



FISHERIES FACT SHEET

BARRAMUNDI



Barramundi
Lates calcarifer

Barramundi – icon of the Kimberley

Barramundi are a highly opportunistic species that dominate many tropical rivers. Delicious and thrilling to catch, they also live in both freshwater and saltwater, change sex and eat just about anything. Barramundi support substantial commercial, recreational and customary fisheries, as well as an aquaculture industry Australia-wide.

What's in a name?

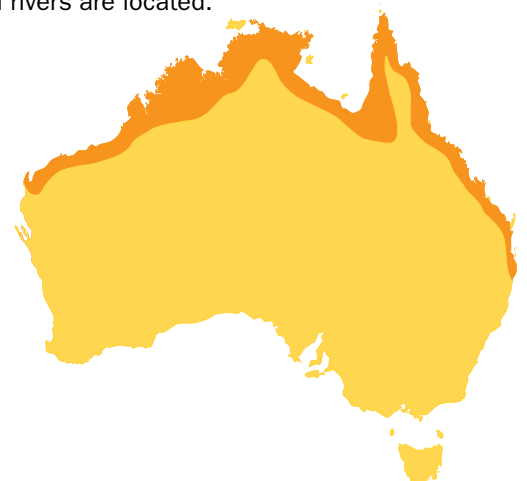
Barramundi belong to the sea perch family of fishes (Centropomidae) and are distantly related to the famous Nile perch of Africa. Internationally, barramundi are also known as Asian sea bass, giant perch, or giant sea perch.

Barramundi have not always had such an iconic name in Australia, and were once known as Asian sea bass. In the 1980's, barramundi was appropriated for marketing reasons. Prior to this, barramundi was believed to be an Aboriginal word initiated from the Rockhampton area meaning 'large scale river fish'. This is thought to have originally referred to another large freshwater fish, the saratoga. The earliest recorded form is 'burra-mundi'.

A broad distribution

Barramundi are distributed throughout coastal areas of the Indo-West Pacific region – from the eastern edge of the Persian Gulf to China, Taiwan, southern Japan southward to Papua New Guinea, and northern Australia. In Western Australia, barramundi are found in rivers and along the coast from Exmouth Gulf to the Northern Territory border, however, they are most prolific in the Kimberley where a large area of the State's tropical rivers are located.

Distribution of barramundi in Australia



Barramundi have the potential to travel great distances in their life; one fish that was tagged and released had travelled 622 kilometres before recaptured.

Not fussy with food

Barramundi are opportunistic predators and eat just about anything that lives in the water. This includes insects, spiders, prawns, fish, other barramundi and even crocodiles! In fact, a barramundi can consume up to 60 per cent of its own length.

The size of prey is largely determined by the size of the barramundi. The diet of larger barramundi consists of 60 per cent fish and 40 per cent crustaceans, while smaller barramundi eat mostly small prawns.

As water temperatures cool during the dry seasons (May to August), barramundi become less active and eat less frequently. During the build-up to the wet season, water temperatures can be up to 10°C higher than during the dry season, and barramundi activity increases with the warmer temperatures.

A sex change

Barramundi are protandrous hermaphrodites, which means they change sex from male to female. They mature first as functional male fish and then undergo sex change to become female. Studies have shown there is a relationship between size and sex. Most barramundi mature as males at about 50 to 60 centimetres and start to change sex at around 80 centimetres, but only if they are living in marine waters.

In freshwater impoundments, such as Manton Dam in the Northern Territory and Tinaroo Dam in Queensland, barramundi were introduced for the enjoyment of recreational fishers. Here, you can find barramundi weighing over 20 kilograms and over 100 centimetres long, however they are all males. Because of this, restocking is the only way to replenish barramundi populations in these freshwater impoundments.

It is believed that saltwater triggers sexual maturity in males and that they need to spawn at least once before changing into females.



An exponential relationship exists between the length and fecundity (the number of eggs produced) of female barramundi. The larger the female fish, the more eggs she will produce – up to 32 million eggs can be produced during a breeding season. That's a lot of eggs!

