



Australian Government



Fish 'n' Chips

Why do we tag fish?

Beneath the waters of the Murray–Darling Basin’s rivers and wetlands, our native fish live hidden lives. Most of us only see them when they are on the end of a fishing rod, but what exactly do they get up to under the surface of the water?

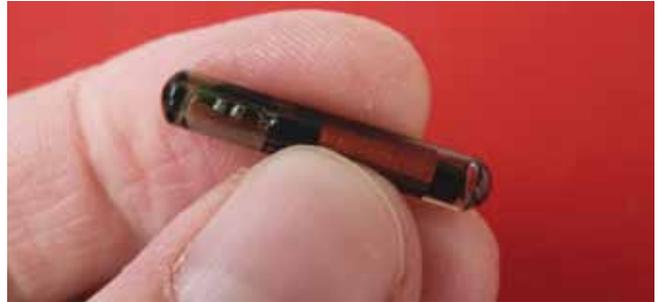
To discover their secrets we need to tag them to investigate where, when and why they move. Compiling information from lots of individuals is important for us to understand the biology and needs of different fish species. This type of information is essential so that we can manage rivers to ensure our native fish populations and communities are self-sustaining and healthy.

New technology means that we can now insert small microchips called PIT (Passive Integrated Transponder) tags, similar to those used for pet cats and dogs, which last throughout a fish’s life. For some long-lived fish like the Murray cod, this means that we can potentially collect over 50 years worth of cod secrets!

How do PIT tags work?

PIT tags are small glass or plastic tubes about 2cm long. Inside there is a microchip programmed with a unique code. This little capsule is inserted by injection into the shoulder muscle of the fish, in the gut cavity, or under the cheek of large fish such as Murray cod. As the tags are small and hidden inside the fish, we also need a way to see from the outside that the fish has been microchipped. Thus we insert a colourful plastic dart tag into the base of their dorsal fin (the fin on the top of the fish) so that fishers and scientists alike can see that the fish is at work collecting scientific information as it swims around.

The best thing about the new microchip tags is that they don’t need batteries. We call them ‘passive’ as they rely on the fish



PIT tag close up. Image courtesy: Janet Pritchard



PIT tags are surgically inserted into the stomach cavity of small fish by trained biologists. Image courtesy: Janet Pritchard

swimming near a field of radio waves to trigger them and release the ten digit code unique to each fish. In order for this technology to work we put antennas in the river that emit a field of radio waves over a short distance and also detect PIT tag codes as they get reflected back whenever a tagged fish swims nearby. Every time a tagged fish swims close to an antenna, the time, date and PIT tag number are recorded onto a computer.

Where can we detect tagged fish?

PIT tagging technology only works when fish swim within 50cm of the antennas. Thus the challenge is to make sure that fish do indeed swim past the antennas in order to be confident that we can detect their movements. Antennas can be constructed to encompass the entire width of a stream or placed in areas where fish are directed, such as through a fishway.



A researcher implanting a PIT tag into the cheek of an adult Murray cod. Tags are either implanted into the cheek (large fish) or shoulder (smaller fish) of fish that are of interest to scientists. Image courtesy: Brenton Zampatti SARDI



Upstream exit of the fishway on Lock 8 near Mildura. Both upstream and downstream entry points are fitted with antennas that detect the movements of PIT tagged fish as they pass through the fishway. Image courtesy: Lee Baumgartner NSW DII

Antennas to detect PIT tagged fish are being installed at all new fishways on the River Murray as part of the 'Sea to Hume Dam' project. This is an initiative under the Murray–Darling Basin Authority's Native Fish Strategy, and funded through The Living Murray Environmental Works and Measures Program, which aims to provide continuous passage for fish from the mouth of the Murray River to the Hume Dam near Albury-Wodonga, a distance of 2,225km.

Fishways are also being built on barriers in other parts of the Murray–Darling Basin and several of these have incorporated PIT tagging technology, including the Boggabilla Weir on the MacIntyre River at the border between Queensland and New South Wales. The data collected from these structures is helping to give us a clearer picture of fish movements right across the Basin.

