

# Enabling better water management

## CASE STUDY

### Seasonal Streamflow Forecast Service influencing water decisions

#### Water management decisions made with confidence

Using the Bureau's streamflow forecasting, ACTEW Water confidently removed temporary water restrictions after the millennium drought.

#### Millennium drought restrictions

The 1997–2009 millennium drought placed severe stress on water security in the Australia Capital Territory. In response, ACTEW Water put a range of water security measures in place. Temporary water restrictions were in effect between 2003 and 2010, with more severe restrictions active from 2006 to 2010.

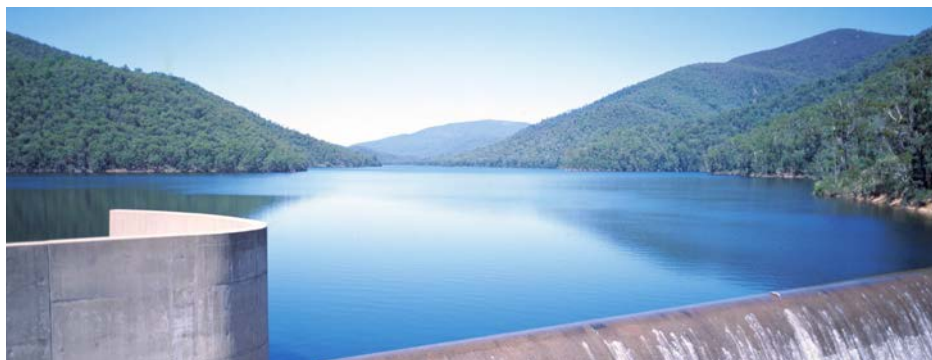
#### Critical water decisions

In spring 2010, ACTEW Water was considering whether water storage levels had increased enough to remove restrictions before summer. To determine if temporary water restrictions are necessary, ACTEW Water considers many factors, such as:

- current conditions such as weather, water storage levels, consumption and inflows;
- historic consumption and inflow;
- available forecasts and projections; and
- how frequently changing restriction levels affect communities and businesses.

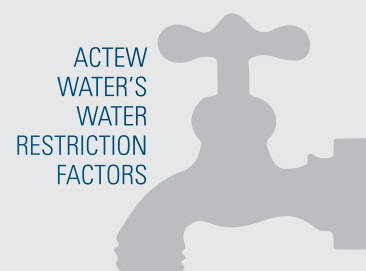
ACTEW Water uses indicative water storage levels for introducing stages of temporary water restrictions and for keeping restrictions in place.

Due to the large variability in historic climate data, a small number of scenarios showed that water in the storages would remain below the level needed to lift restrictions over summer.



