Australian Government

MURRAY–DARLING BASIN AUTHORITY

Guidelines for the method to determine priorities for applying environmental water

November 2012

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Relevant legislative framework

Section 28(2)(e) of the *Water Act 2007* requires the environmental watering plan to include "…principles to be applied and methods to be used to determine the priorities for applying environmental water…". In the Basin Plan these are set out at Part 6 of Chapter 8.

Purpose of guidelines

These guidelines set out additional information to guide people involved in the planning or management of environmental water about the process to follow when applying the method (as set out in 8.60 of the Basin Plan). In particular this includes guidance on how to determine the relevant resource availability scenarios (RASs) and thus the management outcomes that apply to that RAS. These guidelines do not take the place of or otherwise override the environmental management framework set out in Part 4 of Chapter 8 of the Basin Plan.

These guidelines should be used by any person needing to know the RAS, whether that be to undertake environmental water planning or to manage environmental watering in real time (or for any other purpose).

The use of these guidelines will increase the transparency and reproducibility of determining the RAS. These guidelines are flexible to enable variations in climate and river flow across the Basin to be accommodated.

When using these guidelines please refer to Part 6 of Chapter 8 of the Basin Plan and related sections that provide important context.

Detail of guidelines

For ease of use, the steps set out hereunder are arranged to follow the steps set out in section 8.60 of the Basin Plan 'How to determine priorities for applying environmental water'.

Step 1: Determine the resource availability scenario

The determination of the RAS will occur from time to time and at a relevant scale. There will be many circumstances where multiple RASs should be used in environmental water planning.

The critical information required for this determination will be the water available for the environment and the condition of the environment (antecedent conditions). These can be determined with reference to existing data. These data should be sourced from either the Bureau of Meteorology or state water agencies or both.

As set out in section 8.61 of the Basin Plan a RAS will be one of: very dry, dry, moderate, wet, or very wet.

Steps to follow and use of a default matrix

To determine the resource availability scenario, the following steps should be followed:

a. determine the antecedent conditions for a given water resource plan area by (the 'X' axis of the matrix in Table 1, below):

   i. selecting a representative number of water accounting periods preceding the current water year (e.g. 3-5 years);
   ii. assessing the water received by the environment for those years[1];
   iii. comparing the amount in (ii) to all the historical data; and
   iv. categorising the antecedent conditions as a percentile relative to all historical water years;

b. determine the surface water availability by (the 'Y' axis of the matrix in Table 1, below):

   i. assessing all sources[2] of water available for the environment for a given period[3];
   ii. comparing these to all the historical data; and
   iii. categorising the surface water availability as a percentile relative to all historical water years;

c. for the relevant water accounting period, determine the surface water availability relative to the antecedent conditions for the water resource plan area using all of the historical climate condition data that are available (in Table 1 this is the surface water availability percentile); and
d. using the following matrix (Table 1), determine the applicable water resource availability scenario.

Table 1: Default matrix for determining the RAS

Surface water availability (percentile)	**Antecedent conditions** (percentile)				
	0-15	**16-45**	**46-60**	**61-85**	**86-100**
0-15	very dry	very dry	dry	dry	N/A
16-45	very dry	dry	dry	moderate	wet
46-60	dry	dry	moderate	wet	wet
61-85	dry	moderate	wet	wet	very wet
86-100	N/A	moderate	wet	very wet	very wet

Note: N/A means that it is improbable that this combination will arise and so no RAS is specified.

Use of a different matrix

An adjusted matrix may be used to more accurately reflect local conditions (for example, climate conditions, flow characteristics and flow response relationships) in a particular water resource plan area.

[1] While flow history will be the major input it may be moderated by other factors such as temperature and local rainfall.

[2] Environmental water requirements can be met through any combination of unregulated flows, dam releases (spills, rules-based releases), held environmental water (seasonal allocations, carry-over water, traded allocations).

[3] The appropriate period may vary, e.g. a year may be relevant for long-term planning, whereas for real time management of environmental water a shorter period or multiple RASs may be appropriate.

