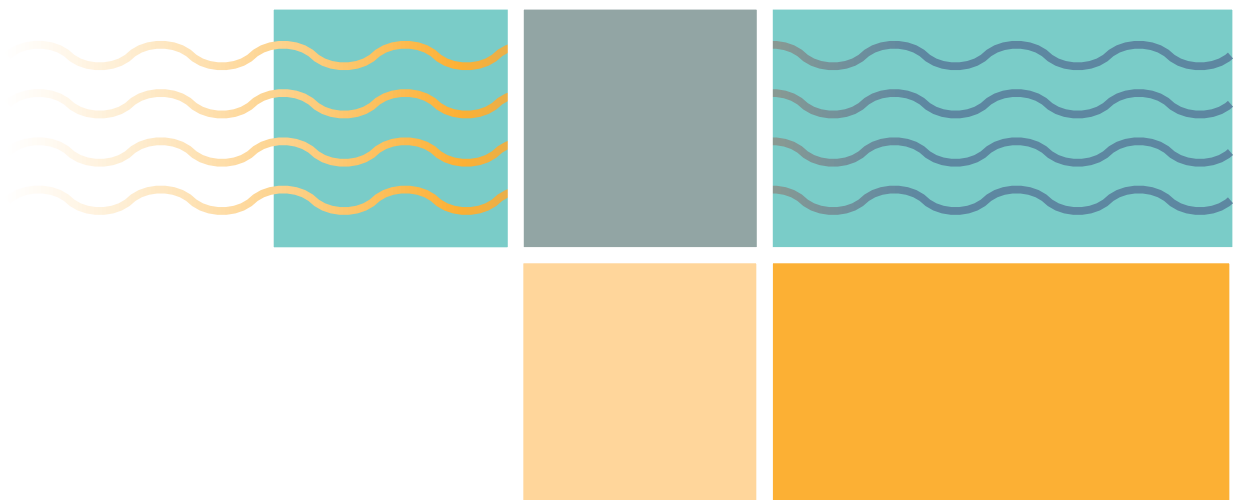


# Guidelines for surface water sharing plan **report cards**



Guidelines for surface water sharing plan report cards

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## Introduction

Water Source Report cards have been developed to assist in the consultation process for developing Macro Water Sharing Plans. They consist of three parts:

- 1) The nature of the water source area and the implications of water extraction.
- 2) The proposed rules controlling the extraction and trading of water entitlements.
- 3) Key factors considered in the formulation of the rules.

Report cards that have been developed for Surface Water Sharing Plans relate to the water features (streams, lakes and estuary) that are situated upon the land surface within the area the plan, and where appropriate, to the highly connected alluvial groundwater upstream of the tidal limit. They generally do not describe underground water sources as they are covered by a separate Groundwater Sharing Plan.

## Report card sections

### Water source context section

This section has a simple overview of the water source area, including:

- average annual rainfall
- proportion of forested cover, and
- the water sources that provide inflows or receive outflows.

### River flows section

This section describes some elements of the hydrology of the water source.

It summarises the sources of recorded flows and uses a *Low Flow Index* flow rate to estimate how much of the daily water flow could typically be expected to occur during dry periods (low flows).

### Licensed water use section

This section provides an overview of water that has been currently allocated within the water source via *Water Act (1912)* licenses and to what purpose, including surface water, and where appropriate groundwater licences relating to highly connected alluvial groundwater. It does not include unresolved water licence applications submitted during amnesty periods. The potential maximum demand (*Peak Daily Demand*) is also shown.

Total annual entitlement is the sum total of annual entitlements of all the water licences within the water source. The percentage figure shows how significant this water source is with respect to the whole Extraction Management Unit (usually equivalent to the catchment area). Refer to the map showing Management Units for the plan.

## Background information sections

These sections outline the nature of the water source with respect to the inherent water related values (environmental, social and economic), and the level of risk water extraction may create upon those values. If the water source includes both non-tidal and tidal waters, they are covered by separate sections.

