



FISHERIES FACT SHEET

WESTERN ROCK LOBSTER



Western rock lobster
Panulirus cygnus

Unlocking lobster secrets

Colourful and protected by a strong carapace, the western rock lobster is one of the family of 'spiny' lobsters – and the target of WA's largest and most valuable fishery.

Spiny by nature

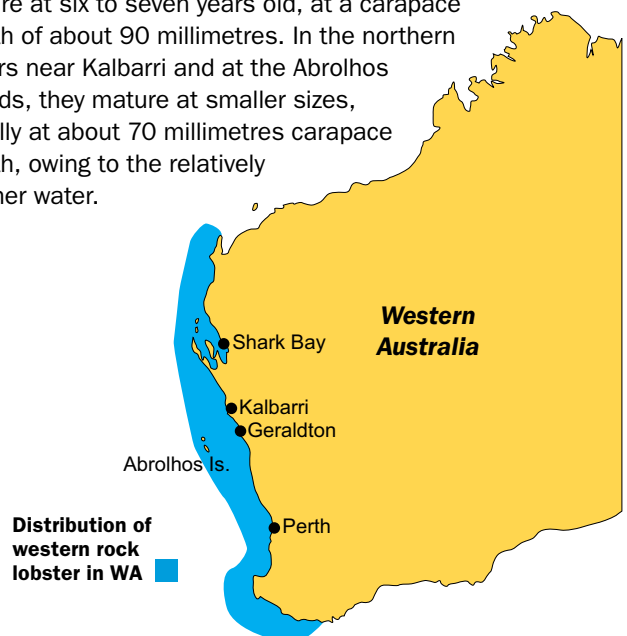
Western rock lobster are sometimes called 'crayfish' or 'crays'. They can live for over 20 years and reach sizes over five kilograms, although fishing rules to protect the breeding stock mean that animals over three kilograms are rarely retained by fishers.

This lobster species belongs to the spiny lobster family, which get their name from the hundreds of tiny forward-pointing spines that cover their body and carapace, as well as their most prominent feature – the two huge antennae that protrude from their head. Whilst these antennae are vital for spiny lobsters to find their way around, they also form a crucial defensive weapon and communications tool.

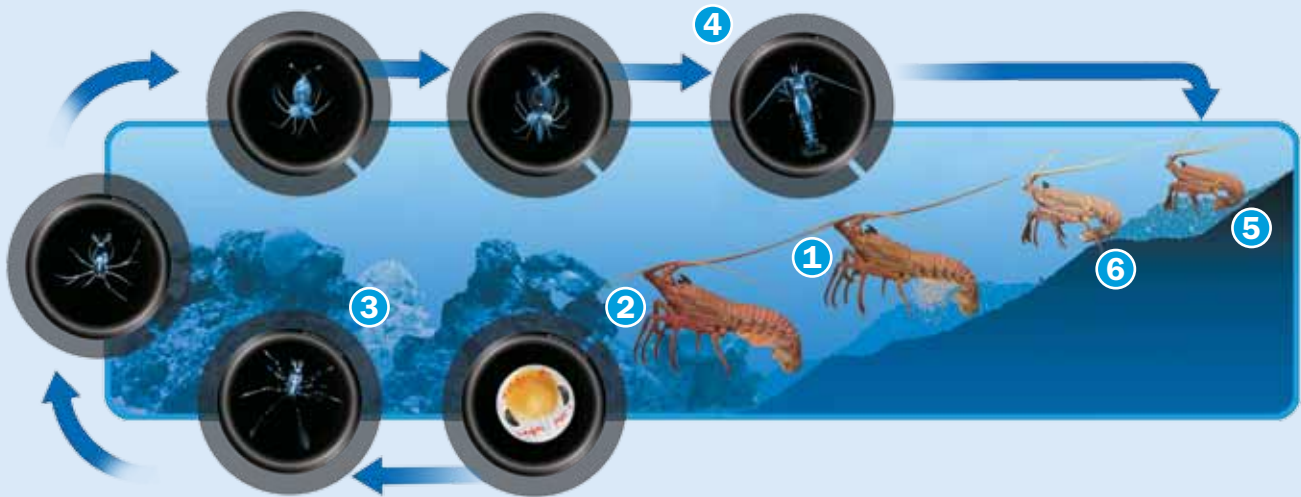
A temperate species

Around eight species of rock lobster are found in WA waters, but the most abundant by far is the western rock lobster. A temperate species, western rock lobsters are only found on the continental shelf off the coast of Western Australia, with most living in the area between Perth and Geraldton.

