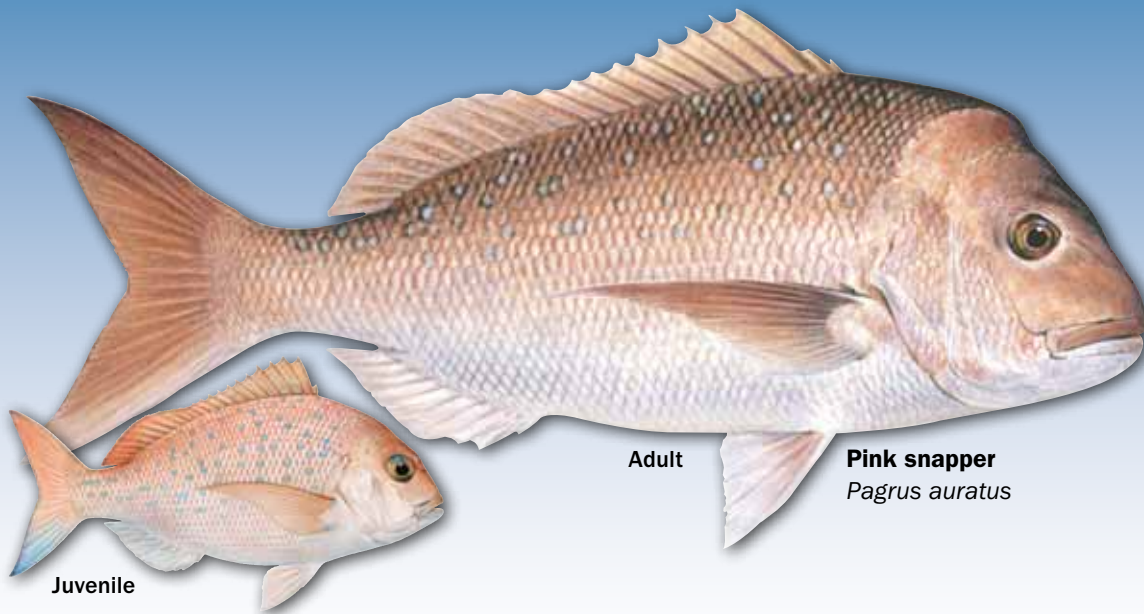




# FISHERIES FACT SHEET

# PINK SNAPPER



Adult

**Pink snapper**  
*Pagrus auratus*

Juvenile

## Snap it up

Pink snapper are one of Western Australia's best-known and most sought-after fish, prized by commercial and recreational fishers alike, and seafood lovers for their excellent taste.

### A large distribution...

Pink snapper are found in coastal waters off China, Japan, Taiwan, the Philippines, New Zealand and Australia, where their range extends from northern Western Australia down and across to South Australia and Victoria, and up to New South Wales and southern Queensland.

In WA, pink snapper are found from the warmer waters to the north of Karratha to the cooler waters of the Great Australian Bight.

In some locations, pink snapper gather seasonally to spawn in large schools called 'aggregations'. The best known of these occur in Shark Bay and in Cockburn and Warnbro sounds off the Perth metropolitan area.



Distribution of pink snapper in WA

### Not actually snapper

Despite their name, pink snapper are actually members of the sea bream family (Sparidae) and are related to species such as black bream (*Acanthopagrus butcheri*) and tarwhine or silver bream (*Rhabdosargus sarba*) rather than the true snapper family (Lutjanidae).

### ...but most prefer to stay close to home

The population structure of pink snapper in oceanic waters off the WA coast is not fully understood. Tagging has shown that while some individuals can move long distances (hundreds of kilometres) to find food or to spawn, most fish show much more restricted movement patterns. Snapper that were tagged in oceanic waters outside Shark Bay were mostly recaptured within 20 kilometres of their release point.

In Shark Bay's inner gulfs, tagging and genetic studies have shown that there are three separate snapper populations with little interbreeding between them. Fish tagged in the Freycinet Estuary have been recaptured on average only 14 kilometres from where they were originally tagged after up to three years at liberty.

The tendency of pink snapper to reside in specific areas and have limited home ranges with little intermixing of populations makes them vulnerable to high fishing levels and localised stock depletion.



Pigments called 'astaxanthins' probably give snapper their pink colour – similar to what occurs with pink flamingos. In Japan, where snapper are farmed, the fish are fed krill oil to ensure the presence of these pigments.

## Bottom-dwellers

Pink snapper are 'demersal' or bottom-dwelling but also spend some of their lives in the mid- to upper water levels. Adults are found out to depths of 200 to 300 metres along the continental shelf, while juveniles are common in bays, inlets and estuaries that provide important nursery areas.

They have a broad-ranging diet and feed on small fish, crustaceans, worms, molluscs, jellyfish, echinoderms (such as sea stars and sea urchins) and algae. Although they are near the top of the marine food web, pink snapper may become prey to bigger species such as large estuary cod, dolphins and sharks.

