NSW DPI

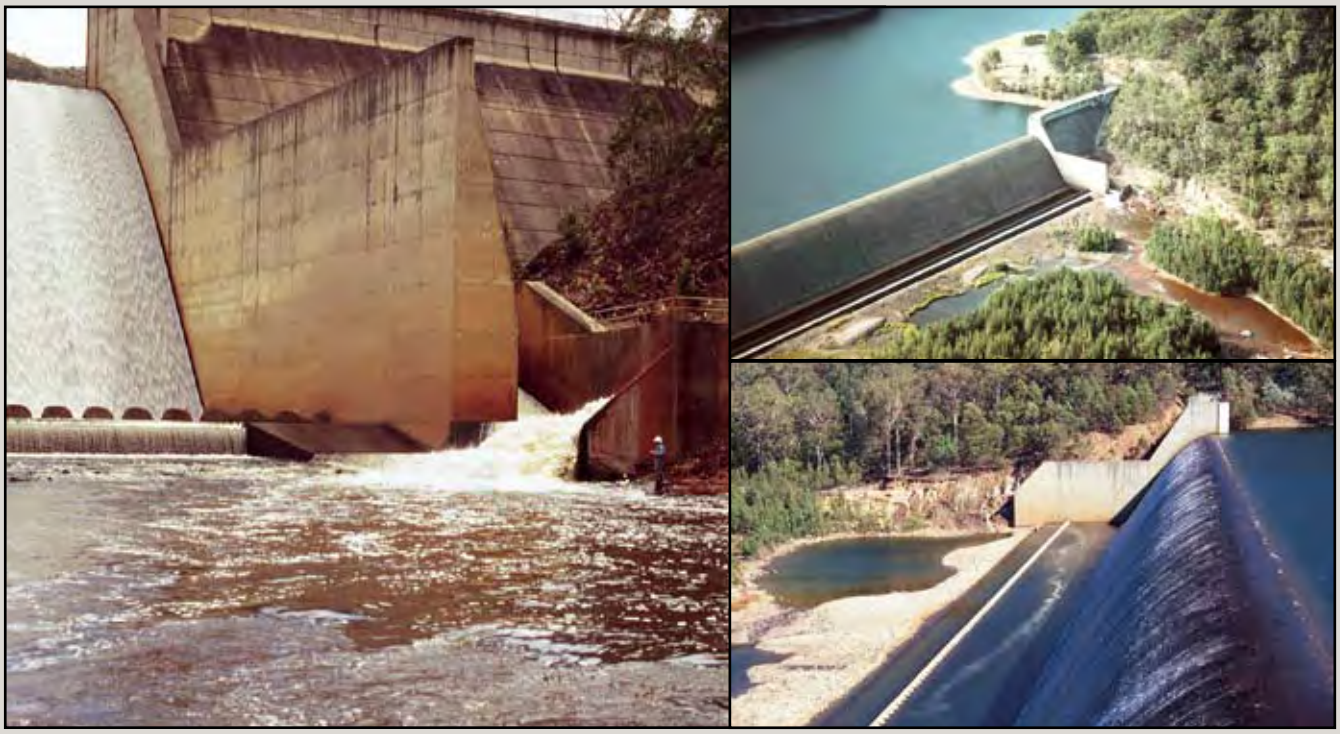
Improving fish passage in the Shoalhaven:

Fish monitoring at Tallowa Dam

SYDNEY CATCHMENT AUTHORITY

NSW DEPARTMENT OF PRIMARY INDUSTRIES

Tallowa Dam fishlift



Tallowa Dam prior to construction of the new fishlift

Why provide fish passage?

An important part of the NSW Government's Metropolitan Water Plan are works designed to improve the health of the Shoalhaven River. The works will include changes to allow for new environmental flow releases from the dam, as well as the construction of fish passage to allow the up and down stream movement of native fish.

Freshwater fish are extremely mobile and it is important to provide fish passage to enable them to reproduce, to feed, to disperse, form new territories and to avoid predators. Migrations can be within small stretches of river or over thousands of kilometres. Some fish in coastal regions regularly migrate between fresh and salt water to complete their life cycle.

A new mechanical fishway at Tallowa Dam will help ten native fish species, including the endangered Grayling, to migrate between the lower and upper Shoalhaven River. A new offtake at the dam will increase the temperature of the water released downstream and help attract fish.

The works will be finished in 2009 and will see Tallowa Dam become the first dam in NSW to have both fish passage and variable environmental flows.

The problem

Fish migration in the Shoalhaven Catchment has been blocked since the completion of Tallowa Dam in 1976. Migratory fish represent 96% of freshwater fish species occurring in the catchment. Tallowa Dam prevents most species from using over 75% of important habitat within the river channel.

Sampling undertaken in 2005, twenty-nine years after the construction of the dam indicated that no migratory fish species that move between fresh and salt water exist naturally above the dam wall except for those that have been stocked (e.g. Australian bass) or those capable of climbing (e.g. some gudgeon species and eels).