In the southern areas of its distribution, western rock lobster mature at six to seven years old, at a carapace length of about 90 millimetres. In the northern waters near Kalbarri and at the Abrolhos Islands, they mature at smaller sizes, usually at about 70 millimetres carapace length, owing to the relatively warmer water.



Life Cycle



Most setose females also have tar spots (sperm packets) attached.



Fully setose female.



Female swimmerets.



Berried female.

1. Mating: When rock lobsters mate, in late winter and spring, the male attaches a packet of sperm, which resembles a blob of tar, to the underside of the female. The scientific name for this sperm packet is a 'spermatophoric mass' but, owing to its appearance, it is generally called a 'tar spot'. It remains underneath the female between the hind-most pair of legs until she is ready to spawn her eggs.

2. Spawning: When female lobsters release their eggs, they also release sperm from the tar spot by scratching it. The eggs are thus fertilised as they are swept backwards from the female and become attached to the sticky 'setae' (fine hairs) on the 'swimmerettes' beneath the tail of the female lobster.

Females carrying eggs are known as 'berried'. The eggs hatch in about four to eight weeks, depending on water temperature, and release tiny larvae into the water currents.

3. Larvae: Called phyllosoma because of their leaf-like shape, the larvae drift offshore and spend nine to 11 months in a planktonic state, growing in a series of moults from 2 mm long at hatching to approximately 35 mm long in the final larval stage. During this time, most of the larvae remain 400 to 1,000 km offshore, but some have been found as far out as 1,500 km.

Most larvae die on their ocean journey, but the survivors are eventually carried by winds and currents back towards the continental shelf.

4. Pueruli: The late-stage larvae undergo a moult that totally changes their appearance. They become fully-fledged but miniature (about 25 mm long), transparent rock lobsters known as pueruli.

It is at this time that they swim across the continental shelf, with assistance from prevailing currents, from deep waters onto onshore reefs – a distance in some parts of 60 km. What makes this long journey extraordinary is that the tiny pueruli do it without eating at all on the way, powered entirely from energy preserved from their larval phase.

Many are eaten by predators or are not carried close enough to the onshore reefs by the ocean currents to allow them to 'settle' into their new lives as lobsters.

Within days of making themselves at home on the onshore reefs, the pueruli develop the red colouration that is associated with western rock lobsters.

5. Juveniles: The pueruli that successfully return to the coast will, through a series of moults, grow to become juvenile rock lobsters. These juveniles feed and grow on the shallow onshore reefs for the next three or four years.

6. Whites' migration: At this point, the lobsters undergo a synchronised moult in late spring, when they change their normal red shell colour to a creamy-white/pale pink. The lobsters are then known as 'whites', until they return to their normal red colour at the next moult a few months later.

The whites phase of the western rock lobster's life cycle is a migratory phase. Once their new lighter-coloured shell has hardened, they set out on a two-pronged migration. The vast majority head west and undergo a mass migration into deeper water, where they re-settle on deeper reefs. A small percentage makes a longer migration to the north, usually following the continental shelf.

In large groups, the lobsters set out on their march, trekking at night, until they reach the spawning grounds, occasionally a hundred or more kilometres away from where they started and in water up to 100 m deep.

Above them, the western rock lobster fishing season has started.



Adult and non-migrating lobsters are known as 'reds'

Predators – and prey

Western rock lobster are opportunists and feed on a wide range of items – from coralline algae and detritus (dead and dying marine matter) to molluscs and crustaceans.

When they are juveniles, lobster are eaten by a number of fish species, and as adults are prey for octopus and a variety of large fish.

i As part of the moulting process, rock lobsters actually regrow any legs and antennae that have been lost – usually from skirmishes with hungry predators such as octopus.



Each reef has a limited number of holes that suit rock lobster.
Photo: Sue Morrison

i Migrating lobsters are tracked through extensive tagging programs that have been carried out since the mid-1980s. Data from returned lobsters provide vital information on growth, migration and mortality.

Armour-plated

Once larvae moult to become pueruli, they get a suit of armour that they retain for the rest of their lives. The simple fact is that spiny lobsters like western rock lobster need some sort of protection, as they feed by conducting sudden raids on reefs and ocean floors at night.

This involves a lot of looking around with their large bulbous eyes, feeling with their long antennae and small sensory hairs on their body called 'setae', tasting the water with their claw-like feet (strange but true) and smelling with their antennules – small antenna-like protrusions just above the mouth.

