



DEPARTMENT OF
THE ENVIRONMENT,
CLIMATE CHANGE,
ENERGY AND WATER

Environmental Flows

FACTSHEET

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What are environmental flows?

Rivers, streams and wetlands need certain amounts of water at certain times to support healthy aquatic ecosystems.

In rivers that have been dammed, or are being used for irrigation this normal flow is changed. In other situations, where water is added to a river, such as outflow from a sewage treatment plant, this also alters the natural flow of the river.

To compensate for changes of flow, water may be released from dams or protected from abstraction (this is where water is removed from a river for irrigation or some other purpose), at certain times to allow rivers to function normally. For rivers where more water is being added it may be necessary to allow for more abstraction to regulate the flow.

There are two broad classes of environmental flows: releases of water below dams, and protection of flows in unregulated rivers. Environmental flows are designed to mimic the natural condition of rivers. It is not just about the amount of water but also timing and quality. In the ACT flows are naturally low during summer and autumn, and are much higher during winter and spring. Rivers also naturally experience periods of very low or no flow, and at other times there are floods (see Figure 1). It is important that environmental flows mimic this variability of flows. The quality of water released below dams can sometimes be compromised by lower than normal water temperatures, low dissolved oxygen levels, or other water quality parameters. Releasing sub-standard water quality can severely impair the functioning of aquatic ecosystems.

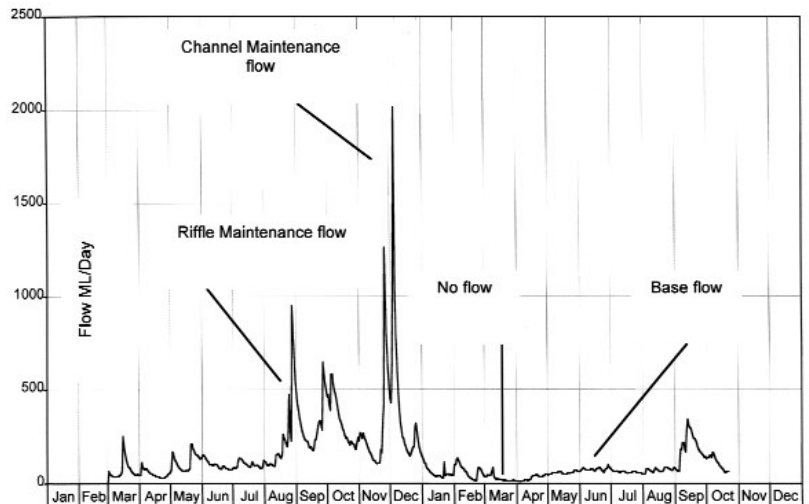


Figure 1: Seasonal Variation of Flows in the Murrumbidgee River at Lobbs Hole

The need for environmental flows

Streams and rivers need water to survive. Particular flow patterns determine the shape of the stream channel, how different stream habitats connect to each other and what plants and animals occur. For example, fish feed, breed, spawn and migrate in response to natural flow patterns, and may carry out these activities in different parts of stream.

At the same time, it is recognised that water is required for domestic supply, irrigation, and industrial purposes, but taking too much water for these purposes can change the natural flow patterns and can affect habitat availability, food supplies, water chemistry, and nutrient processing. This can lead to the loss of biodiversity, a decline in river water quality, and a decline in the overall condition.

Water Resources

For more information call Canberra Connect
on 13 22 81 or visit www.environment.act.gov.au

Environmental flows guidelines for the act

In the ACT, the *Water Resources ACT* requires environmental flows to be defined for all water bodies in the ACT. Environmental flows are defined in the Environmental Flow Guidelines. The guidelines were first produced in 1999, and were reviewed in 2005. The Environmental Flow Guidelines set out the volumes and timings of environmental flows, and abstraction limits, in streams, rivers, lakes, and aquifers.

Targeting environmental flows to ecological objectives

The purpose of environmental flows is to protect the aquatic ecosystems. By identifying particular elements of the aquatic ecosystem we want to protect (ecological objectives) we can then target these with particular environmental flows. The ecological objectives for waterbodies in the ACT include broad objectives like “*healthy ecosystems*”, and more specific objectives such as “*maintain populations of the endangered fish species Macquarie Perch*”.

