



Defining 'Environmental Flows'

August 2007

Theme: Environmental Water Allocation - Context

Fact Sheet 1

Purpose of Fact Sheet

The term 'environmental flows' has come into common usage. To some this term applies to releases from dams which are specifically for environmental benefit. To others it can be any flow which achieves an environmental benefit, or the flow at the end of a river system, or any flow event which should be protected. The term "environmental water" is likewise used in different ways.

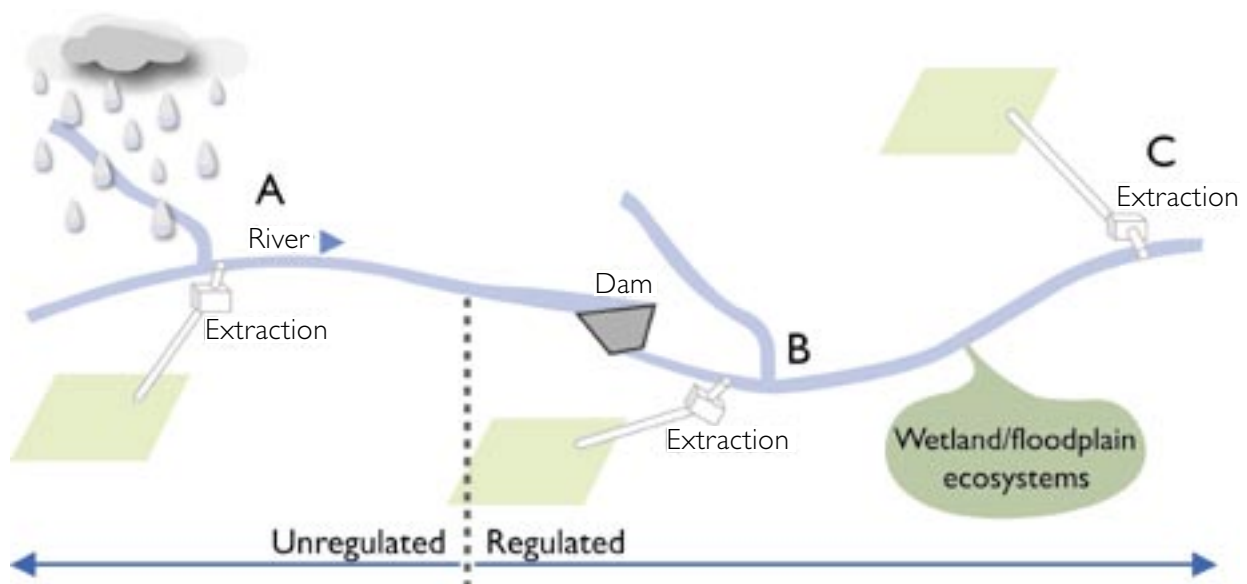
This fact sheet discusses the different ways the terms "environmental flows" and "environmental water" are used and proposes a standard terminology to reduce confusion. Environmental water provisions for groundwater systems will not be discussed here.

Environmental flows and environmental water in rivers

The diagram shows a section of unregulated river above the dam. Extraction at A will affect flow characteristics downstream. Environmentally important characteristics can be maintained by constraining the volume, rate and timing of extraction. The flow rules in water sharing plans for unregulated rivers typically specify how this should be done.

In the regulated section of a river the flow regime is totally changed by the operation of the dam. Restoration of important environmental flow characteristics normally requires releases of water to be made at times which are less than optimal for other users

Environmental flows and environmental water in rivers



of water from the dam because crop water demands frequently occur at different times to natural peak flows. In some cases, a volume of water in storage is held solely for release for environmental purposes. Constraining extraction is also important in regulated rivers. When environmental releases are made it is often necessary to constrain extraction downstream to achieve the desired benefit, eg extraction at B might be constrained to ensure a release reaches the wetland, but extraction at C might still be allowed. “Caps” on extraction help ensure uncontrolled high flow events are preserved for environmental benefit.

The term “environmental flow” is sometimes used to refer to those releases from dams which are intended to achieve environmental benefit as opposed to releases which are intended for consumptive purposes. Some published water balance reports for river systems divide up the total water in a system into environmental and consumptive water. This approach fails to recognize that water is normally used for multiple benefits. For example, “environmental” water returning from a wetland may be extracted downstream, and “consumptive” flows might be released in a manner so as to achieve environmental flow characteristics at points in the river en-route.

Environmental flows and environmental water in statute and policy

The 2004 Intergovernmental Agreement on a National Water Initiative requires water plans that describe desired environmental and other public benefit outcomes, and include the management arrangements to achieve these outcomes (cl 35-37). This can be seen to differentiate between objectives (or in this case outcomes) and strategies to achieve them.