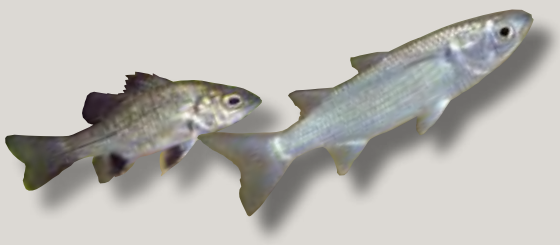
An initial study undertaken in 1998 identified at least 10 migratory fish species accumulated below the dam. A greater number of species, numbers and size classes of fish were caught immediately downstream of the dam than at any other site in the system. This identified a need to remediate fish passage at Tallowa Dam to allow these migrating fish access to important upstream habitat.

Construction of the lifting mechanism for the new fishlift hopper

The solution

The fishlift at Tallowa Dam being constructed by the Sydney Catchment Authority will enable native fish to complete important upstream migrations. The lift is the first of its kind to be built in NSW. Water from the surface of the lake is released into a confined channel at the base of the dam. Fish are attracted to this channel, through a gate and into a hopper. After a specified period of time the gate closes and the hopper is then lifted over the wall and lowered upstream of the dam. Fish are then released from the hopper and are able to resume upstream migrations.

A gated channel is being installed on the spillway leading to a plunge pool at the base of the spillway to allow fish to migrate downstream to the estuary to spawn.



Determining effectiveness

This is the first time a fishlift has been constructed at a high dam in NSW so scientists are eager to determine its effectiveness. NSW Department of Primary Industries and Sydney Catchment Authority plan to perform a series of experiments to measure the success of the works in allowing fish to recolonise upstream habitat and migrate downstream. The experiments aim to:

1. ***Determine what species and size classes use the fishlift***

Scientists will directly trap the fishway to determine whether all species and size classes of fish are completing migrations. The structure of fish populations accumulating below the dam will be compared with those carried over the dam wall in the hopper to make sure that all species and size classes that are trying to migrate upstream are able to use the fish lift. If there are no differences it is a good sign that the fishlift is providing passage for all migratory fish.

2. ***Assess improvements to the upstream fish community***

Researchers will survey fish from 13 sites upstream and downstream of Tallowa Dam using

electrofishing. Data collected from 'before' fishlift construction between 1998 and 2000 will be compared to 'after' data to assess whether species using the lift are successfully re-colonising habitat upstream of the dam. After the fishlift has been operating for some time, it is expected that the numbers and size classes of fish will be relatively similar upstream and downstream of the dam.

3. *Identify if fish return downstream without injury or stress*

It is important that any fish successfully migrating upstream using the fishlift can then migrate back downstream to the estuary to breed. Downstream fish passage facilities are being installed on the dam spillway to allow downstream migration. Scientists will assess whether fish using the fishlift are able to use the downstream fish passage facility by performing mark-recapture experiments.

4. *Work with anglers to commence a large scale tag and recapture program*

Once the fishlift is constructed, it is anticipated that many fish will use it over their lifetime. Scientists aim to investigate these repeat migrations by implanting a large number of fish with passive integrated transponders (PIT), commonly known as PIT Tags. PIT tags are similar to microchips implanted into pets. They have a unique code, so scientist can identify the fish long after tagging has taken place. PIT Tag readers will be placed within the fishway so that fish can be automatically tracked as they use the fishlift. Tagging work is being done in collaboration with anglers from the Southern Bass Fishing Club.

Who is involved?

The project will run for four years and is a collaboration between NSW Department of Primary Industries, Sydney Catchment Authority and Southern Bass Fishing Club.

Further information

Further information can be obtained from NSW DPI Batemans Bay office (02 4478 9111) or from the following reports and articles:

Gehrke, PC, Gilligan DM and Barwick, M (2001). *Fish Communities in the Shoalhaven River – before construction of a fishway*. NSW DPI final report series No 26.

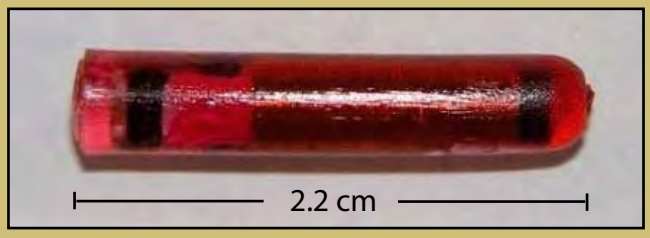
Bishop KA and Bell, JD. (1978). Observations of the fish fauna below Tallowa Dam during flow stoppages. *Australian Journal of Marine and Freshwater Research*, 29: 543 – 549.

Australian bass

Freshwater catfish

What species of fish will use the lift?

All migratory fish found in the Shoalhaven River are expected to use the lift, no matter how small or large. The following are some of the species which are expected to regularly use the structure; Australian bass (*Macquaria novemaculeata*), bully mullet (*Mugil cephalus*), freshwater mullet (*Myxus petardi*), freshwater herring (*Potamalosa richmonidii*), striped gudgeon (*Gobiomorphus australis*), Cox's gudgeon (*Gobiomorphus coxii*), long finned eel (*Anguilla australis*), Empire gudgeon (*Hypseleotris compressa*), Australian smelt (*Retropinna semoni*), freshwater catfish (*Tandanus tandanus*) and even threatened species such as Australian grayling (*Protroctes maraena*).



Top: Inserting a dart tag into a freshwater eel
Middle: Food-safe PIT tag to be inserted into fish as part of this project
Bottom: Electrofishing downstream of Tallowa Dam
Front page: Schematic of the proposed fishlift Photo: Nicolaas Smit, Psyom Creative Solutions

NSWDPI 9084_DEC08