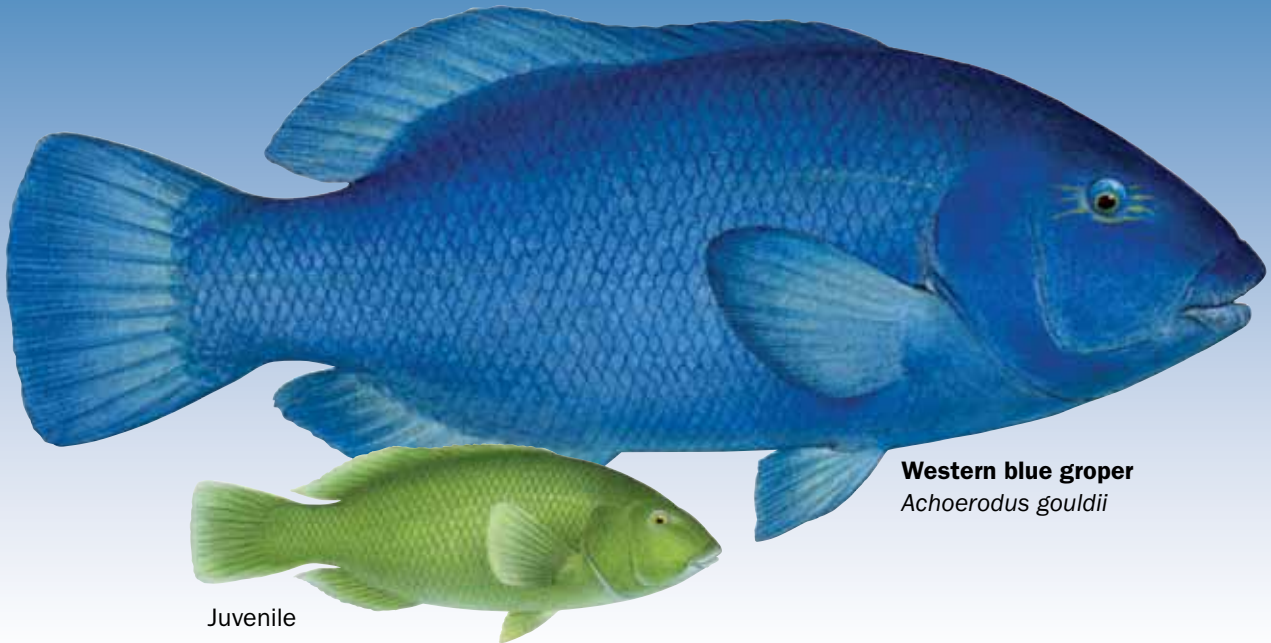




FISHERIES FACT SHEET

WESTERN BLUE GROPER



Western blue groper
Achoerodus gouldii

Juvenile

A wrasse in groper's clothing

In southern Australia, the western blue groper is actually the largest carnivorous bony fish species found living on reefs, reaching a length of up to 1.7 metres and a weight of up to 40 kilograms.

Not just westerners

The western blue groper is found all the way from Geraldton down the west coast and almost as far east as Melbourne, in waters from five to 65 metres deep. Western blue groper spawn between winter and spring and the larvae are caught up in the Leeuwin Current and swept eastwards along WA's south coast. Juveniles often inhabit relatively shallow protected waters, such as inshore reefs and seagrass meadows. As blue groper get older, they tend to venture into deeper water around offshore reefs.



Range of western blue groper in WA



Juvenile western blue groper are actually green in colour – which can lead to misidentification by fishers.



Photo: Peter Coulson

Not what it seems

The western blue groper is not actually a groper (Family Serranidae) at all, but a member of the wrasse family (Labridae). Wrasse are generally much smaller than goppers and it is thought the large size of the western blue is the reason behind its 'groper' name.

Underwater gleaner

The western blue groper uses its strong peg-like teeth to prise off reef organisms, such as sea urchins, molluscs and crustaceans. Adults have a unusual 'bite and suck' feeding behaviour, where they dislocate their jaw so as to bite off a large piece of reef algal mat – and then filter-out and eat the tiny crustaceans that live in it.



Photo: Craig Lebens

Long-lived but slow-growing

Research funded by the Fisheries Research and Development Corporation has been carried out by Dr Peter Coulson and Professor Ian Potter at the Centre for Fish and Fisheries Research at Murdoch University on the biological characteristics of western blue groper in south-western Australia.