Pink snapper are slow-growing and long-lived – they can live to the ripe old age of 40 years or more. This long life increases each snapper's chance of reproducing successfully as natural variations in water temperature and/or food availability between years can influence spawning success and juvenile survival. Their relatively slow growth rate makes them less able to quickly recover from overfishing and rapid environmental change than some other species.

Pink snapper have been caught weighing almost 20 kilograms and measuring over a metre long. These days it is rare to see pink snapper weighing more than 10 kilograms.

## Serial spawners



In waters off Shark Bay, pink snapper reach maturity after three to four years on average, when they are around 40 centimetres long. In contrast, in the cooler waters off the lower west coast, snapper may be five to six years of age and 50 to 60 centimetres in length by the time

they reach maturity. Over 90 per cent of pink snapper will have spawned at least once at around five years in the north and seven years off the lower west coast.

The timing of the spawning season for pink snapper varies with location. Fish in Shark Bay spawn between mid-autumn and mid-spring (April – October) while further south, in the cooler waters of Cockburn Sound, spawning occurs between mid-spring and early summer (October – December) as water temperatures increase.

During the breeding season, pink snapper in some locations form spawning aggregations. These can be made up of thousands of fish and are often found in the same locations each year – so they are easily located and targeted by fishers. Such large numbers of fish aggregating in the same place can give the impression that stocks are healthy, however these fish may have been drawn from over a wide area.

Spawning mostly occurs around the new and, to a lesser extent, full moon. During spawning, eggs and sperm are released into the water and fertilisation occurs externally. Females release millions of eggs in a series of batches over several weeks in an effort to increase reproductive success.

As they grow larger, females produce more eggs each year and become an increasingly valuable part of the breeding stock. Research has shown that a 40 centimetre female can release 100,000 eggs in a single spawning, while a larger fish of 70 centimetre can release 300,000 to 500,000 eggs at a time – which will add up to millions of eggs being produced over the entire season. However, most of these eggs and the larvae that result do not survive even long enough to become juveniles, due to a lack of food and predation (natural mortality).



Snapper in large spawning aggregations sometimes become so voracious they will bite a bare fish hook. It is thought they get so hungry because they expend energy to produce eggs and sperm, and soon consume food sources at the aggregation site. The lead sinker in this photograph is covered in bite marks from aggregating Shark Bay snapper and shows how easy it is for fishers to catch large numbers of pink snapper at these times. Perhaps these fish really do deserve to be called snappers!

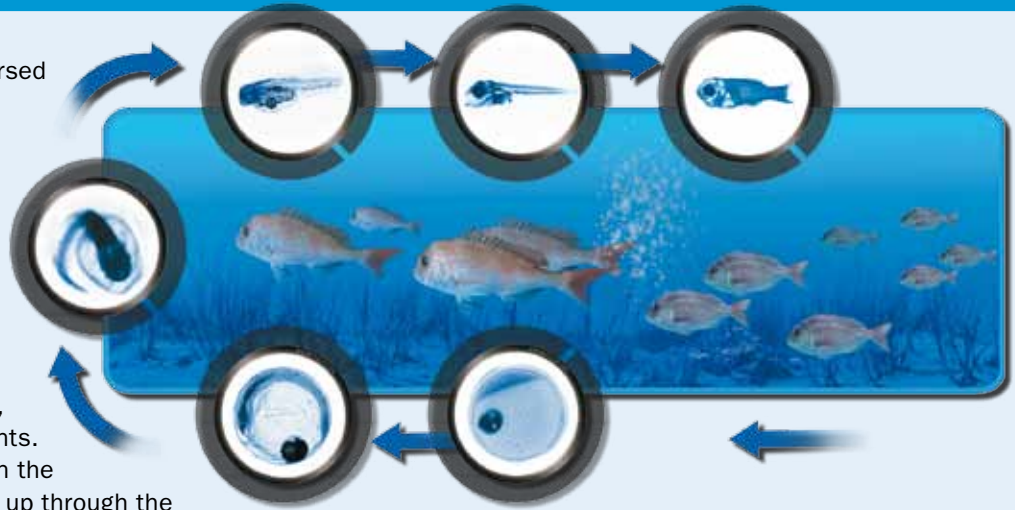


## Drifting with the currents

When spawning occurs in the open ocean, snapper eggs may be dispersed over large distances by the tide, currents and wind. In contrast, in sheltered waters such as Cockburn Sound and the inner gulfs of Shark Bay, the eggs are retained within well-defined areas.

About a day-and-a-half after fertilisation, the eggs hatch into tadpole-like larvae. The larvae cannot swim well so, like the eggs, they drift with the winds and currents. They stay near the ocean bottom in the daytime and as they grow, migrate up through the water column at night.

Over the next three weeks or so, the larvae transform into recognisable juvenile snapper before they settle in large numbers in the deeper waters over muddy or sandy bottoms.