Australian Government  
Bureau of Meteorology

ACTEW  
WATER



How restrictions affect communities and businesses

Conditions such as weather, storage levels and consumption

Available forecasts and projections

Historic consumption and inflows

#### SEASONAL STREAMFLOW LOCATIONS

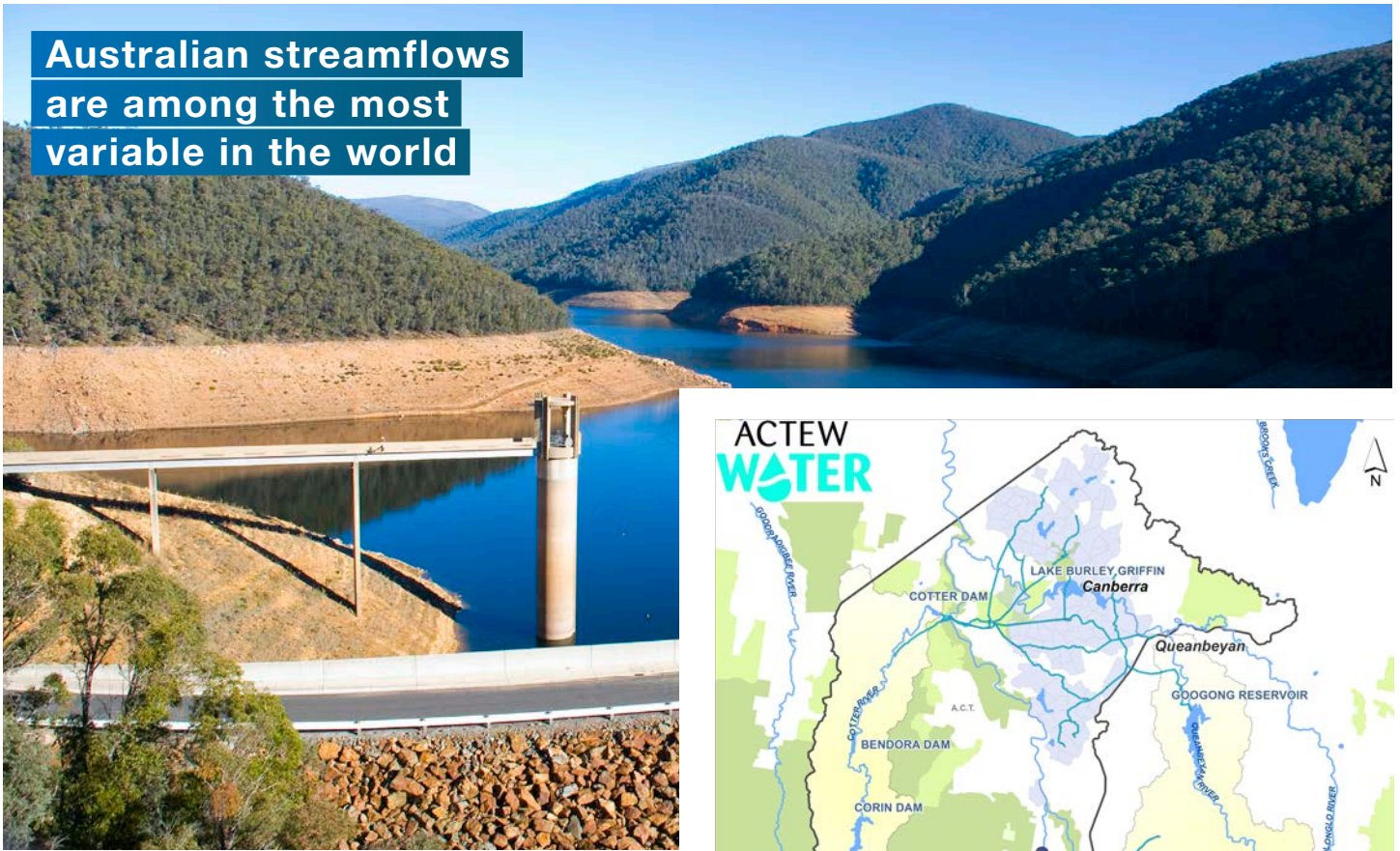
Number of forecast locations across five States and Territories in 2014