A complex life cycle

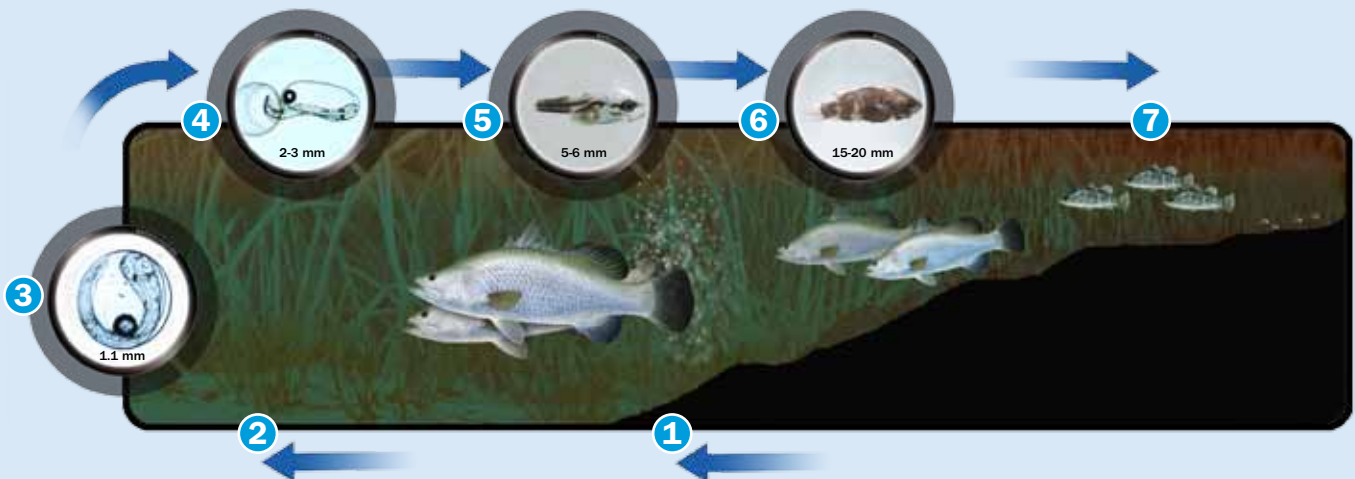


Illustration © Richard McKenna

Barramundi have a complex life cycle that includes freshwater, estuarine and marine phases. Generally, in the wet season, sexually mature adults migrate from fresh water to coastal estuaries assisted by heavy flooding of rivers and streams.

Between September and March in the shallow mudflats of the estuaries, the fish have the most favourable temperature and salinity conditions for spawning, as a result of the build-up of the wet season. Spawning tends to take place at night around the time of the slack tide and appears to be related to the lunar cycle. Nights following full and new moons are the periods of greatest spawning activity.

Newly hatched larvae settle into either temporary tidal habitats or coastal swamps, which appear to act as nursery areas for individuals up to one year old. These juvenile barramundi develop in the mangrove and floodplain lagoons during their first year, and then move into shallow coastal seas before migrating back to the freshwater rivers and streams. Here they remain for the next three to four years while developing into adults. If they do not have access to freshwater, they will remain in coastal and estuarine areas.

1. Barramundi become sexually mature as males at about three to four years old. Males turn into females from about five or six years of age onwards, but require saltwater for this sex change. They can live to at least 20 years of age.
2. At the beginning of the wet season (October), sexually active adults migrate from freshwater rivers to coastal estuaries to spawn, releasing eggs and sperm into the water. A large female can produce up to 32 million eggs during the spawning season.
3. Only 24 hours after fertilisation, the barramundi is almost ready to hatch from the egg.
4. After hatching, larvae are not yet fully developed. The eyes and mouth are closed and the larvae must rely on an internal supply of nutrients from the yolk sac.
5. High tides and wet season floods wash eggs and larvae into mangrove and wetland habitats. At day two or three of life, eyes and mouth open and the larvae begin searching for food. The first live organisms that larvae eat are small plankton, such as copepods.
6. At the end of the wet season (April), floodplains begin to dry and most juveniles migrate upstream to freshwater. Some remain in estuarine habitats.
7. After one year, barramundi have attained a size between 30 to 40 centimetres and are voracious opportunistic predators.

