



FISHERIES FACT SHEET

ESTUARINE COBBLER



Cobbler

Cnidoglanis macrocephalus

Mysterious ways

While the cobbler has soft, delicate flesh that's good to eat, it also has sharp venomous spines which are to be avoided. The male cobbler builds a burrow then lures a female in to lay her eggs. It's still a mystery whether the cobbler uses the burrow more than once.

Family connections

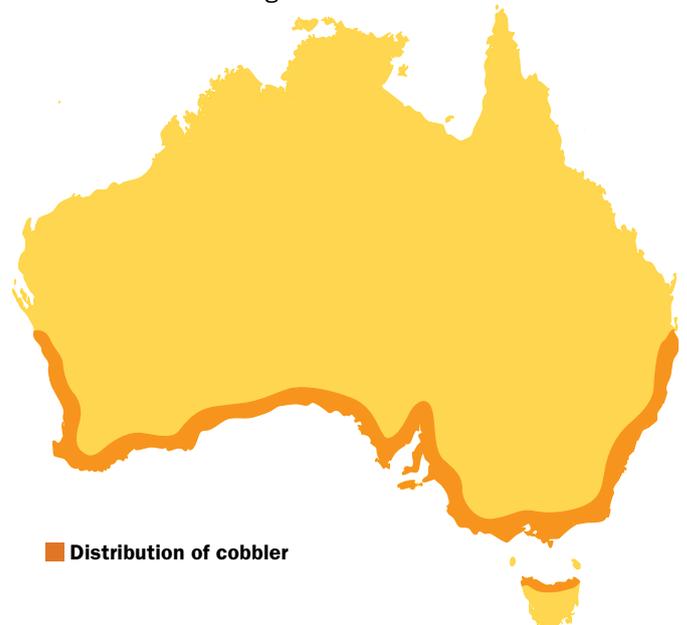
Cobbler belong to the Plotosidae family, commonly known as eel-tailed catfish. There are about 40 species in the family, with most found in tropical waters from Japan to Australia. These fish are characterised by a long tapering body and barbels (fleshy whisker-like organs) around the mouth, which they use to find food. They have venomous spines on their dorsal and pectoral fins that can cause a painful wound if you step on one.



Cobbler. Photo: Anna Micha

Made in Australia

Cobbler (*Cnidoglanis macrocephalus*), or catfish as they're known outside Western Australia, are 'endemic' to Australia, meaning they're only found here. They live in the southern half of the country, in coastal and estuarine waters up to about 30 metres deep. In Western Australia they're found south of the Abrolhos Islands and east into the Great Australian Bight.



Lifecycle

Cobbler can complete their lifecycles in marine (ocean) or estuarine waters. The male builds a burrow then lures a female in to lay her eggs. After fertilisation, the male stays in the burrow to protect the eggs while they develop and hatch. The male then continues to protect the young for about a month, until they are developed enough to forage for themselves.



Cobbler produce a small quantity of very large eggs.

Cobbler burrows are rarely seen. However, observations in estuaries in the State's south-west have indicated that they are built under structures such as rocks or seagrass root mats.

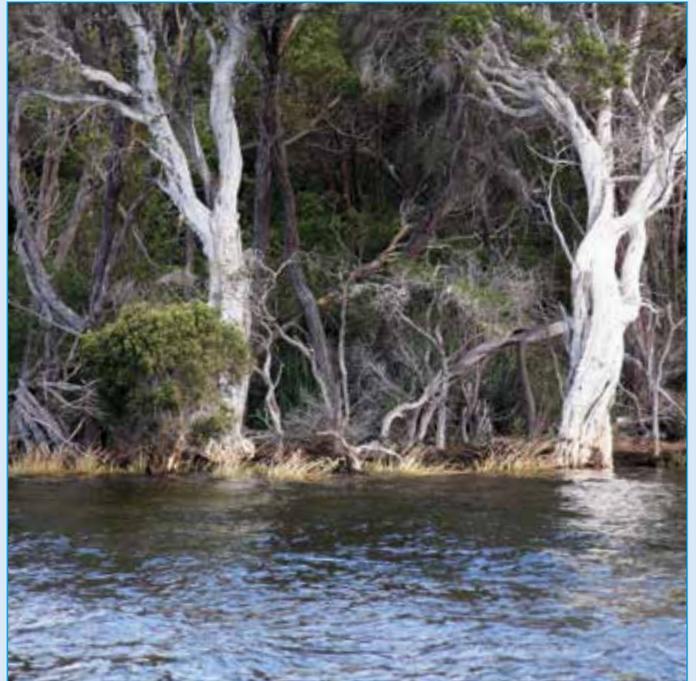
Destruction of suitable breeding habitats may have contributed to a decrease in cobbler in some areas.