74

Number of forecast locations when service was launched in 2010

21

# Australian streamflows are among the most variable in the world

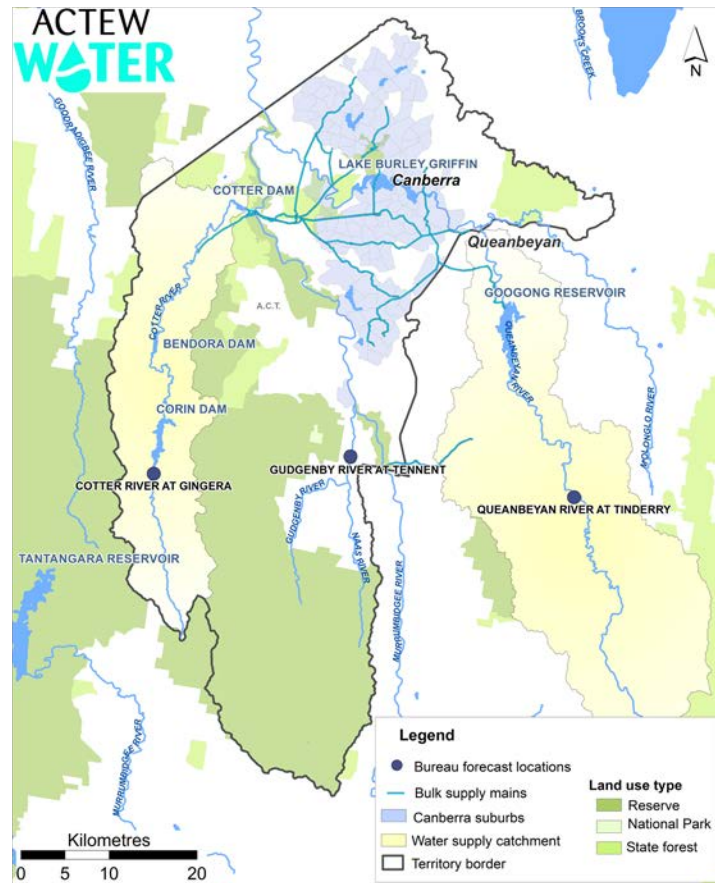


## Restrictions removed

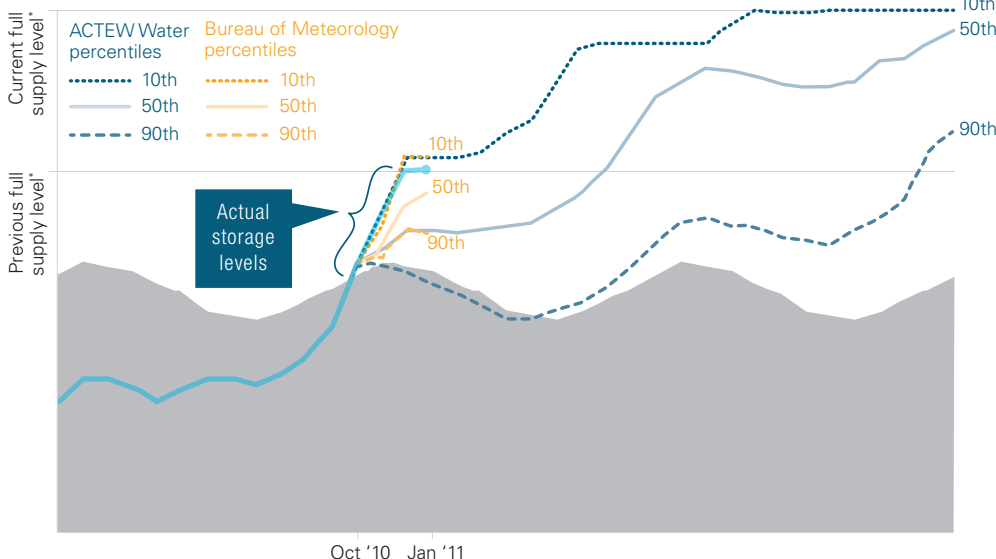
To assist, the Bureau provided ACTEW Water with seasonal streamflow forecasts. ACTEW Water converted these into water storage forecasts and overlaid them onto the historic reference period.

The streamflow forecasts were much less variable than historical data, and they are accurate and reliable. Importantly, the Bureau's streamflow forecasts did not indicate that water storages would decline below the level needed to keep restrictions in place. In fact, the forecasts showed there was a high chance that storage levels would increase.

This provided ACTEW Water with the confidence to remove water restrictions in October 2010. This decision proved prudent as the storage levels increased and remained above the threshold for water restrictions.



**Figure 1.** Map of ACTEW Water's infrastructure including: reservoir catchment areas, urban supply system for Canberra/Queanbeyan and ACTEW Water reticulation. The Bureau provides seasonal streamflow forecasts upstream of the Cotter Dam and Googong Reservoir.



**Figure 2.** Comparison of the Bureau's seasonal streamflow forecast and ACTEW Water storage projections.

In October 2010, storage levels had sufficiently recovered so ACTEW Water could consider removing temporary water restrictions. The Bureau's Seasonal Streamflow Forecast Service reduced the range of likely outcomes and the decision to remove water restrictions had a lower risk than the projections based on historic climate indicated.

\*Note: Expected full supply level used in scenarios increased periodically between November 2010 and February 2012. This was due to the planned enlargement of the Cotter Dam.