Warm water dwellers

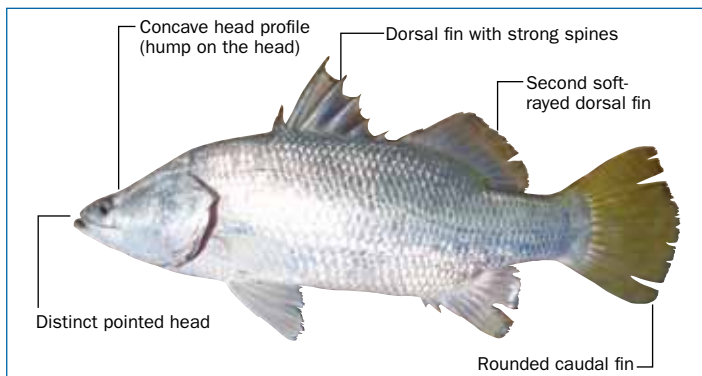
Barramundi inhabit a wide variety of habitats in coastal waters, estuaries and lagoons in clear to turbid water up to 40 metres deep. Most commonly, they are found in rivers and creeks with large catchments and slow, continuous water flow. They prefer water temperatures above 20°C and will take cover around undercut banks, submerged logs and overhanging vegetation.

i The survival of barramundi larvae and juveniles is highly variable from year to year. Despite the production of many millions of eggs, like with many species of finfish, more than 90 per cent die in the first few weeks or months. The death rate is even higher in years of low rainfall, colder water temperatures, or when food is scarce.

A distinctive form

Barramundi can be recognised by a distinct pointed head, concave forehead, large jaw extending behind the eye and a rounded tail fin. They have a dorsal fin with seven or eight strong spines and a second dorsal fin of ten or eleven rays.

There are well marked differences between barramundi taken from saltwater and those taken from freshwater. Saltwater specimens are coloured bluish or greenish-grey on the upper body, silver on the lower body, have yellowish fins and an elongated general body shape. Usually there is no trace of fatty tissue internally.



Freshwater barramundi have a much darker upper body, a golden underbody, dark fins, deep girth and a thick tail. The body contains large fat deposits, especially those living in land-locked lagoons. The flesh of these fish often has a muddy or earthy flavour when cooked.

Juveniles have the structure and form of the adult fish. The only distinguishing juvenile characteristic, other than size, is the presence of a white dorsal head stripe in fish between one and five centimetres in length. The intensity of the stripe varies with the physiological state of the fish – the stripe is most obvious when individuals are excited.



A freshwater juvenile barramundi.
Photo: Broome Aquaculture Centre

Important commercial catch

Barramundi have gained a reputation as one of Australia's finest eating fish and as a result are the most important freshwater-estuarine commercial fish in Australia. The commercial fishery is managed through low intensity and minimal impact fishing, limited entry, seasonal and area closures, and gear restrictions.



Barramundi support a substantial commercial fishery in WA and Australia wide. Photo: Henrique Kwong

In Western Australia, the main areas of the fishery are the river systems and tidal creek systems of Cambridge Gulf, the Ria coast of the northern Kimberley, King Sound and Roebuck Bay. The fishery is managed primarily through input controls in the form of limited entry, seasonal and spatial area closures and gear restrictions. In 2009, the total commercial catch of barramundi was 60 tonnes.

i Many Australian populations of barramundi are thought to be quite separate from each other – so they don't intermingle or interbreed.

Fun to fish for

'Barra' are highly targeted by recreational fishers. They are famous for their great tenacity when hooked, and are a great game and sports fish. Many visitors to Western Australia's top end attempt to bag themselves an elusive 'metrey' (a barramundi measuring in excess of a metre and weighing anywhere between 10 and 25 kilograms).



Sport fishing for barramundi is a favourite for recreational fishers.

As a precautionary measure, breeding stock levels are maintained by the implementation of special fishing rules for the Fitzroy River, King Sound, Broome and the Ord River areas, all of which are key fishing locations. Strict bag limits also apply for anglers catching this fish in other areas of the state.