Cobbler 'spawn' (release sperm and eggs) in spring and summer between October and January. Studies of cobbler in the Wilson Inlet, near Denmark, have shown that this time of year corresponds with a water temperature of about 18° C and a salinity level of 20 per cent. Cobbler in the Swan-Canning Estuary also spawn at a similar time of year, but on average, the temperature is 20° C and salinity levels at 22 per cent.

Female cobbler lay between 500 and 3,500 eggs, which is a relatively small number of eggs for a fish. However, these

eggs are considerably larger than most fish eggs. (Fish species that offer a high level of protection to their eggs, by guarding the eggs or building nests, such as cobbler, usually lay fewer and larger eggs than other species.)

Cobbler reach sexual maturity at about three to four years of age and about 42.5 centimetres in length. Sexual maturity is both age and size dependent. Various conditions in different inlets have been shown to influence growth rates. In some waters a cobbler may be sexually mature at the age of three, while in other waters, they don't reach maturity until five years of age. Cobbler can grow up to 91 centimetres in length, weigh up to 2.5 kilograms and live for 13 years.



**Shallow edges with vegetation and fallen trees provide cobbler with a suitable sheltered habitat for their burrows.
Photo: Cathy Anderson**

The cryptic cobbler

With a soft, scaleless body, and only their spines for defence, cobbler evade some major predators, such as pelicans and shags, by being nocturnal and hiding during the day.

With poor eyesight, they use their extremely sensitive barbels to search the muddy bottoms for tiny invertebrates, such as molluscs and small crustaceans, to eat.

A major threat to cobbler populations is the destruction of their habitat, including lack of shelter offered by seagrass, floating weed mats or rocky reefs. Cobbler are also affected by water quality; they depend on oxygen dissolved in the water to breathe. The bottom layer of water in estuaries is often lacking in oxygen, and as this is where the cobbler lives, it can have a detrimental effect on their population. Although adults may be able to swim away, the larvae (new hatchlings) and eggs are very vulnerable to this lack of oxygen, as are the invertebrates cobbler feed on.

Eutrophication is one of the main causes of hypoxia (low oxygen levels) and anoxia (no oxygen). Eutrophication happens when nitrates and phosphates are added to the water, from fertiliser run-off, for example. This leads to an increase in the growth of plants, especially algae, which can lower oxygen levels.



The cobbler has whisker-like barbels to help it find food.

Marine versus estuarine

Although the cobbler in marine and estuarine environments are known to be the same species, they are separate breeding stocks, with little or no mixing between the populations. In some areas, where the estuaries are rarely open to the ocean, it's not geographically possible for marine and estuarine populations to mix.

In areas where the estuary does open to the ocean, like the Swan Estuary, it's believed there are still separate breeding stocks. Historically, it's thought there were two stocks living in the Swan Estuary – the estuarine stock in the upper estuary and an oceanic stock that bred outside of the estuary and then ventured into the lower estuary as juveniles. The estuarine cobbler population in the Swan Estuary dropped to such low levels that, in July 2007, a 10-year fishing ban was implemented in both the Swan and Canning rivers to allow the stock to recover.



Cobbler thrive in Wilson Inlet, near Denmark, which is not open to the ocean for most of the year. Photo: Eloise Dortch

Fishery science

Estuarine cobbler are vulnerable to depletion due to their low fecundity, low breeding stock levels, small geographic range and dependence on 'benthic' (river or sea bed) habitats, which are typically degraded in Western Australia's south-west estuaries. Overfishing has also been a factor.

As a result of a combination of biological characteristics, environmental threats and fishing pressure, the Wilson Inlet cobbler stock is one of the most at risk finfish stocks in the South Coast Bioregion (from Black Point, east of Augusta, to the WA/SA border). Estuarine stocks of cobbler in the West Coast Bioregion (from the Zuytdorp Cliffs, north of Kalbarri, to Black Point) are also at high risk.

Researchers from the Department of Fisheries closely monitor the Wilson Inlet cobbler fishery each year to ensure it continues to operate sustainably. A range of data is collected, including:

- **Annual catch and 'effort' (time spent fishing) data supplied by commercial fishers.** Catch levels are compared to the amount of effort. This data is used to monitor trends in the commercial 'catch rate' (catch per unit of effort), which is an index of stock abundance.
- **Annual level of juvenile recruitment.** This involves catch-and-release sampling. Fish are counted, measured and released alive. 'Recruitment' (the addition of young cobbler to the stock) varies significantly and it's thought this variation is caused by environmental factors such as the amount of seagrass. Recruitment levels determine the stock size and therefore the catch rate in

the fishery. Cobbler can be caught at about four years of age. Recruitment monitoring enables researchers to investigate the environmental factors influencing recruitment and to forecast future catch levels.