Each water source is given a comparative rating of high, medium or low for up to five important factors:

1. Relative instream value and/or estuary value
2. Hydrologic stress
3. Relative economic significance of irrigation
4. Risk to instream values or estuary value from extraction
5. Estuary sensitivity to freshwater inflows

### **Relative instream value (non-tidal)**

The best available information was collated by NSW government agencies into a series of attributes for each of the water sources. Where information was not available or very limited, local knowledge or other information was used to make a subjective judgment.

The various instream attributes are given a numerical score (and weighting if required) and then combined to determine an instream value. The values are then ranked by comparing them with all the other water sources in the plan area to yield a range of High, Medium or Low ratings.

### **Estuary value (tidal pool)**

Estuary values were determined in a similar way described above for *Relative Instream Value*. However, final estuary values were ranked by comparing the relative value of estuaries against other estuaries in the same coastal bioregion.

### **Hydrologic stress**

By comparing the potential maximum demand (*Peak Daily Demand*) to a measure of the capacity of the water source to provide water during low flows (*Low Flow Index*), the *hydrologic stress rating* provides a way to identify where instream values may be at risk or there may be conflict between users during dry periods. The stress is based on full licensed entitlement, whether it is fully utilised or not as water trading may re-activate unused entitlement.

The *hydrologic stress rating* is based on the stress caused from extractions both within and upstream of the water source. The hydrologic stress within the water source is also detailed.

The *hydrologic stress rating* is High if peak daily demand is more than  $\frac{2}{3}$  of the low flow index (available low flows), Medium if between  $\frac{2}{3}$  and  $\frac{1}{3}$  of available flows and Low if less than  $\frac{1}{3}$  of available flows.

### **Relative economic significance of irrigation (non tidal and tidal pool)**

This section estimates the relative level of dependence the community has upon irrigated agriculture in the water source in comparison with all others in the plan area. Economic significance is based on the volume and economic value of water extracted; and the social benefit the community derives from water extraction. The various social and economic attributes are combined to determine a relative dependence ranking of High, Medium or Low.

### **Risk to instream value rating (non-tidal)**

This section describes to what extent the identified instream values of a water source are at risk from the impacts of extraction within the water source. Risk is calculated from the instream value and hydrologic stress factors and given a rating of High, Medium or Low.

### **Risk to estuary value**

This section describes to what extent the identified estuary values of a water source are at *risk* from the impacts of extraction from within the tidal pool and all upstream water sources.

### **Inflow sensitivity (tidal pool)**

This rating describes how much freshwater inflows affect the salinity profile of an estuary (which includes the tidal pool).

## Existing access arrangements during dry conditions section

This section details the current arrangements that the Department of Water and Energy (DWE), have previously implemented, to limit when water extraction can occur during dry conditions. These are in the form of a suspension (Cease to Pump) and pumping time restrictions. Known water user associations and any management rules they may enforce are also listed.

## Proposed recommendations section

### **Access rules**

This describes recommended set of rules to control the extraction of water from the water source.

The range of rules includes:

**Cease to pump (CtP):** that relates to the trigger at which pumping must stop until these conditions no longer prevail. Can be expressed as particular flows in megalitres (ML)/day at a reference point, a depth on a staff gauge or simply visible flow at either the reference point or pump site.

**Special environmental rules:** are special conditions to protect particular instream values and may be of a seasonal nature or have particular flow requirements.

**Daily flow sharing** is a range of conditions intended to gradually reduce extractions above the CtP. This could be implemented through hourly restrictions or daily volume limits.

**Reference point** - relates to the point at which the access rules are triggered

### **Trading rules**

Trading rules determine if entitlement can be traded into the water source and from which particular water sources. They can also define whether there are restrictions to trading within the water source.

Trading into some water sources is capped at a specified level of stress.

Trading rules are based on the general principle of not increasing hydrologic stress in areas of high stress and high environmental value. Trading is also subject to individual site assessment by Department of Water and Energy staff to ensure local impacts of the trade are within acceptable limits.

