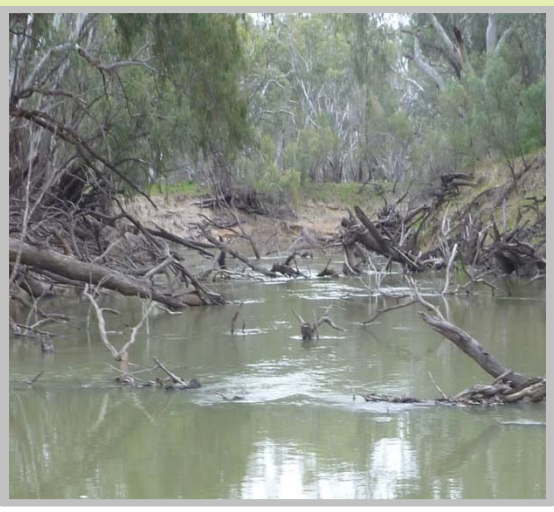
more fish

with more

habitat

The ‘what’ and ‘why’ of fish habitat

Inland systems

aquatic habitat rehabilitation

making more fish **...naturally**

What fish need...

1 **CONNECTIONS** - Murray Cod, Golden Perch and Silver Perch travel large distances upstream to breed. These fish spawn in response to rises in river flow, combined with increases in water temperature.

2 **OXYGEN** - Macquarie Perch lay their eggs in riffles where water bubbles over shallow pebbles. Their larvae get washed into deeper pools. Freshwater Catfish and Murray Cod fan their eggs to ensure they have enough oxygen. Catfish clear a circular gravel nest to lay their eggs and stop them getting smothered by sediment.

3 **SNAGS** – (fallen timber) is important to many fish as home sites, spawning locations, for ambushing prey or escaping predators. 80% of Murray Cod are found within 1m of a snag and have a strong connection to particular snags, returning to the same snag after breeding.

4 **REEDS** - juvenile and smaller fish species prefer reedy habitat as it provides both food and protection. Insect larvae found around aquatic and emerging plants provide an important food source for many fish.
Larger fish will feed in deeper water where they can escape predators.

5 **BANK-SIDE VEGETATION** - helps control the amount of nutrient and sediment entering a waterway. Overhanging trees and shrubs will provide a food source to fish as terrestrial insects fall into the water from overhanging branches.

6 **WETLANDS** - filter water and improve water quality. They also support many smaller fish and crustaceans that become food for larger fish species.

This is what good fish habitat looks like

1 Rivers that are connected allow fish to escape predators, find food and undertake their often long migrational journey to breed.