- **Age structure of the commercial catch.** In co-operation with commercial fishers, fish are randomly sampled from catches throughout the year. Fish are measured, sexed and aged. The data is mainly used to determine the age structure of the total annual catch, which is then used to determine rates of 'fishing mortality' (removal from the population due to fishing). It also provides information about the presence of strong or weak 'year classes' (fish hatched in the same year) in the population, which is used to support the monitoring of juvenile recruitment.



A researcher measures a cobbler. Photo: Cathy Anderson

Commercial fishery

Commercial fishing for cobbler began as early as the 1940s. Historically, cobbler is a popular fish species known for its soft and delicate flesh. In Western Australia, commercial targeting of cobbler is restricted to estuaries. Each estuary hosts a discrete breeding stock that's genetically distinct to other estuarine populations. Between 2000 and 2011, 95 per cent of commercial cobbler catches came from estuaries in the South Coast Bioregion and the remaining five per cent from the West Coast Bioregion. Ninety per cent of the commercial catch in the West Coast Bioregion was from the Peel-Harvey Estuary.

Historically, commercial catches in the West Coast Bioregion were much higher and more widespread, occurring in the Peel-Harvey Estuary, Leschenault Estuary, Swan-Canning Estuary and Hardy Inlet. Reduced catches in these estuaries followed substantial declines in stock levels due to the combined effects of environmental degradation and fishing pressure. In recent years low catches are also partly due to reductions in commercial fishing effort.

The South Coast Estuarine Managed Fishery (SCEF) is now the only significant cobbler fishery in Australia. About 80 per cent of the SCEF catch is taken from Wilson Inlet each year. The SCEF is managed by gear and size restrictions, which means restrictions to the net length and mesh size commercial fishers can use. They're also limited to setting their nets on certain days and at certain times of day to allow for sharing of resources between commercial and recreational fishers.

Commercial cobbler fisheries in the past



Commercial cobbler fisheries today



References

Publications

Brearley, A. 2005. **Ernest Hodgkin's Swanland: Estuaries and Coastal Lagoons of South-western Australia.**

Nel, S.A., Potter, I.C., and Loneragan, N.R. 1985. **The Biology of the Catfish *Cnidogobius macrocephalus* (Plotosidae) in an Australian Estuary.** Estuarine, Coastal and Shelf Science, Volume 21, Issue 6, pp895-909.

Smallwood, C.B and Sumner, N.R. 2007. Fisheries Research Report No. 159. **A 12-Month Survey of Recreational Estuarine Fishing in the South Coast Bioregion of Western Australia During 2002/03.**

Smith, K.A. 2006. Fisheries Research Report No. 156. **Review of Fishery Resources and Status of Key Fishery Stocks in the Swan-Canning Estuary.**

Smith, K.A., Close, P.G. & Ireland, S. 2005. **Fish, Flows and the Future for Our South Coast Estuaries.** Western Fisheries, September 2005. Department of Fisheries, Western Australia.

Glossary

Age structure

The number of fish of different ages in a population.

Benthic

Relating to the bottom of a body of water or to the animals and plants that live there.

Endemic

Only found in one place.

Estuarine

Relating to an estuary, which is an enclosed or semi-enclosed coastal water body with a permanent or intermittent opening to the sea that allows some penetration of marine water with tides, and receiving fresh water inflow from the land.

Eutrophication

The process of enrichment of water with excessive nutrients, such as nitrates, increasing growth of plants, especially algae, generally resulting in depletion of dissolved oxygen.

Fishing mortality

Removal of fish from a stock due to fishing.

Spawn

To produce or deposit sperm or eggs.

Recruitment

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

This fact sheet is the twenty seventh (No. 27) in a Department of Fisheries series. ISSN 1834-9382

Fish illustrations

© R.Swainston/www.anima.net.au

FURTHER INFORMATION

Visit the Department's website at www.fish.wa.gov.au or contact:

DEPARTMENT OF FISHERIES – HEAD OFFICE

3rd Floor, The Atrium,
168 St George's Terrace, Perth 6000
T: (08) 9482 7333 F: (08) 9482 7389
E: headoffice@fish.wa.gov.au
ABN: 55 689 794 771