### **Conversion to high flow access**

To reduce the hydrologic stress in low flow periods, some water sources have an incentive option that allows the annual entitlement to be increased by a factor of 2.5 to 1 if the licence holder surrenders the ability to take water from below the 50% percentile flow level. This may be an option for land owners if they can utilise a storage dam to store the water extracted during the high flows to be used when needed.

### **Conversion to aquifer access**

In highly connected water sources, there may be an option that allows the licence holder to convert their surface water access to groundwater to reduce stress on surface water flows.

## Key factors for panel decisions section

A Regional Panel consisting of staff from the Departments of Water and Energy, Primary Industry and Environment and Climate Change were given the task of reviewing information and applying the macro water planning methodology to define the rules for each water source. This section describes what particular factors were important to the panels' deliberations.

# Glossary

## Water Source

A Water Source is a discrete part of a catchment that contains the rivers and streams within its topographic extents. It is the primary unit within a plan that is used for application of water sharing rules available under the *Water Management Act 2000*.

## Extraction Management Unit

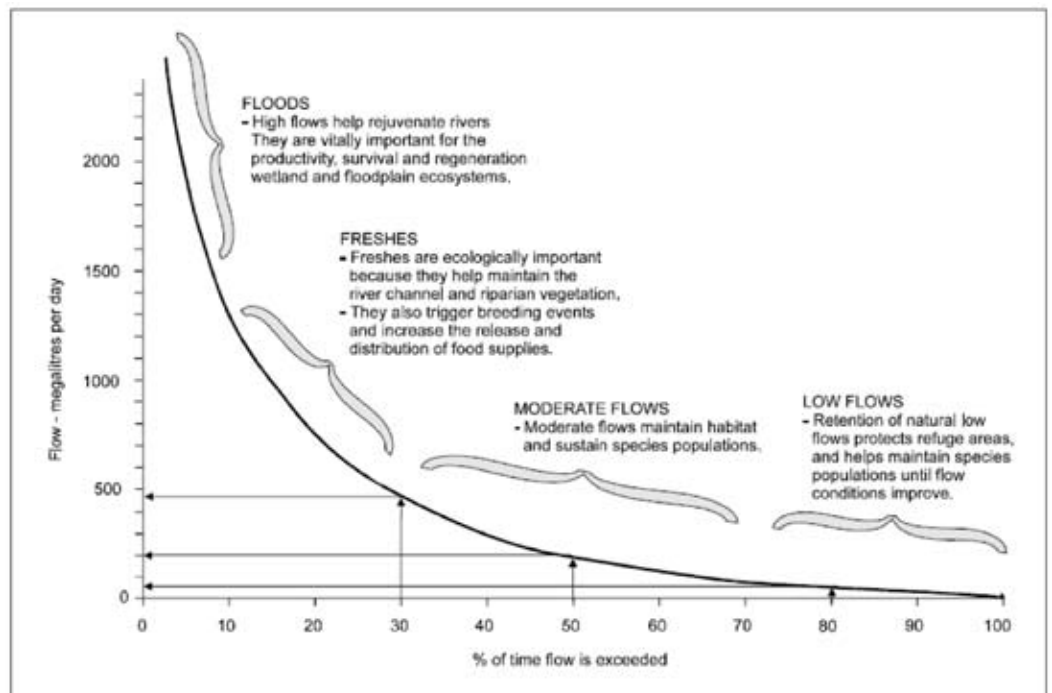
An Extraction Management Unit (EMU) is the collection of individual water sources within the plan area that are hydrologically connected. An EMU can be as large as a whole river catchment. They are used for the management of the overall level of extraction within a plan area.

## Low Flow Index

The Low Flow Index is a comparative index of the volume of water (in megalitres per day) that typically flows out of the bottom of the water source at the 80<sup>th</sup> percentile. This percentile figure is used as it shows the flows that are likely to occur or be exceeded 80% of the time. It also corresponds well to the period when catchment flows are noticeably diminishing and irrigation demand is often high.

This is calculated from available or estimated flow records by tabulating how often the range of daily flow volumes occur, usually called a Flow Duration Table. Graphically it can be shown as a Flow Duration Curve.

