Australian Government
Bureau of Meteorology

Hydrologic Reference Stations

What are hydrologic reference stations?

Hydrologic reference stations are high-quality monitoring sites used to:

- identify long-term trends in streamflow variability
- predict the effects of climate variability and change on water availability across all hydroclimatic regions in Australia at annual, seasonal, monthly and daily time scales.

The hydrologic reference station network comprises 221 stations nationally, all of which meet specific criteria, including:

- each station represents an unregulated catchment (with minimal effects of water resource development and land use change)
- each station holds high-quality streamflow data and long-term records for 30 years or more (to quantify streamflow trends across Australia)
- collectively, these stations are geographically and temporally representative of all hydroclimatic regions across Australia.

Streamflow variability and trends are determined from the statistical analysis of data collected from each of the stations.

What information does the Hydrologic Reference Stations website provide?

The website provides:

- analysis of 221 stations that identifies long-term streamflow trends due to climate variability and change
- graphical representations, tables and statistical test results about streamflow data, including linear trends and step changes.

Streamflow information for each station may be viewed or downloaded as annual, seasonal, monthly, or daily time series, or examined for long-term trend analysis.

The Bureau's Hydrologic Reference Stations website is a one-stop portal to access high-quality streamflow information for 221 stations across Australia.

How is the information used?

Information on the website assists in detecting long-term variability and changes in streamflow at all 221 sites, which supports water planning and decision-making. Users include international and national research communities, government agencies, water managers and utilities. The stations will serve as 'living gauges' that record and detect changes in streamflow due to long-term climate variability and other factors. Information found on the Hydrologic Reference Stations website may also be used to test hypotheses and to develop tools and models.

Will more stations be added to the network?

Upon periodic reviews of the network, further stations that meet the selection criteria may be included.

Hydrologic Reference Stations and streamflow trends

In 2010, the Bureau developed draft guidelines for the selection of Hydrologic Reference Stations. A preliminary list of streamflow gauging stations that are spatially and temporally representative of all hydroclimatic regions across Australia was then built.

Each station holds long-term data, little missing data, and high-quality rating curves for all flow regimes. None have been significantly affected by farm water storages or land use change.

Through consultation with 70 stakeholders, the list was further refined and additional stations were included. Following a data quality assurance process, the final list of 221 stations was determined (Figure 1).

The Bureau developed a Hydrologic Reference Stations toolkit to quantify the step and/or linear trends (Figure 2) in streamflow, changes in the intra-annual distribution and changes in a series of important streamflow variables. It also enabled the graphical products, data and statistical summary tables to be generated for inclusion in the website.

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Looking to the future

The Bureau will make a national statement on the long-term effects of climate variability and change at Hydrologic Reference Stations using Intergovernmental Panel on Climate Change Fifth Assessment Report data. Operational short-term (up to ten days) and seasonal (up to three months) streamflow forecasting services will also be implemented at some of these sites.

For more information

For more information about the Hydrologic Reference Stations, email water_hrs@bom.gov.au or visit www.bom.gov.au/water/hrs