## What are seasonal streamflow forecasts?

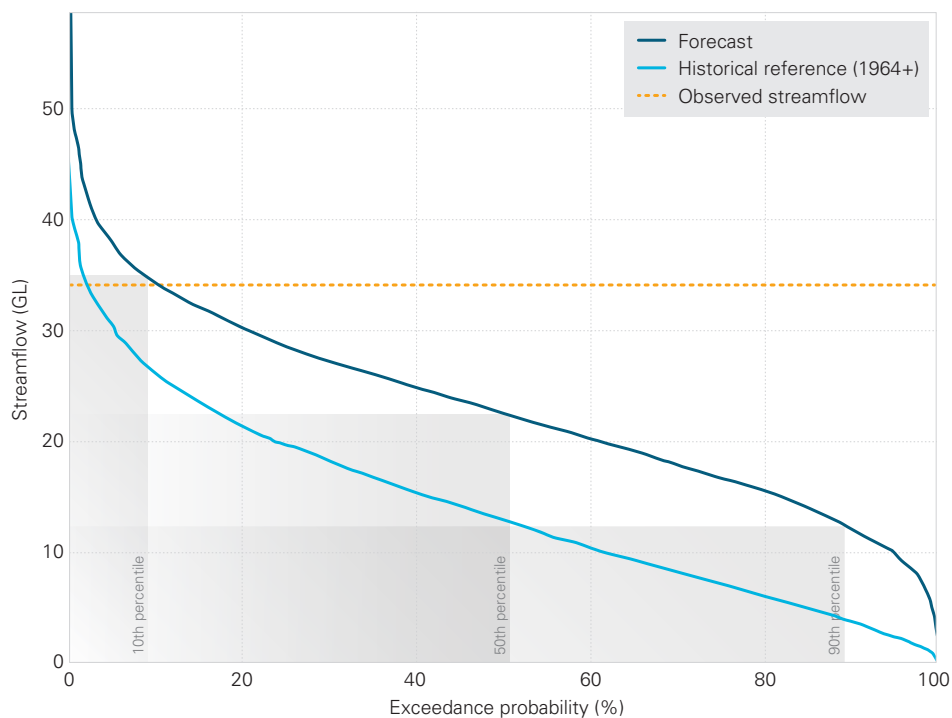
They are forecasts issued monthly by the Bureau that forecast three months ahead and predict how much water will flow into a stream or catchment. They are based on probabilities—that is the likelihood or chance of a given volume of water flowing into a stream based on recent climate and catchment conditions.