After microchip antennas are installed at new fishways and more and more fish are tagged, in time we will be able to work out:

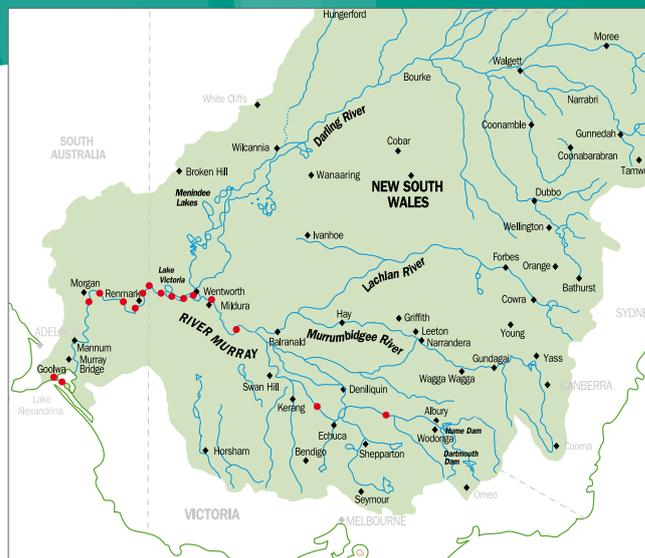
- How far fish move
- When fish move
- How frequently fish move
- How long they take to move between fishways
- How long it takes them to get up fishways
- Why fish move
- The time of year, temperature and flows linked to fish movements
- Whether different species do different things
- What percentage of fish species/populations are migratory

What have we found out so far?

There are lots of questions to be answered and we have only just begun. Over 20,000 fish have been PIT tagged so far. In its first year of operation a wide range of tagged species were recorded moving through the Lock 8 fishway, including Murray cod, golden perch, silver perch, bony herring and carp. Indeed it is estimated that over a quarter of a million fish used the fishway in the first 12 months. Golden perch and carp were the most abundant PIT tagged species recorded at the Lock 7 and 8



Large tagged Murray cod such as this one from the Murray River provide vital information about the movements of our native fish to aid in their conservation. This fish was released and will continue to gather further information for years to come.
Image courtesy: Lee Baumgartner NSW DII



Location of new fishways upon completion of the "Sea to Hume Dam" program.

fishways followed by lower numbers of silver perch, Murray cod and bony herring.

Many different types of movements were recorded, ranging from fish that stayed around the local area where they were tagged, to those that moved distances of over 450km. For instance golden perch moved from Lock 8 all the way up to Euston Weir (over 400km) and carp tagged below Lock 1 have made it all the way through Lock 10 (over 550km). As well as distances, we have also learnt more about timing of movements.

We now have operational PIT reader systems at Locks 1, 3, 5, 6, 7, 8, 9, 10, 15(Euston), 26(Torrumbarry) and Yarrawonga Weir.

What should you do if you catch a tagged fish?

It is up to individual fishers whether or not they release or keep a tagged fish of legal size that was caught by legal methods. However the data that the fish collects as it lives out its life in the river is very valuable to scientists and managers. Whether you decide to keep or release a tagged fish it is important to let us know several key pieces of information about the fish. Please record the:

- Date of capture
- Location where you caught the fish
- Length of the fish (measure from the tip of the nose to the tip of the tail)
- The numbers written on the plastic dart tag attached to the top fin of the fish

Then call the phone number written on the dart tag to tell us your information. Your State fisheries agency will investigate the tag number and let you know what has been recorded about your fish. By taking the time to do this, you can help shed some light on the secret lives of our native fish so that we can ensure they are sustained for future generations to appreciate and enjoy.

Further Information

If you would like to find out further information about PIT tagging and the information the fish are providing us, or to obtain a copy of the Native Fish Strategy for the Murray–Darling Basin, contact the Murray–Darling Basin Authority on (02) 6279 0100 or visit www.mdba.gov.au