Figure 1 Flow Duration Curve for an unregulated river



## Relative instream value

This is the relative value of the flow dependent plants, animals and the water related landscape features of a water source with respect to all other water sources in the plan area.

Three different types of values contribute to the relative instream value: ecological (intrinsic) value, economic (non-extractive use) value and cultural (place) value.

**Peak daily demand**

Peak Daily Demand (PDD) is the maximum daily volume of water required for crops during an irrigation season. The demand is an estimate because most unregulated river licences do not have meters and the actual extraction volumes are not known. The areas and types of crops being irrigated in a water source has been derived from past surveys. Records of rainfall and evapo-transpiration rates are then used to determine the demand for irrigation within the water source.

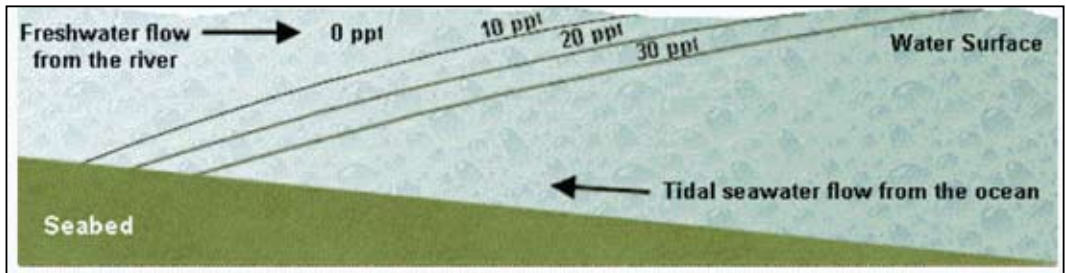
**Reference point**

The Reference Point a location within or near the bottom of water source used to set pumping limitations. It is expressed as the name of a stream gauge, an established staff gauge, a road crossing structure, or the pump site (of the particular works approval of the license holder).

**Tidal pool**

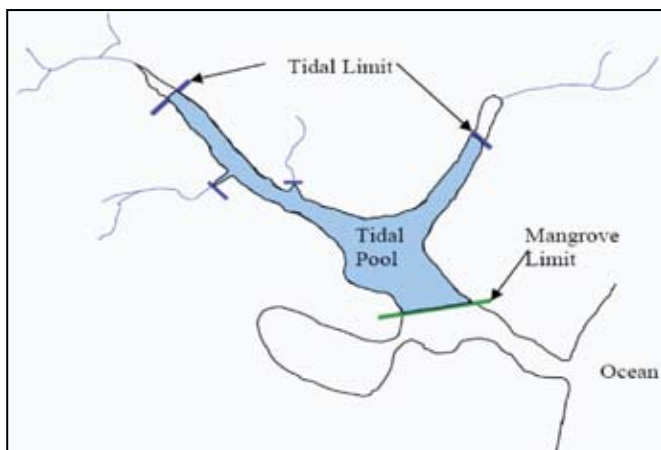
The Tidal Pool is a ‘pool’ of useable fresh or brackish water that is present in estuaries above a wedge of salty water brought into the estuary by tides.

Figure 2 Salt wedge estuary



For the purposes of a water sharing plan, a tidal pool area is defined as the area of the estuary between the upstream limit of mangrove growth and the upstream limit of tidal influence often defined by a structure that restricts the upper tidal limit (eg. a weir or barrier).

Figure 3 Tidal pool area



### **Instream risk**

Risk is often described as a combination of likelihood and consequence. For a water sharing plan, the consequence can be considered to be equivalent to the value of the asset under threat (the consequence of losing a high value asset is more than that of losing a low value one). The likelihood of impact can be considered to be the level of hydrologic stress (if a greater percentage of flow is extracted the likelihood of damage is greater).

### **Cease to pump**

A Cease to Pump (CtP) event is when extractors are required to stop pumping. It may be based upon a reading at a river gauge or upon a reference location where the depth of water or absence of visibly flowing water is used as the CtP trigger. In highly connected water sources the CtP may be based on a groundwater level.

### **Visible flow**

Visible Flow is the continuous downstream movement of water that is perceptible to the human eye.