## Why are they important?

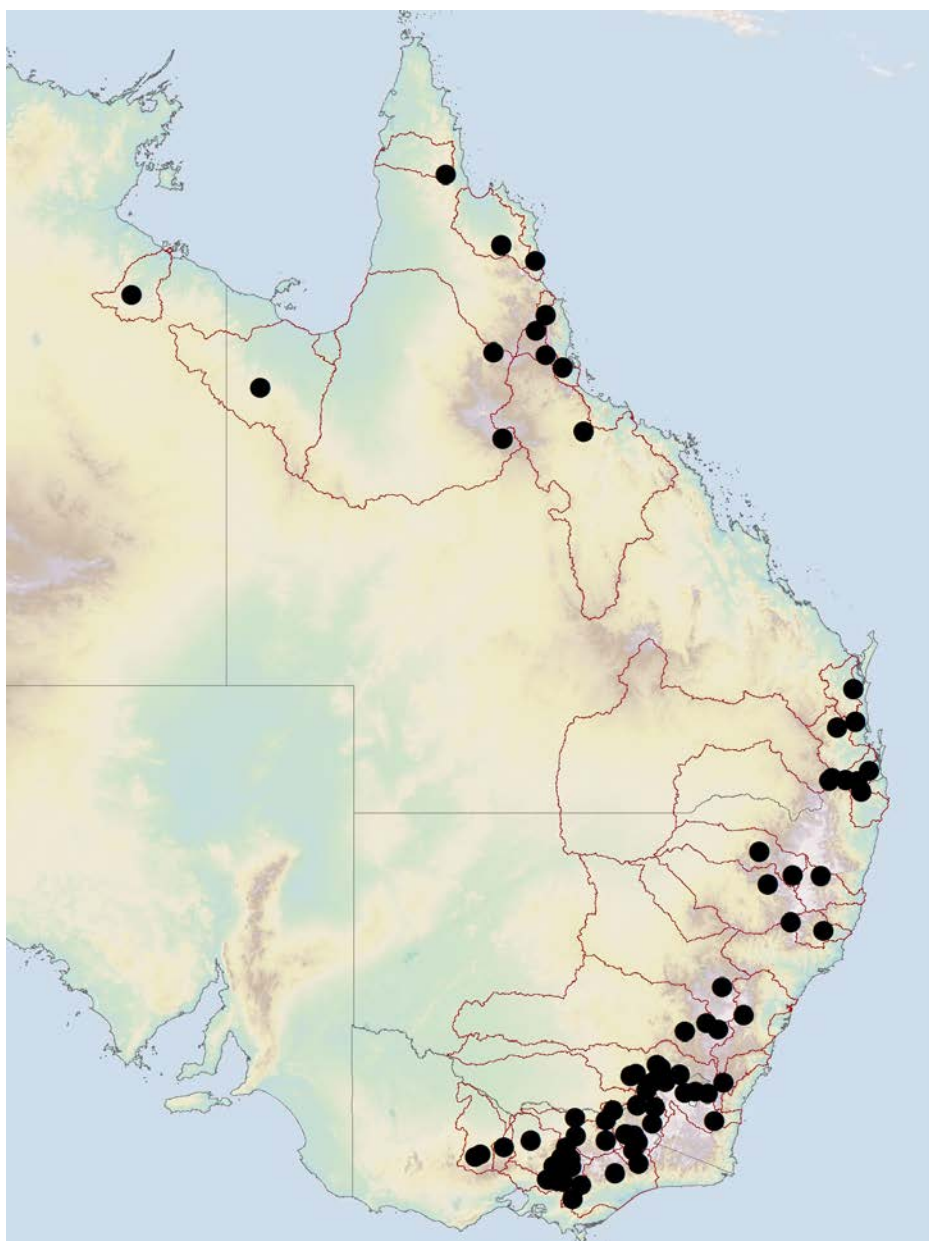
Australian streamflows are among the most variable in the world. Streamflow forecasts are vital in helping water managers and users make informed decisions. They indicate the likelihood of being above or below defined criteria for making certain decisions and can help water managers make decisions such as choosing a water source or whether environmental flows should be allocated.

## What areas do the forecasts cover?

They cover 74 locations across the Northern Territory, Queensland, New South Wales, Australian Capital Territory and Victoria. This has expanded from 21 locations when the service was launched in 2010, and will evolve to cover all jurisdictions by 2015.