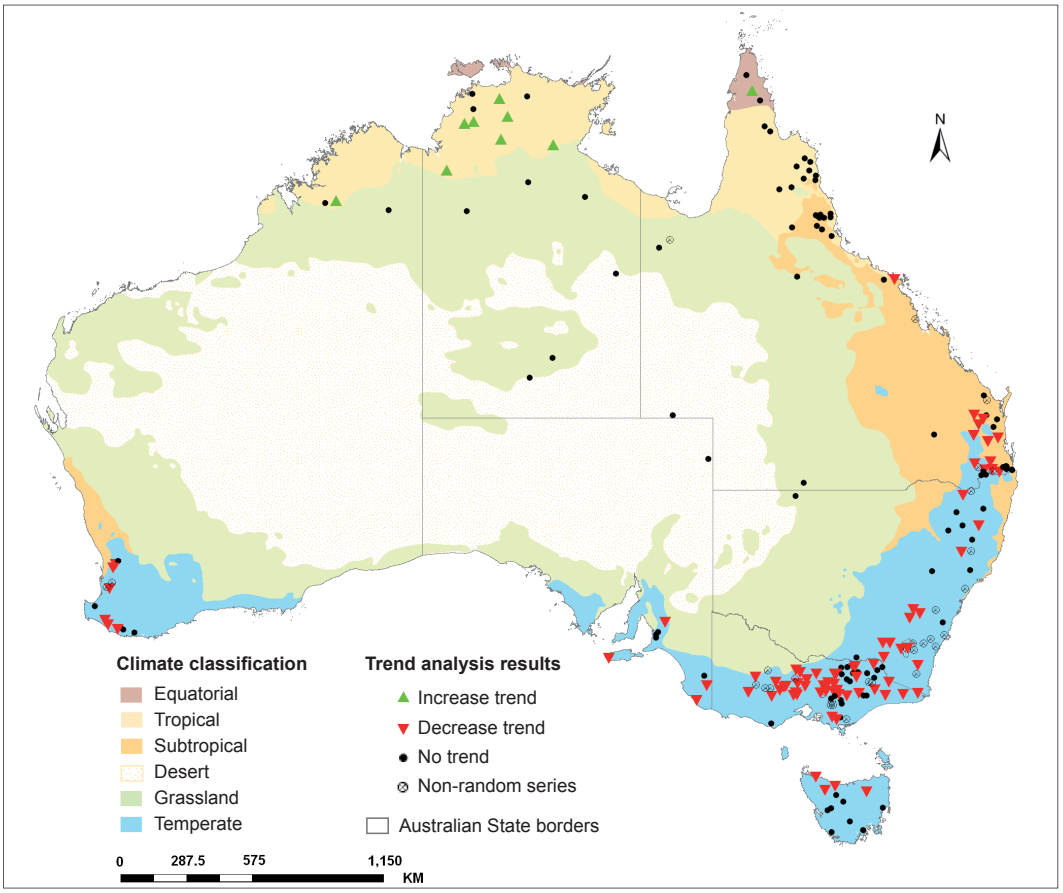

Figure 1: Distribution of Hydrologic Reference Stations and streamflow trends.

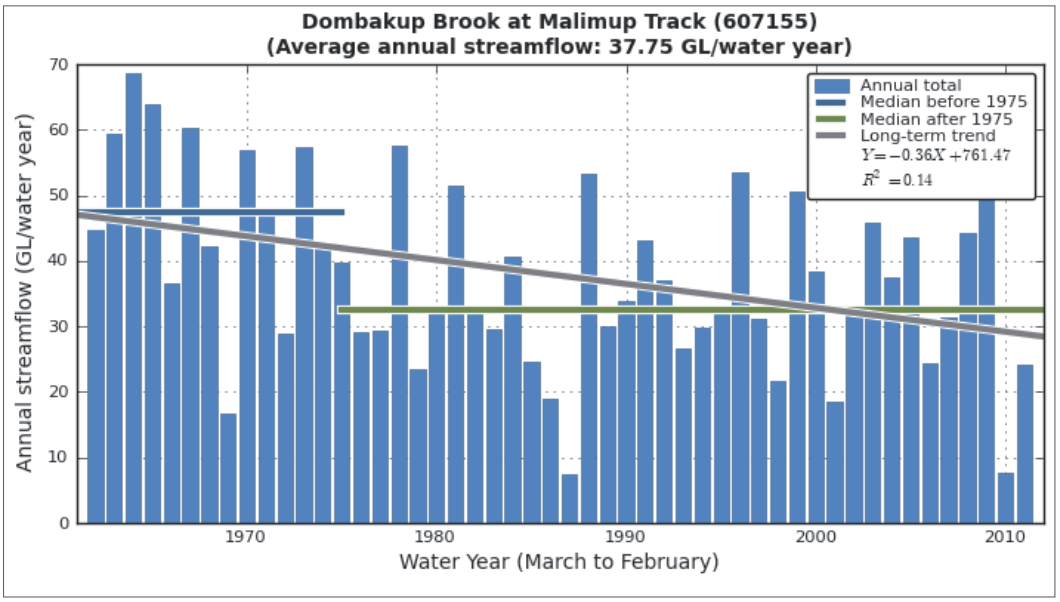

Figure 2: An example of step change and linear trend.

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