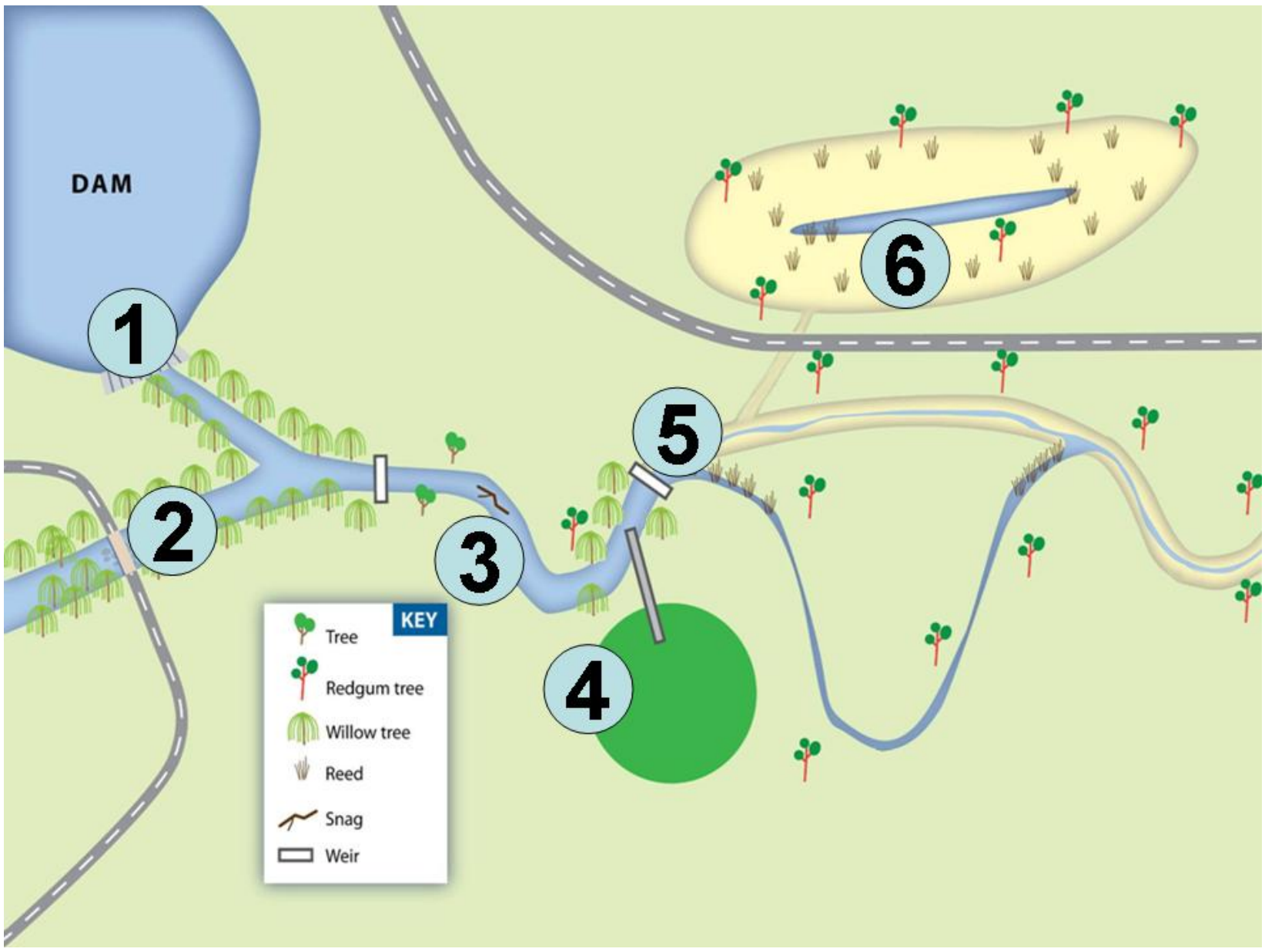
2 Places like riffles help aerate the water and provide sites for some species to lay their eggs.

3 Snags provide shelter and protection from predators for larger fish.

4 Healthy aquatic and riparian (bank) vegetation like ribbon weed, pondweed, sedges and reeds provide shelter and food.

5 Overhanging riparian vegetation provides shade, a source of food and acts to absorb nutrients and contain sediment before they reach the waterway.

6 Wetlands help manage water movement in the catchment and act as a filter. They provide habitat for smaller fish and crustacean species, which become food for larger fish.



What has happened...

1 **DAMS** control the timing, amount of flow, and temperature of the river downstream. They also block fish passage. These can all affect natural breeding cues and opportunities for freshwater fish, reducing their opportunity to spawn.

2 **STABLE WATER LEVELS** - when natural river flows are altered and water is held behind structures, shallow riffle areas can be drowned out as water is held over them. This altered condition causes a change in flora and fauna and may favour introduced species like willows and Carp.

3 **DE-SNAGGING** - many rivers have been de-snagged in an effort to improve navigation and water movement. Some areas remain less degraded but these are greatly reduced and impact on the ability for fish to survive and grow.

4 **WATER EXTRACTION** for irrigated agriculture can change the timing of flows in a river as crops need more water in hot weather. Flows are reduced downstream of large irrigation areas. Changes to the amount and timing of flows can affect wetlands, causing them to be drier for longer.

5 **ISOLATED POPULATIONS** - weirs and poorly designed road crossings can physically block fish from moving where they need to go to access food and shelter, isolating them from valuable habitat – either as a complete barrier or because pipes are too small and water velocities through pipes too high.

6 **STOCK GRAZING** wetlands and riverbanks removes vegetation, increases nutrients and pugs soil, making germination and survival difficult. Wetlands may also be affected by roads and tracks that limit water reaching them until all but the highest flows.

