



Research Angler Program Newsletter

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Baitfish – the base of the food chain

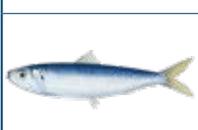
Baitfish are vital in the marine food chain. They are typically small fish that aggregate in large schools, and are an important food source for larger fish. Baitfish are also very valuable to humans – as bait and food.

In Western Australia, baitfish are mainly from the Families Clupeidae (pilchards, herrings), Engraulidae (anchovies), Atherinidae (Hardyheads) and Carangidae (scads). These families occur in tropical and temperate areas, although the major fisheries for baitfish in WA are located in southern areas.

Pilchard numbers impacted by fish kill event

Pilchards make up the vast majority of baitfish catches in WA. There are two separate pilchard stocks in WA – a West Coast Bioregion (WCB) stock that spawns in summer and a South Coast Bioregion (SCB) stock that spawns in winter. Both stocks are targeted by commercial purse seine fishers. In 1995, a massive fish kill affected all pilchard stocks across Australia (the largest fish kill ever recorded). It was caused by a herpesvirus, which also caused another smaller kill in 1998–1999. About 70% of adults died in each event (representing a huge loss of biomass), with major economic and ecological impacts.

In WA, commercial catches suddenly dropped by about 90% and many purse seine fishers ceased fishing for pilchards as a consequence. Pilchard stocks have now mostly recovered but commercial catches in WA are now only about a quarter of pre-1999 levels, due to the smaller fishing fleet rather than a lack of fish.

Family Engraulidae		
		<i>Engraulis australis</i> (Australian anchovy) Heron Island (Qld) to Shark Bay (WA). Max. length 15cm; max. age 6yr.
Family Clupeidae		
		<i>Sardinops sagax</i> (Pilchard/Mulie/Australian sardine) Rockhampton (Qld) to Shark Bay (WA). Max. length 29cm; max. age 9yr.
		<i>Spratelloides robustus</i> (Blue sprat) Southern Qld to Dampier Archipelago (WA). Shallow, coastal waters. Max. length 29cm; max. age 1yr.
		<i>Etrumeus teres</i> (Maray/Round herring) Southern Qld to Geraldton (WA). Offshore. Max. length 27cm; max. age 5yr.
		<i>Sardinella lemuru</i> (Scaly mackerel) Coastal and offshore north of Albany (WA). Juveniles harvested for bait and food. Max. length 23cm; max. age 7yr.
		<i>Hyperlophus vittatus</i> (Sandy sprat/Whitebait) Kalbarri to Augusta in WA (southern Qld to Vic. on east coast). Shallow, sandy habitats. Coastal and estuarine. Max. length 10cm; max. age 4yr.
		<i>Nematalosa vlahminghii</i> (Perth herring/bony herring) Perth to Bunbury (WA). Adults feed in coastal waters but migrate into rivers to spawn. Juveniles in estuaries. Max. length 36cm; max. age 18yr.
Family Carangidae		
		<i>Trachurus novaezelandiae</i> (Yellowtail scad) Southern Qld to Northwest Cape (WA). Nearshore and offshore, older fish offshore. Low commercial value in WA. Max. length >50cm; max. age 28yr.
Family Atherinidae (Hardyheads)		
		Many different species throughout WA. Shallow coastal waters and estuaries. Rarely harvested in WA, large fisheries in Asia. Max. length 15cm.

In the WCB, pilchards share the waters with scaly mackerel. Scaly mackerel are caught by purse seine fishers from Perth northwards, whereas pilchards are caught from Perth southwards. The two species prefer slightly different water conditions, so the populations of each species tends to alternate depending on the environment. Warmer temperatures in recent years seem to have favoured scaly mackerel, and they have taken over from pilchards as the dominant baitfish species around Perth. Since 2016, sea temperatures have been below average off the west coast, due to a weak Leeuwin Current. Perhaps scaly mackerel numbers will decrease and pilchards will make a comeback under these colder conditions?

How rainfall effects baitfish

Another important factor affecting baitfish in south-west WA in recent times is the decline in rainfall, which has resulted in less coastal productivity. When freshwater flows from a river mouth, baitfish such as scaly mackerel and pilchards tend to aggregate there. Juvenile whitebait and anchovies also aggregate there. As nutrients transported by the river flow into an estuary or ocean, they support plankton growth, which in turn is a food source for baitfish. Thus, strong recruitment of baitfish is linked to high rainfall.

Declining rainfall may explain why whitebait has suffered a major population decline in WA over the past 50 years. This coastal species was once abundant between Geographe Bay and Perth. The stock is now concentrated in Geographe Bay, with much lower densities of fish further north.

A small commercial fishery for whitebait still exists, with strict restrictions in place (e.g. a two-month fishing season) to protect the remaining stock. Whitebait and anchovies both spawn in ocean waters but use estuaries as juvenile nurseries. Unlike whitebait, anchovies are difficult to catch and

not targeted by commercial fishers. In the absence of any fisheries data for anchovy, it is unclear whether this population has declined in the same way as whitebait.

