea are in berry March - October and pawharu October - February – be aware or cautious if collecting during these months
- Kōura in the soft-shell stage (during moult)
- Kōura that can't be measured (due to tail damage for example).

Note: Regulations as at April 2024

Photo credits: Richie Hughes, James Williams, Alex Fear, Chris Woods, Alison McDiarmid, Irene Middleton, Nava Fedaeff, John Mckoy, Lana Young, Jochen Bind, Tony & Jenny Enderby, Jon Stead.



NIWA

National Institute of Water & Atmospheric Research Ltd (NIWA) is New Zealand's leading provider of climate, freshwater and marine 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 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 Māori that is relevant to your area.



For more on kōura or other taonga species visit
niwa.co.nz/taonga-species



Climate, Freshwater & Marine Science



NIWA
Taihoro Nukurangi