This is what impacts on fish and their habitat look like

1

Weirs and poorly designed road crossings block fish from moving where they want to go and can cause downstream water temperatures to be much cooler than normal.

2

Introduced plants like willows choke out native plants and drop leaves all at once, changing food dynamics for insects and therefore availability of food for fish.

3

Remaining areas with good riparian vegetation, snags and aquatic plants are the only places where fish larvae and juveniles can survive and grow.

4

Water extraction reduces the amount of water downstream. Delivery of flows may not sync with breeding times of fish, upsetting their breeding opportunities. Water that does pass downstream is often much colder than what it would be naturally. This can also affect fish breeding.

5

Clearing vegetation and removing snags require permits. For fish, loss of riparian vegetation and snags means more sediment and nutrients in the river and the loss of food sources, shelter and places to breed.

6

Unmanaged stock access to riverbanks and wetlands leads to loss of riparian vegetation and soil loss through bank erosion.

So what?

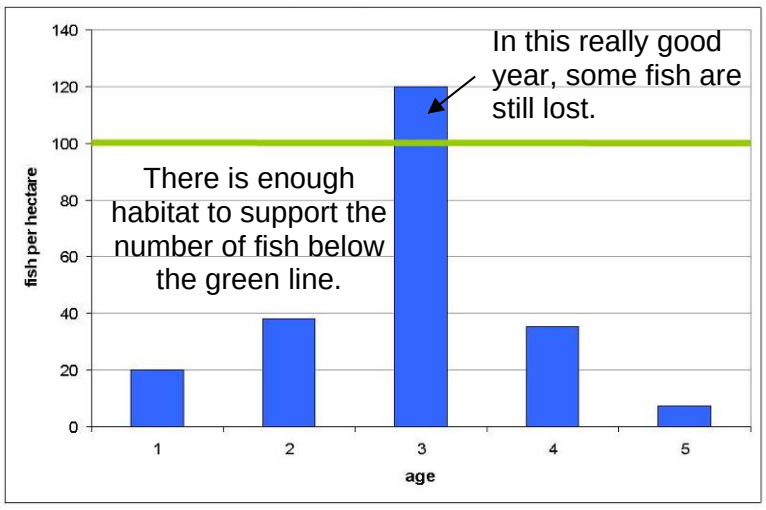
When there are a lot of different types of habitat available to fish, there is less competition for resources. Fish have the opportunity to breed and grow, with most of the larvae and juveniles having a greater chance of surviving, becoming adults, and then breed themselves.

Good condition

When a river is in **good condition** nearly all fish produced can survive to maturity.

This means the carrying **capacity is high**.

This means there are **MANY MORE FISH.**



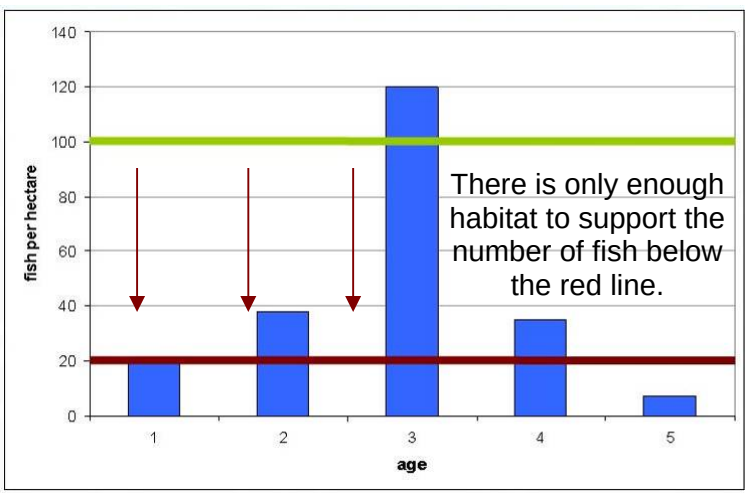
Right now over 97% of waterways in NSW are degraded in some way. Changes to the availability of fish habitat – the loss of snags, wetlands and riparian vegetation – and changes to the natural flow cycle means that the opportunities for fish to grow and survive are drastically reduced.