Implications of declining baitfish numbers

In the lower WCB, Perth herring migrate from the sea into rivers to spawn in summer. The decline in quantity and quality of riverine habitats on the lower west coast over the past 50 years has had a devastating impact on this species. Perth herring once supported a large commercial fishery, but is now found only in small numbers.

Fewer baitfish has major implications for the rest of the food chain which relies on them. For example, the breeding success of Little Penguins near Perth has declined as parents struggle to find enough small baitfish to feed their chicks.

Yellowtail scad are somewhat of an anomaly amongst baitfish in that they are bigger and longer lived. In New Zealand, the species grows to a larger size and has been aged to 28 years. In Australia they have been aged to 15 years. Being longer-lived and slower growing, scad are potentially more vulnerable to overfishing. However, unlike the situation on the east coast and in NZ catches, catches of this species in WA are very low and so there is no risk to our local population.

Get in touch

We are always interested in hearing from recreational fishers about their observations of baitfish. If you notice, as examples, large schools of anchovy in the Swan river, or are catching a lot of yellowtail scad where you fish, we are interested in hearing about such things via email or phone. There is also a comments section at the bottom of your daily log sheets for observations such as these.

Too loud for lobster

In a world first study, Department of Primary Industries and Regional Development (DPIRD) scientists have shown that seismic surveys impact western rock lobster behaviour and physiology. DPIRD scientists are studying the effects seismic surveys have on WA rock lobster, which supports Australia's most valuable single-species fishery.

Seismic surveys are conducted by sending sound waves (very loud noises using air-guns) through the water column and underground, which bounce off subterranean rocks and reflect back to sensors on the seafloor. These allow oil and gas reservoirs to be discovered. With such large air gun explosions over lobster habitat, researchers were keen to find out what impact they might have on this valuable species.

It was known that seismic surveys have the potential to affect marine life. Groups of four lobsters were placed in 50 plastic baskets and randomly deployed either within the survey area or 15km north, in a similar habitat, all at depths of about 6m. The following day all lobsters were run through a series of behavioral and physiological tests before being released onto the reef.

The lobsters exposed to the seismic survey displayed significantly different responses to those that were not. The exposed lobsters showed less ability to right themselves (stand up), experienced greater loss of limbs and displayed less ability to actively swim away upon release. All of these effects are likely to affect lobster mortality. The released lobsters have been individually marked with tags. Their subsequent relative recapture rates from commercial or recreational anglers will provide important information on their medium to long-term survival.



Researchers testing the response rate of lobsters placed upside down, to see how long it takes to right themselves. Righting times varied from instantaneous to over five minutes. Lobsters exposed to a seismic survey were significantly slower to right themselves, increasing the chances of predation

WA's oldest fish

DPIRD Fisheries and Marine Officer Jack Dawson has claimed the title for catching the oldest recorded fish in WA. He was enjoying some downtime when he caught a 743mm deepsea black cardinalfish (*Epigonus telescopus*) in very deep water off Albany.

Around the same time, Albany-based recreational fisher Simon Stone landed a 1055mm pink ling (*Genypterus blacodes*) in deep water off Bremer Bay.



Jack Dawson with his 743mm deepsea black cardinalfish caught off Albany which has been aged at between 94 and 95 years

These two species are rarely recorded in WA, so there was some interest to see how old the fish were. The deepsea black cardinalfish is a tropical species, and is likely to have moved south down the west coast of WA under the influence of the Leeuwin current and increasing water temperature. Pink ling are considered an eastern species, so was found much further west than expected.

DPIRD Research Scientist Dr Peter Coulson aged each fish by counting the number of growth zones in their otoliths. He found that the cardinalfish was 94–95 years old and the pink ling was 13 years old. The majority of our knowledge of these two species comes from New Zealand, where they are caught by commercial fishers. Deepsea black cardinalfish are known to live for more than 100 years, and pink ling up to 40 years.

The cardinalfish is now the oldest fish caught in WA waters, beating an 84-year-old bight redfish caught in Two Peoples Bay Canyon.



Simon Stone caught a 13-year-old 1055mm pink ling off Bremer Bay

RAP fisher of the month (random prize draw)

Congratulations to the following 'fishers of the month':

Jun 17	Puran Sanesh	Feb 18	Alan Scott	Oct 18	Peter Newman
Jul 17	Ross Tate	Mar 18	Brian Heterick	Nov 18	Geoffrey Cocks
Aug 17	John Scholes	Apr 18	Kim Meldrum	Dec 18	Simon McLernon
Sep 17	Tony Moore	May 18	Gerhard Saueracker	Jan 19	Mal Berrick
Oct 17	Ronan Prince	Jun 18	Andrew Nicholls	Feb 19	Peter Tuck
Nov 17	Anthony Federico	Jul 18	N/A	Mar 19	Shannon Wake
Dec 17	Bert Brescianini	Aug 18	Tarot Morgan	Apr 19	Gordon Lee
Jan 18	Basil McIlhagga	Sep 18	Adam Husak		

Thank you for your ongoing support and happy fishing!

Crab Research Team: Danielle Johnston, David Harris, Marcus Newman & Daniel Yeoh

Nearshore and Estuarine Finfish Research Team: Kim Smith, Amber Quinn, Tim Leary and Blaine Hodgson

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