In Queensland, SA, Tasmania, WA and ACT, water plans set out environmental objectives, though the way these are described varies. Queensland and Tasmania plans use the term objectives; SA plans include an assessment of the needs of ecosystems; WA refers to environmental values; the ACT has environmental flow guidelines; and the NT has sustainable yields. In all of these jurisdictions the strategies are the management arrangements (variously described as strategies, rules, regimes etc) designed to achieve these objectives. Apart from the ACT none of these jurisdictions make any reference in statutes to environmental flows or environmental water.

Legislation in both NSW and Victoria does, on the other hand, explicitly refer to “environmental water”. The NSW legislation defines environmental water as the actual water arising from commitments either via rules or allocations. Victorian legislation provides for an “environmental water reserve”, which is water that is set aside for the environment via rules or allocations.

The approach used in NSW and Victoria is based implicitly on the assumption that water in a river system can be rationally divided into environmental or consumptive portions. Authorities in both states prepare annual water balance reports for river systems which divide up the total water in a system into environmental and consumptive categories, though the methods used to do so are



inconsistent and by their nature cannot allow for flows being both environmentally beneficial and consumptively used. These reports can give a false impression of environmental performance, since a tenuous calculation of the proportion of water which is environmental cannot properly represent whether environmental flow objectives and outcomes are being achieved or not.

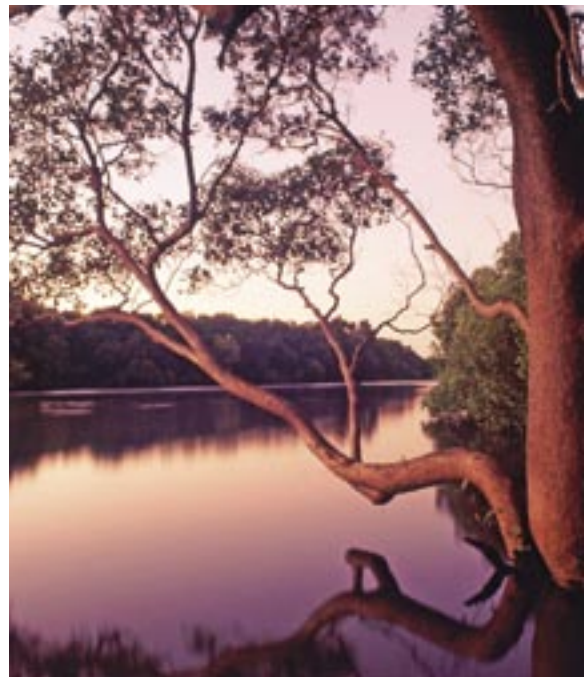
Differentiating between objectives and strategies

In order to remove these ambiguities, it is essential to differentiate between hydrologic characteristics which are determined to be environmentally necessary (objectives) and management measures to achieve them (strategies). In current usage both objectives and strategies are often referred to as environmental flows or environmental water, causing confusion.

Environmental flow assessments generally aim to identify the particular flow characteristics which are important for the health of rivers and dependant ecosystems. These characteristics denote the “environmental flow” requirements of that river system, which are often expressed as environmental flow objectives or targets in water plans.

Water plans typically include various strategies to achieve these flow objectives. These include *environmental flow* rules relating to extraction or system operation such as:

- ▶ Limiting extraction volumes (eg “caps” on extraction)
- ▶ Constraining timing and rate of extraction to protect designated flow events or characteristics (eg cease to pump levels, “protected” flow events)
- ▶ Requiring certain flow characteristics to be achieved regardless of water supply requirements (eg minimum flows, “transparent” or “translucent” dam release rules)



They also include *environmental allocations*, which are specific volumes captured in storages for release when it is considered by an environmental water manager to be environmentally beneficial (eg environmental contingency allowances) or water access entitlements committed to use for environmental purposes. In some cases environmental rules and allocations are tied together, eg requirements for translucent dam releases may be tied to an allocation held in storage rather than simply being an operational requirement.

Suggested terminology

Differentiating between objectives and strategies will lead to greater clarity and less confusion. It is also consistent with the NWI and legislation in most jurisdictions.

Using this approach, environmental flow assessments and water planning decisions for river systems should result in *environmental flow objectives* which are designed to achieve intended environmental outcomes. *Environmental flow strategies* aim to achieve those environmental flow objectives. These strategies include extraction caps, extraction constraints and releases from dams. The various strategies should be explicitly labelled rather than being called environmental flows or environmental water. For example a release from a dam specifically to achieve an environmental objective might be called a “targeted environmental release” rather than just an “environmental flow”.

Categorising volumes of water in rivers as “environmental” vs “consumptive” is not needed and can be misleading. Use of the term “environmental water” is similarly unhelpful and should be avoided. The focus should shift to setting measurable objectives and reporting whether they are achieved rather than trying to account for environmental water as volumes.

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The Environmental Water Allocation Program manages R&D into environmental water needs and engages with water managers and regional communities to provide the knowledge required for managing our rivers and waterways.

This fact sheet is one in a series that summarise current knowledge on environmental water for policy audiences. For more information on the program see:

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