Poor condition

When a river is in **poor condition** there is not the habitat available to support the spawned larvae and juveniles.

This means the carrying **capacity is low**.

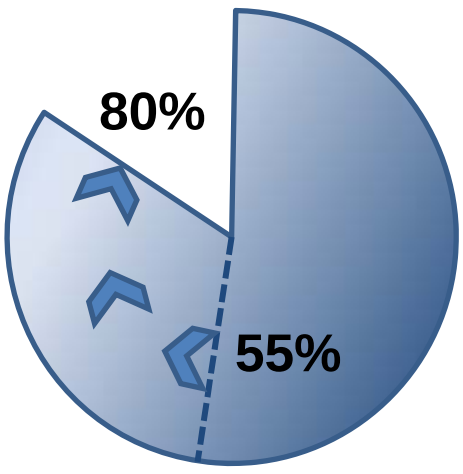
This means there can be **MUCH LESS FISH.**



What this means is **there are a lot less fish around to catch**. However, if we can work to restore their habitat, the opportunities for fish to breed and survive increase meaning you effectively **improve your chances at catching a fish**.

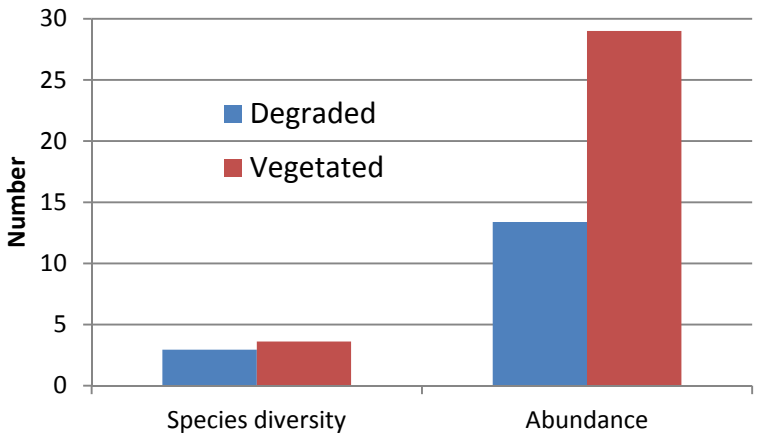
More habitat means more fish

Barwon-Darling & Paroo Rivers



Between 55-80% total catch of Murray Cod and Golden Perch associated with woody debris

Hawkesbury-Nepean River



More fish and more species beside vegetated banks

Things YOU can do to improve fish habitat!

Be a **FISH FRIENDLY FARMER** by controlling stock access to waterways. Fencing and providing offstream watering points will also result in improved farm management and stock control.

CONTROL WEEDS along your waterway to allow native plants to regenerate and provide appropriate habitat and food for native fish.

RETAIN AND REPLANT NATIVE VEGETATION along waterways to help reduce sediment (from bank erosion) and nutrient inputs. Native vegetation will also improve conditions for stock by creating windbreaks.

RESNAG* - by placing snags back into the river, you are creating places for fish to avoid predators, shelter during high river events, and lay eggs. They also act to protect riverbanks from erosion.

FISH FRIENDLY DEVELOPMENT* - control erosion and siltation at work sites by using silt curtains. Ensure machinery refuelling and stockpiling of materials occurs in a bunded area away from the water to prevent pollution.

IMPROVE ROAD CROSSINGS* by encouraging councils to install bridges or use box culverts. By increasing the area available for water (and fish) to move under a road crossing will decrease water velocities and allow for fish movement at all flows.

INSTALL FISHWAYS* – where structures like weirs can't be removed, encourage installation of a fishway to allow for fish to migrate. Unfortunately fishways are very expensive - installation will take some time to identify funding and support.

* these works need a permit from NSW Department of Primary Industries (Fisheries)

Where would **you**

rather **fish?**

Who can help you?

Staff from Fisheries NSW are available to help identify local opportunities and who needs to be involved and provide advice on practical matters like filling in funding applications and obtaining permits.

Contact

Milly Hobson on 6763 1206 or milly.hobson@dpi.nsw.gov.au

For more information:

Fisheries NSW
www.dpi.nsw.gov.au/fisheries/habitat

Fish Habitat Network

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