Another good reason for them being armour-plated – and having a couple of large spiny antennae that they can swing at a predator – is finding a safe home on a crowded piece of reef. Each reef has a limited number of small holes that suit a single rock lobster – and these are sometimes occupied by octopus, which like the taste of lobster.

As a result, the lobster will often seek safety in numbers and take over larger caves and rock ledges that are large enough to provide shelter for a whole group of them. A common defensive strategy employed by lobsters is for them to back into caves, so their carapace spines and spiny antennae point aggressively forward.

Good and bad years

'Recruitment' is a term generally used by researchers to describe the addition of lobsters or fish (juvenile or legal size) to an adult 'fishable' population, either by breeding or migration.

Levels of recruitment of puerulus to WA's western rock lobster population fluctuates considerably, depending on the strength of the Leeuwin Current, and the frequency and intensity of low-pressure weather systems that generate westerly winds.

In years when the Leeuwin Current is flowing strongly, a higher proportion of larval lobster are able to return to the coast. In years when the Leeuwin Current is weak, recruitment is usually poorer. Westerly winds at the time of year when the pueruli are ready to 'settle' may also help more of these larval lobster to reach the shallow reefs along the coast.

Western Australia's major fishery

Western Australia's western rock lobster fishery has received international acknowledgement as one of the best managed and most sustainable in the world. The commercial fishery, which involves around 280 boats, has recently moved to a quota managed framework. The recreational fishery, which is managed though bag limits and season length, involves around 30,000 recreational fishers.

Under quota management, commercial fishers have catch allocations that they are able to take during the commercial season, which runs from 15 November until 31 August 2011 (with the exception of the Abrolhos Island zone, which starts on 15 March). The recreational season runs from 15 November until June 30.

The key goal of the quota management system is to ensure the integrity of the Total Allowable Commercial Catch (TACC) that has been set for the western rock lobster fishery. For the 2010/11 season, the TACC was set at 5,500 tonnes to help keep the fishery sustainable in the light of the impacts of record low puerulus (larval lobster) settlement in recent years. The TACC can be varied, depending on factors like the success of puerulus settlement.

Several additional protective measures are used to ensure the sustainability of WA's rock lobster populations including size limits, protection for any females in breeding condition and controls on the type of gear used (including a requirement to use escape gaps to allow small lobsters to escape from pots).



The western rock lobster fishery uses baited pots and is commercially fished by around 280 boats.

Fishy science

The western rock lobster fishery is one of a handful in Australia where a long-term scientific program has provided sufficient detailed information so to be able to predict catches up to four years in advance. This scientific program also provides estimates of breeding stock levels, along with a range of information on natural variations in the fishery, as it responds to both fishing activity and environmental variations.

To protect populations into the future, the Department of Fisheries uses a number of methods to monitor the status of lobster populations and forecast future catch levels. This involves fishery-independent monitoring of puerulus settlement and breeding stock levels.

i Artificial seaweed collectors are placed at various sites along the coast. These can look rather like an oversized bottle-brush and are used to monitor the levels of puerulus that settle on inshore reefs.



The Department also monitors the activities of commercial rock lobster fishers and processors through compulsory 'catch and effort' logbooks. In addition, fishers provide additional data through a voluntary logbook scheme. Both these logbook systems provide comprehensive data that are used for stock modelling and assessment.

i To reduce the interaction of Australian sea lion pups with rock lobster pots, sea lion exclusion devices (SLEDs) have been fitted to pots in areas where sea lion pups are common.



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Glossary

Berried

When a female rock lobster carries eggs attached to the swimmerettes on the underside of her tail

Breeding stock

Mature rock lobsters in a population that are able to breed

Carapace

A protective shell covering the rock lobster's back, head and upper body

Distribution

The places where a species occurs

Phyllosoma

Early larval stage in the development of a rock lobster

Pueruli

Late larval stage in the development of a rock lobster, when the larvae become fully-fledged but miniature rock lobsters

Recruitment

Addition of rock lobsters (or fish) to a population as a result of reproduction, migration or growth to legal size

Settlement

A type of behaviour in fish where they reside in/inhabit/ occupy/ populate an area for a period of time

Sustainability

A condition where catch is removed from a fish stock without causing the stock to decline to unsustainable levels.

Swimmerettes

Small paddle-like structures located under the abdomen that assist in movement and reproduction

Temperate

In the southern hemisphere, seas that lie between the Antarctic and the tropic of Capricorn

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FURTHER INFORMATION

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