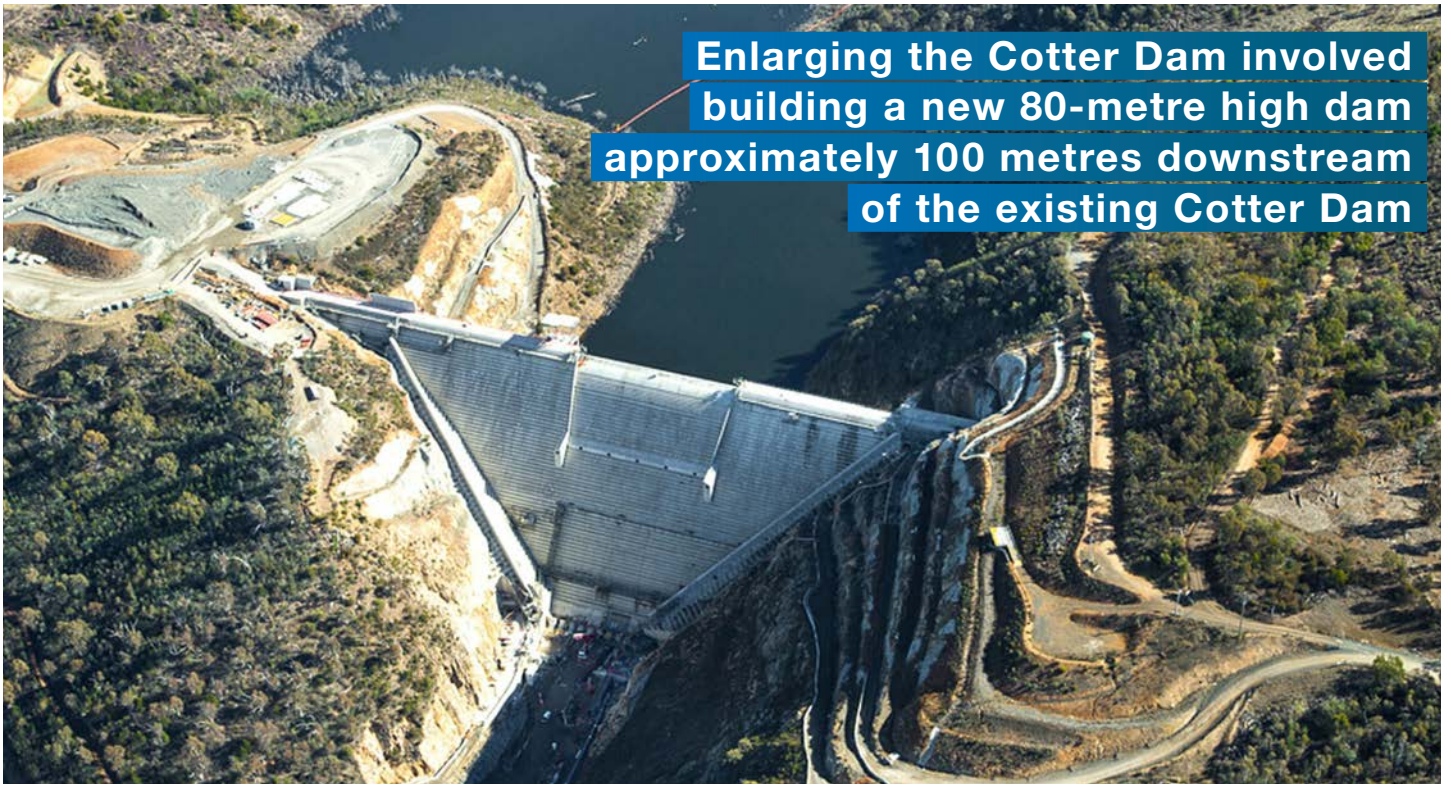


**Figure 3.** The October to December 2010 seasonal streamflow forecast for Gingera. The 10th, 50th and 90th percentile forecasts—or exceedance probability—are converted to monthly inflows by ACTEW Water.



**Figure 4.** Current seasonal streamflow forecast locations (black dots) and the river regions that the forecast locations are situated within (red outlines).

**Enlarging the Cotter Dam involved building a new 80-metre high dam approximately 100 metres downstream of the existing Cotter Dam**



## ABOUT ACTEW WATER

### How does ACTEW Water use the Bureau's streamflow forecasts?

ACTEW Water applies the Bureau's forecast using the following process:

- Three-month 10th, 50th and 90th percentile forecasts are selected for: Gingera, upstream of Corin Dam; Tinderry, upstream of Googong Dam; and Tennent on the Gudgenby River.
- Forecasts are converted to monthly inflows using disaggregation factors specific to each month and location.
- These flows are incorporated into ACTEW Water's water supply planning model, along with estimates of water demand.
- Operational and environmental rules are applied to projected storage levels from each of the forecasts.
- Data are overlaid onto two-year water storage projections developed from their historic reference climate via the same water supply model.
- Projections then inform ACTEW Water's strategic operational decisions.

### Infrastructure

ACTEW Water provides water services to an urban population of around 415 000 people—servicing ACT and the Queanbeyan Council area. Its infrastructure includes:

- three storage sites on the Cotter River – Corin, Bendora and Cotter Dams;
- one storage site on the Queanbeyan River – Googong Reservoir;
- two extraction points on the Murrumbidgee River; and
- two water treatment plants.

ACTEW Water's capacity was recently increased through the Cotter Dam enlargement and constructing the Murrumbidgee to Googong Transfer. It also holds water licences which enable release of additional Murrumbidgee water from Tantangara Reservoir.

ACTEW Water provides water services to around

 **415 000**  
PEOPLE

ACTEW Water infrastructure includes

 **4** WATER STORAGE SITES

 **2** WATER EXTRACTION POINTS

 **2** WATER TREATMENT PLANTS

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