Adjustments can be made to the following components:

a. the percentile ranges for surface water availability and antecedent conditions;
b. the resource availability scenarios that apply within those ranges.

The adjusted matrix should set out resource availability scenarios appropriate to the water resources of the water resource plan area.

The adjusted matrix must be made having regard to water availability for the water resource plan area for all of the years for which historical climate condition data are available.

An adjusted matrix should be published so that all interested parties have access to it and the reasons why it better reflects local conditions.

Step 2: determine the management outcomes that apply to the resource availability scenario

The broad management outcomes relevant to each RAS are determined using Table 2 (below).

Detailed prioritisation decisions and real time management of environmental water will be based on reconciling water supply and ecological demand, consistent with the provisions of the environmental management framework set out in Part 4 of Chapter 8 of the Basin Plan and are not addressed by these guidelines.

Table 2: Management outcomes for each RAS

	Resource availability scenario				
	Very dry	**Dry**	**Moderate**	**Wet**	**Very wet**
Management outcomes	**Avoid irretrievable loss of or damage to, environmental assets:** – Avoid critical loss of species, communities, and ecosystems. – Maintain critical refuges. – Avoid irretrievable damage or catastrophic events. – Allow drying to occur, where appropriate, but relieve severe unnaturally prolonged dry periods.	**Ensure environmental assets maintain their basic functions and resilience:** – Support the survival and viability of threatened species and communities. – Maintain environmental assets and ecosystem functions, including by allowing drying to occur consistent with natural wetting-drying cycles. – Maintain refuges.	**Maintain ecological health and resilience:** – Enable growth, reproduction and small-scale recruitment for a diverse range of flora and fauna. – Promote low-lying floodplain-river connectivity. – Support medium-flow river and floodplain functions.	**Improve the health and resilience of water-dependent ecosystems:** – Enable growth, reproduction and large-scale recruitment for a diverse range of flora and fauna. – Promote higher floodplain-river connectivity. – Support high-flow river and floodplain functions.	**Improve the health and resilience of water-dependent ecosystems:** – Enable growth, reproduction and large-scale recruitment for a diverse range of flora and fauna. – Promote higher floodplain-river connectivity. – Support high-flow river and floodplain functions.

Note: More than one resource availability scenario could apply at one time (for example, between different water resource plan areas across the Murray-Darling Basin).

Using alternative management outcomes

Table 2 sets out the management outcomes that apply to each of the five RASs, which are determined using the methodology in Step 1.

Alternative management outcomes may be identified if these are necessary to reflect more accurately variations in conditions[4] (e.g. climate conditions, flow characteristics and flow response relationships) in a particular water resource plan area. However, it is envisaged that most variations will be addressed in the prioritisation processes set out in the environmental management framework in Part 4 of Chapter 8 of the Basin Plan rather than by creation of multiple alternative management outcomes.

Adjusted management outcomes should be published so that all interested parties have access to them and the reasons why they better reflect local conditions.

Step 3: Determine the priorities[5] for applying environmental water

These guidelines do not address this step. Please refer to the principles set out in Part 6, Division 1 of Chapter 8 of the Basin Plan.

Step 4: Refine those priorities based on seasonal, operational and management considerations

The seasonal, operational and management considerations upon which priorities for applying environmental water should be based on all the following:

a. the best available knowledge of the watering requirements of each environmental asset and ecosystem function and of the system as a whole;
b. the site-specific ecological objectives and site-specific ecological targets for each environmental asset and ecosystem function that requires environmental watering;
c. conceptual models which identify ecological responses to hydrology;
d. recent flow history at each environmental asset and for each ecosystem function to assess antecedent conditions;
e. forecasts of likely water availability;
f. operational feasibility; and
g. evaluation and review of the results and effectiveness of previous watering.

[4] For example, climate change may drive changes and this would be appropriate to reflect in alternative management outcomes.

[5] Given the highly variable nature of the Basin climate and flows, priorities will generally need to be identified for a number of different RASs. This will improve certainty in the planning stage about what will guide environmental water use as conditions change. The better this is done, the less the need to revise the priorities themselves as conditions change.