Components of environmental flows in the ACT

‘Turning the tap on’, i.e. providing a volume of water released at constant rate is not an environmental flow and will not protect the aquatic ecosystems and associated ecological objectives. In the ACT, the flow in streams and rivers is highly variable. Flows are naturally higher in winter, and lower in summer, but even within a season the flows vary. These aquatic ecosystems are adapted to and need this variability.

The components of natural flow regimes that have been identified as being important for rivers and streams in the ACT are

- Base flow;
- Small floods (Riffle maintenance flows);

- Large floods (Pool or Channel maintenance flows; and
- Special needs flows.

Base flows are the flow component largely contributed by groundwater, and are the minimal volume of water that the river needs to stay healthy. If the base flows are compromised, the river shrinks and certain habitats disappear, with significant consequences for selected aquatic fauna and flora.

Riffle maintenance flows are flows that flush out the fine sand and silt that accumulate in the shallow fast-flowing sections of the river damaging habitat for fish, water plants, and other aquatic species.

Pool and Channel maintenance flows flush sediment from pools and ensure the river maintains its natural channel form. The flushing of sediment is an important function for maintaining healthy aquatic ecosystems.

Special Needs Flows are designed for a particular ecological need.

Other water uses in our catchments

The best environmental flow for any stream or river is the natural flow that would exist if there were no diversions from the river. However, our rivers and catchments fulfil multiple functions like domestic water supply, recreation, and biodiversity conservation. These other uses need to be considered when considering the water needed for environmental flows. In the ACT, four ecosystem types have been identified for the purpose of environmental flows in the ACT.

- Water supply, i.e. the Cotter River and Googong Foreshores;
- Natural ecosystems, rivers and streams in Namadgi National Park (excluding the Cotter Catchment), and Tidbinbilla Nature Reserve;

- Modified ecosystems, i.e. rural streams and rivers like the Murrumbidgee and Molonglo rivers; and
- Created ecosystems, i.e., urban streams like Ginninderra Creek.

Each ecosystem is primarily used for different purposes and has different social, economic and environmental values. Consequently, the environmental flows for each ecosystem are different.

For example, the primary use in Water Supply catchments is to provide an adequate supply of water for domestic use, and at the same time we need to ensure that the health of the river and several threatened fish species are protected. In these catchments the environmental flow components are:

- base flows to ensure sufficient aquatic habitat for fish, and other aquatic species;
- a regular small flood to clean sediment out of the shallow rocky stretches of river reaches; and
- an annual larger flood to move the sediment out of the pools to maintain the channel and associated fish habitat.

In other catchments healthy ecosystems are maintained by providing for:

- base flows to ensure sufficient aquatic habitat; and
- ensuring the continuation of small to medium floods which maintain the shape of the channel.

The volumes and timing of the flow components vary between the catchments, reflecting differences in the rivers, and ecological objectives.

How environmental flows are done

We ensure that rivers receive their required environmental flows in four ways. In rivers below water supply dams, environmental flows are releases of water delivered at certain times of the

year. For example, one environmental flow component in the Cotter River is the bimonthly release of 150ML of water a day for three days below Bendora and Corin dams. In other rivers, setting limits on how much water can be abstracted protects environmental flows. This makes sure there is always enough water in the rivers to keep them healthy. Abstraction limits are also set for groundwater, because in the ACT groundwater flows back into streams providing most of the base flow. And finally, for urban lakes and ponds there are limits on how much water can be taken from a waterbody so as not to significantly affect its designed drawdown regime (water level). Drawdown regimes influence the health of lake ecosystems by allowing the water plants growing around lake margins to survive and reproduce.

Environmental flows during drought

Rivers and streams in the ACT are adapted to periods of low rainfall. However, they can become unnaturally stressed during extended dry periods because of the changes we have made to them by land use change or dams. For this reason it is important that some level of environmental flows are maintained during droughts. At the same time, it is recognised that droughts are a critical time for the domestic water supply system and the community may need to undergo water restrictions. In these situations it is appropriate to reduce environmental flow requirements to minimal levels to allow more water to be available for domestic consumption. These reduced flows can protect the aquatic ecosystems for a limited time but are not extended beyond drought periods otherwise there is a risk that there could be lasting damage to aquatic ecosystems.