Counts of rings in the otoliths (ear bones) of western blue groper have shown that this species can live for up to 70 years, but undergoes little increase in its length after reaching 30 years of age.

The otoliths, used by fish to balance and hear underwater, lay down growth rings every year in a similar manner to tree trunks. Researchers count the growth rings to build a picture of the abundance of each 'age class' in the population of a fishery. This information is used to gain an understanding of the impact of fishing on the stocks of species.



Section of an otolith from a 70-year old western blue groper.
Photo: Peter Coulson



The western blue groper is an interesting fish species – which seems to be fascinated with humans. Probably due to its long life span and size, many large specimens of blue groper are very inquisitive when they encounter divers. This behaviour makes them vulnerable to spearfishing, which can consequently lead to localised stock depletion.

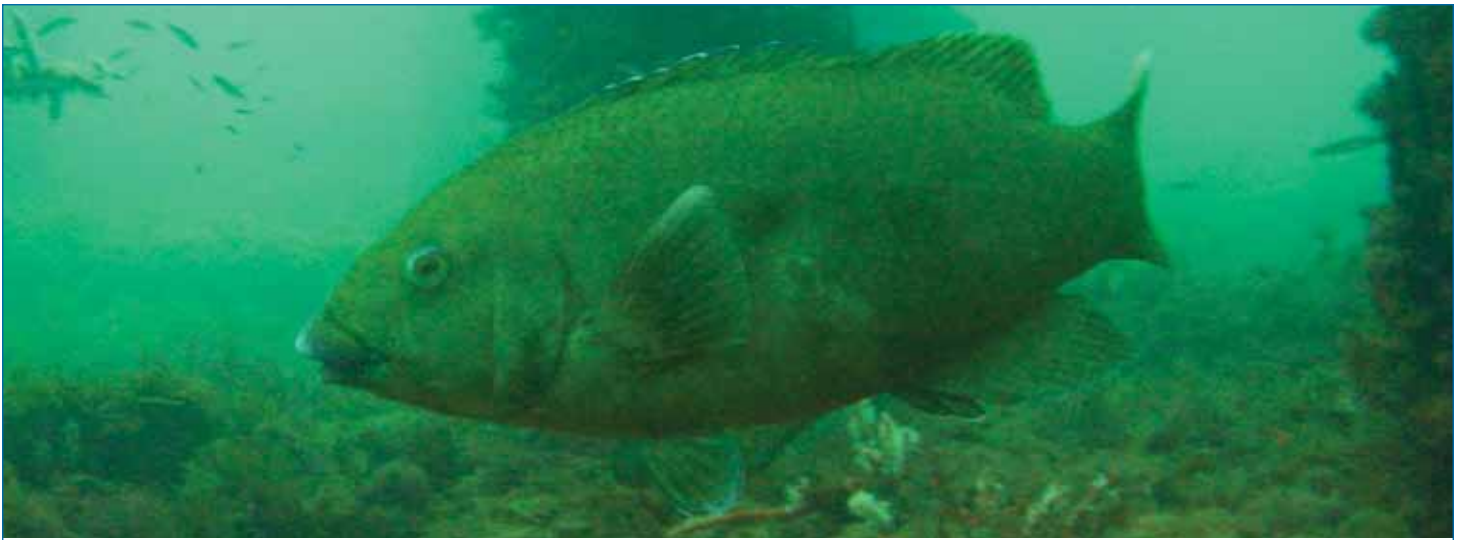
Fortunately, in recent years, many dive clubs and individual divers have become aware of the pressure on blue groper stocks and have changed their behaviour from spearfishing for the gropers to simply enjoying a friendly underwater interaction with them.

Threat from overfishing

The western blue groper is very vulnerable to heavy fishing, as the species is extremely long-lived, taking many years to reach sexual maturity and even longer to be able to change sex from female to male. Along the west coast – especially in the Perth metropolitan area – the fish is a rare sight nowadays.



Stocks of blue groper along the south-west and south coasts are in much better shape, due to a greater area of suitable habitat, frequent poor weather conditions that can restrict fishing access and a lower number of fishers.



Sex change in western blue groper is closely associated in a change in colour from green to blue. This occurs when a groper is 30 to 35 years old.
Photo: Paul McKeown

Changing sex is a regular feature

All western blue groper begin life as females and some, but not all, change sex to males later in life. Biologists call this type of change 'protogynous hermaphroditism', which is very common for members of the wrasse family.