A favourite to farm

The Australian farmed barramundi industry started in the mid 1980s. Today it consists of about 100 licensed farmers. Barramundi is farmed in all states of Australia except Tasmania. There is every indication the industry will continue to expand, with growth coming from existing farms and new entrants to the barramundi aquaculture industry.

Australian barramundi is farmed in diverse production systems. The majority of production comes from outdoor freshwater pond operations in north Queensland and the Northern Territory. A significant amount is also grown in saltwater ponds.



Aquaculture sea cages used at Cone Bay. Photo: Broome Aquaculture Centre

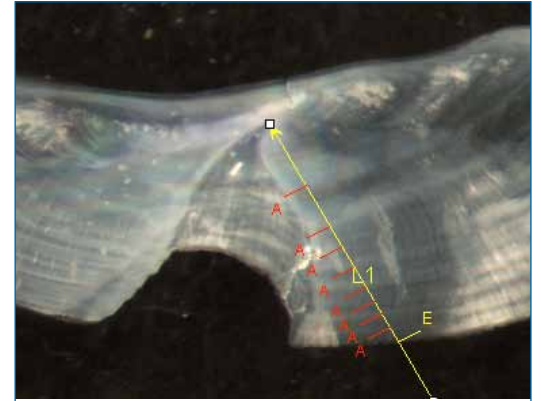
Western Australia's barramundi production is small compared with other states. However, one enterprise at Cone Bay in the Kimberley has just received approval to increase their production of barramundi to 1,000 tonnes per annum.

Barramundi was traditionally produced as plate fish for the restaurant trade, but the majority is now being sold as fillets with a new market developing around direct sales to the major supermarkets.

Fishy science

The age of barramundi is determined by counting growth rings on their ear bones (otoliths), much like counting growth rings found on a tree.

There are many factors that can affect the growth of a fish, such as food availability and water conditions. As a result, length-age relationships can differ between areas.



The rings on this sectioned barramundi otolith can be counted to work out the age of this fish. Photo: Northern Territory Fisheries



Barramundi can live to over 20 years of age and have been recorded at more than a metre and a half in length and 55 kilograms in weight.

References

Books

- Davis, T.L.O. (1984). **Estimation of fecundity in barramundi *Lates calcarifer* (Bloch) using an automatic particle counter.** Australian Journal of Marine and Freshwater Research 35, 111-118.
- Davis, T.L.O. (1982). **Maturity and sexuality in barramundi *Lates calcarifer* (Bloch) in the Northern Territory and south-eastern Gulf of Carpentaria.** Australian Journal of Marine and Freshwater Research 33, 529-545.

Glossary

Aquaculture

Commonly termed 'fish farming' but broadly the commercial growing, holding or breeding of marine or freshwater animals and plants in water

Caudal fin

Tail fin of fishes and some other vertebrate animals, used for propulsion

Crustacean

Class of arthropods with hard, jointed external skeletons, such as crabs, shrimp, prawns and lobsters

Dorsal fin

Fin located on the upper side of fishes and some other vertebrate animals, used for stabilisation and manoeuvrability

Estuarine

Of, relating to, or found in an estuary

Gear restriction

A type of input control used as a management tool whereby the amount and/or type of fishing gear used by fishers in a particular fishery is restricted by law

Input controls

Controls on fishing to limit catches, e.g. pot numbers; seasonal closures; size, vessel or gear restrictions; or limiting of licences

Limited entry (fishery)

A fishery where the number of operators is restricted to control the amount of fishing effort; frequently involves controls

on the number and size of vessels, and conditions relating to the transfer of fishing rights or the replacement of vessels.

Lunar cycle

The cycle of the waxing and waning of the moon

Maturity

Stage at which an animal can reproduce or breed

Otolith

Fish ear bone

Protandrous hermaphrodite

Animal that begins adult life as a male and has the ability to change sex to a female later in life

Sea cages

Cages suspended in the sea and used for aquaculture

Slack tide

The occurrence of relatively still water at the turn of the (low) tide

Spawning

Release or deposit of spermatozoa or ova, of which some will fertilise or be fertilised to produce offspring

Turbid

Cloudy, not clear or transparent, because of stirred-up sediment or particles suspended in the water

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FURTHER INFORMATION

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