When they are about one-and-a-half years' old and between 15 and 18 centimetres in length, juveniles in large marine bays and estuaries move to the margins to often live over seagrass beds or in the open oceans near rocky reefs.

## Boom or bust?

Water temperature, salinity and food availability all play a role in the survival of pink snapper eggs, larvae and juveniles, as well as the growth of older fish.

Juvenile pink snapper, like many species of scalefish, have a very high natural 'mortality' – in fact, more than 90 per cent die of natural causes in the first few weeks or months of life. Natural mortality declines as the fish get larger and older, and reach adulthood.

Successful recruitment depends on favourable environmental conditions. In most years, it is probable that there will be low recruitment, in that very few young fish will survive ('bust' years). In other years, when environmental conditions are more favourable, the survival rate can be much higher ('boom' years). These boom years may only happen a few times each decade and can lead to a snapper population being dominated by a small number of 'year classes' – that is, fish that were born in the same year. A fish population that has this sort of 'age structure' is highly vulnerable to sustained heavy fishing.



## A favourite of fishers

Pink snapper support important commercial fisheries and are very popular with recreational fishers in all the Australian mainland states. Management of fisheries seeks to control the overall catch, and protect spawning populations and important habitats.

Most of the commercial pink snapper catch in WA comes from the oceanic stock off Shark Bay, where the commercial fishery is managed using quotas and gear controls. Despite being WA's biggest commercial pink snapper fishery (hundreds of tonnes taken per year), the Shark Bay fishery is relatively small compared to the commercial fishery in New Zealand (thousands of tonnes taken per year).

Recreational catches of pink snapper in WA are managed using daily bag, possession, size and gear limits, as well as closed seasons to protect spawning aggregations. Quota tags are used to manage catches of pink snapper in the Freycinet Estuary in the inner gulfs of Shark Bay.



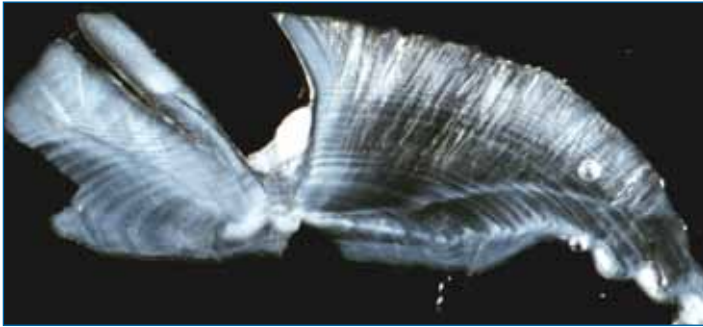
Pink snapper are a symbol of happiness and good fortune in Japan. High quality Japanese and WA wild-caught pink snapper are sought for weddings and other ceremonial occasions, and fetch much better prices than cultured snapper.

## Fishy science

Fisheries research scientists collect samples of pink snapper taken by commercial and recreational fishers. These fish are used to determine how fast pink snapper grow and how old they are when they reach a certain size.

Researchers can determine the age of a fish by studying its 'otoliths' or ear bones. Thousands of these small bony structures are examined every year. The otoliths – used by fish to orientate themselves, balance and 'hear' underwater – lay down growth rings every year similar to those of trees. Researchers count the growth rings to build a picture of the abundance of each age class in the population and assess the health of the fishery.

The number of fish in each age class (same year of birth) when described across the lifespan of the species provides the age structure. Looking at the age structure of a fish population over several years, researchers can see the impact of successful recruitment and the effects of fishing.



## Hyperostosis

As they grow, all pink snapper develop bony humps on the forehead. This is called 'hyperostosis', or above-normal bone growth. Older males also grow fleshy bumps on the snout and it is thought that the males use these bumps to nudge females at breeding time, as if to stimulate the release of eggs.



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## Glossary

### Abundance

Number of fish in a stock or  
population

### Age structure

The number of fish of different  
ages within a population

### Aggregation

Large gathering of fish, usually  
occurring during spawning

### Catch rate

The amount of fish caught in  
relation to fishing effort

### Demersal

Bottom-dwelling, or living near  
the sea bed

### Gonads

Organs producing eggs or sperm

### Hyperostosis

Above-normal bone growth

### Maturity

Stage at which a fish can  
reproduce or breed

### Mortality

Frequency of death

### Otolith

Fish ear bone

### Recruitment

Addition of fish to a stock  
or population as a result of  
reproduction, migration or the  
growth of juveniles to legal size.

### Scalefish

Fish that have scales, unlike  
sharks and rays that have skin  
instead of scales.

### Year class

(also called age class)

Fish within a stock or population  
that were spawned in the same  
season

This fact sheet is the fifth (No. 5, second revision) in  
a Department of Fisheries series. ISSN 1834-9382

### Fish illustrations

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## FURTHER INFORMATION

Visit the Department's website at  
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