On average, female western blue groper take 15 to 20 years to reach sexual maturity, when they are around 650 mm in length.

Sex change in western blue groper occurs at a length of about 820 mm and at an age of between 30 and 35 years. This change in sex is closely associated with a change in the groper's colour from green to blue.

Western blue groper prefer to live in small groups or 'harems', consisting of one male, one or two females and several juveniles. The male fish is always the largest one in the group.

If the male is removed from the group (say, by fishing, predation or old age), then the group's dominant female takes the former's place – by changing sex and colour.

Within a couple of hours of the disappearance of the male, the dominant female will start behaving in a masculine manner. A couple of days later, the female's colouration will change to that of the male and within about 14 days her sex will have changed to male. As a result of this change, the other females will have moved up one position in the social order of the harem, with a vacant position left at the bottom for a new female member.



Photo: Paul McKeown



Western blue goppers can be affected by barotrauma and poor handling when they are caught. Generally, fishers tend to catch the larger males. It is important they are returned quickly and gently to the water, if not being kept.

Barotrauma and handling

You will have probably heard of SCUBA divers getting 'the bends' because they travelled to the surface too quickly after a deep dive. Some fish that live on the bottom (what scientists refer to as demersal species) or who are found in deep water experience similar problems when they are caught and pulled quickly to the surface on a fishing line. This condition, which results from gases expanding in the fish's body, is called barotrauma.



The most obvious signs of barotraumas in a fish are a bloated stomach, bulging eyes and the stomach pushed out through the mouth or gills. A fish with these symptoms is unlikely to survive if put back and may simply float on the sea's surface. However, its chances of recovery may be improved if a fisher uses a release weight.

This is a barbless hook with a weight attached that is inserted through the fish's lip. The fish is then lowered into the water and, when it reaches the depth from which it came, it can be released by a gentle tug on the line. Once back in deep water, gases in the fish swiftly recompress, saving it from further injury.

An ancient relative 'over east'

Western blue groper are very closely related to the eastern blue groper (*Achoerodus viridis*). The separation of the two species can be traced back to the Ice Age, when temperate waters became colder and the blue groper population probably split and moved up the west and east coasts, so they could stay warm and in their preferred temperature range.

By the time the Ice Age ended, it is thought that the western and eastern populations of blue groper had evolved in different ways over this period. When they then returned south to their previous distribution, they could not interbreed and remained in their separate western and eastern waters.

Fishy science

Along with WA's human population, the number of recreational boats and the level of fishing activity in near-shore waters off WA have grown considerably over the last decade. Fishing effort today is more widely distributed than it was in the past, with boats traveling further to fish.



In addition, fishing technology has improved and become more widely-owned, including high-quality colour echo sounders and global positioning systems (GPS). This equipment has increased the ability of both recreational and commercial fishers to accurately locate and record the positions of reefs and other prime fishing grounds, and return to them.

To manage fishing activity so that stocks are protected into the future, the Department of Fisheries analyses two types of data about a particular fishery. The first type includes the species' biology, life cycle and evidence about the age structure of the population being fished.

The other type of data includes catch, effort (the amount of time spent fishing) and catch rates (the amount of fish caught over a fishing period) – in other words, information about how many fish are being caught in comparison to the past.

For a slow-growing species such as western blue groper that has few natural predators once fully grown, important signals that populations are being overfished may include a decrease in the maximum age of fish and in the proportion of older fish being sampled/caught.



The western blue groper has few natural predators once fully grown. Image: Paul Lewis.

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Glossary

Age class

(also called year class)
Fish within a stock or population
that were spawned in the same
season

Age structure

The number of fish of different
ages within a population

Barotrauma

Expansion of gases in the fish's
body due to a decrease in
pressure, similar to 'the bends'
in humans

Catch rate

The amount of fish caught in
relation to fishing effort

Demersal

Bottom-dwelling, or living near
the seabed

Effort

The amount of time spent
fishing by a given group of
fishers

Endemic

Restricted to, or only found in,
one place

Maturity

Stage at which a fish can
reproduce or breed

Otolith

Fish ear bone

Protogynous hermaphrodite

Female to male sex change

Recruitment

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

Release weight

A weighted barbless hook
connected to a fishing rig that is
attached to a fish to be released

Sedentary

Non-migratory, or tending to stay
in one location

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FURTHER INFORMATION

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