

Poster: Demersal Scalefish

Region

North Coast, Gascoyne Coast, West Coast, South Coast, Indian Ocean Territories

Summary

There are over 3,000 species of bony fish that have been recorded in Western Australia. Of these, the most highly sought after by recreational and commercial fishers are the demersal scalefish - fish that live on or near the sea floor.

Demersal scalefish

the bottom dwellers

There are over 3,000 species of bony fish that have been recorded in Western Australia. Of these, the most highly sought after by recreational and commercial fishers are the demersal scalefish – fish that live on or near the sea floor. These include baldchin groper, West Australian dhufish, pink snapper, blue groper, breaksea cod, coral trout, harlequin fish, queen snapper and red snapper.

Slow to grow quick to go

Many of these demersal species caught are slow-growing and long-lived. A number of these species aggregate (gather) in large groups to spawn, making them easy to catch, as is the case with pink snapper. Some species, such as baldchin groper, are semi-resident in nature. This means that they live in specific areas and rarely travel far from home and makes them easy for fishers to locate.

In combination with this biology, increased levels of fishing activity have placed the sustainability of demersal species at risk.



Fish get barotrauma too!

Like humans who SCUBA dive, some demersal fish experience barotrauma – an injury caused by the expansion of gases in the fish's body when they experience rapid changes in pressure. That is if they are caught in deep water and brought rapidly to the surface. Fish experiencing barotrauma may have a bloated stomach, bulging eyes and/or the stomach pushed out through the mouth, gills or anus. If returned to the water in this state, the fish is unlikely to survive.

Returning the fish quickly to the water using a release weight greatly improves its chances of survival. A release weight is a weighted barbless hook and is placed through the fish's lip before the fish is lowered into the water. Once it reaches the depths, a quick tug on the line should release the fish.

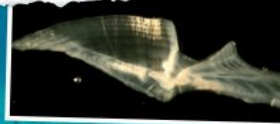


The story otoliths tell

The ear bones (or stones) of fish are called 'otoliths', and are used in balance and hearing. Otoliths contain a detailed record of the age of fish. Each year as a fish grows, tiny bands of calcified material are laid down, similar to growth rings in a tree.

When growth is faster, translucent or clear bands are laid down. When growth is slower, the bands are milky or opaque. Each set of bands represents one year of growth. By counting the number of milky white bands on an otolith, the age of the fish can be determined.

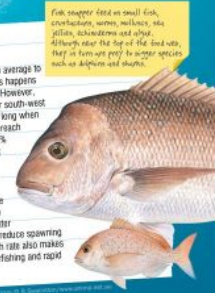
Chemical analysis of otoliths may also provide information about the environmental conditions in which the fish lived and therefore where it may have spent major parts of its life.



A long life

Pink snapper take four to five years on average to reach maturity. In the north of WA, this happens when they are about 40 cm in length. However, new research shows that in the cooler south-west waters, snapper may be 50 to 70 cm long when they reach maturity. By the time they reach about six or seven years old, over 90% of pink snapper will have spawned at least once.

Pink snapper can live to the ripe old age of 30 years or more. This long life increases each snapper's chance of reproducing successfully since in some years, natural variations in water temperature or food availability will reduce spawning success. However, their slow growth rate also makes them less able to recover from overfishing and rapid environmental change.



Fish snapper feed on small fish, crustaceans, worms, molluscs, sea urchins, sponges and algae. Although near the top of the food web, they in turn are prey to larger species such as dolphins and sharks.

Snapper spawning

Pink snapper form seasonal spawning aggregations (groups), also making them vulnerable to overfishing. The well-known spawning areas in Western Australia are Cockburn Sound (off the Perth metropolitan coastline) and Shark Bay. Seasonal closures in some areas protect these spawning stocks.

During spawning, eggs and sperm are released into the water, so fertilisation occurs externally. Female pink snapper release millions of eggs in a series of batches over several weeks as a way to increase their chance of reproductive success. Larger females produce many more eggs each year and become increasingly valuable as part of the breeding stock. Males that produce the biggest quantity of sperm tend to fertilise more eggs, leading to the evolution of large gonads (organs producing eggs or sperm) in these fish.



Fishy science

Researchers use two main methods to work out if fishing pressure is having a negative effect on fish stocks. The first uses knowledge about the biology of a species, including growth patterns, life cycle and age structure of the population. The second method involves analysing historical and current catch data. Catches (the number of fish caught) must be considered in the context of how many people are fishing and how many days they are going fishing (called 'effort'). Catch rates refer to the amount of fish caught in relation to fishing effort.

This research is vital for managing fisheries sustainably. If the information shows a decrease in the maximum age of fish caught or a decrease in the proportion of older fish caught, then that fish population is probably experiencing too much fishing pressure. If most of the mature fish are removed from a population, this may affect the ability of the population to reproduce, leading to smaller and smaller numbers of juveniles in each succeeding generation.



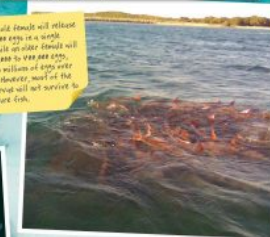
Natural variations

Water temperature, salinity and the availability of food play a major role in spawning and the survival of pink snapper eggs, larvae and juveniles, as well as the growth rates of older fish. Juvenile pink snapper, like many species of scalefish, have a very high natural 'mortality' – in fact, more than 90% die of natural causes in the first few weeks or months.

'Recruitment' describes the addition of fish to a stock or population, either by reproduction or migration. Recruitment for pink snapper depends on favourable environmental conditions, explaining a high variability in the survival rates for larvae and juveniles from year to year. The right conditions, resulting in successful recruitment, may only occur once or twice a decade.

The variation in pink snapper and dhufish recruitment between years is important when managing fish stocks. Heavy fishing combined with low recruitment is likely to put the future of a population at risk.

A four-year old female will release around 100 million eggs in a single spawning, which at this time will release 500 million to 1 billion eggs, adding up to millions of eggs over the season. However, most of the eggs and larvae will not survive to become mature fish.



In the pink

Pink snapper are one of Western Australia's best-known demersal scalefish. Their distribution in WA ranges from the warm water of Karratha in the north to the cool waters of the Great Australian Bight.

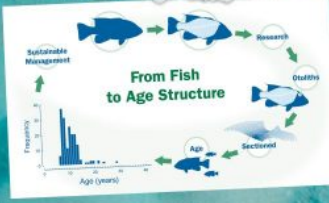
They are usually found down in depths down to 200 m along the continental shelf and in large bays. Suitable pink snapper are common in sheltered bays, estuaries and inshore waters, which are important nursery areas for pink snapper.

Whilst capable of tracking long distances as they search for food or join spawning aggregations, they live in specific areas with limited home ranges. In the inner gulls of Shark Bay alone, studies have shown that there are three distinct populations with little mixing between these populations. Little intermixing of stock makes the vulnerable to high fishing levels and localised stock depletion.



Females called 'retention phase' pink snapper that 'hold' – similar to pink flounder.

Right in their own, pink snapper will actually members of the sea, when family (female) and are therefore related to each other and themselves.



Download Resource
[Demersal Scalefish Poster](https://marinewaters.fish.wa.gov.au/resource/demersal-scalefish-the-bottom-dwellers/)