

# Hills and Fleurieu trend & condition snapshot

## Water

The catchments in the Hills and Fleurieu region receive some of the highest average annual rainfall in the State. The water resources they supply are important regional assets. Both surface and groundwater assets in the region support unique and internationally significant aquatic ecosystems, sustain important industries and provide critical supplies to greater Adelaide as well as many local towns. Our waterways have significant Aboriginal cultural value, contribute to the beauty of our landscapes and are important for community wellbeing.

This regional snapshot document gives an overview of water resource conditions and key threats to water security in the Hills and Fleurieu.

It is structured by the following Focus Areas identified in the [Hills and Fleurieu Landscape Plan 2021-26](#) as requiring priority attention:

- W.1. Deliver water resource planning to meet ecological, economic, cultural and social needs
- W.2. Improve on-ground management of water resources
- W.3. Build understanding of water resources

This summary document draws on a mix of sources, including published and unpublished reports, internal datasets, anecdotal observations and qualitative assessments by landscape officers and other specialists.

Bremer, Central Adelaide and McLaren Vale prescribed wells areas.

Prescribed areas require licences for certain water uses, can include caps on water take and ensure closer management of water extraction to manage salinity, preserve surface water flows and groundwater levels. The following descriptions provide an overview of these three key water resources.

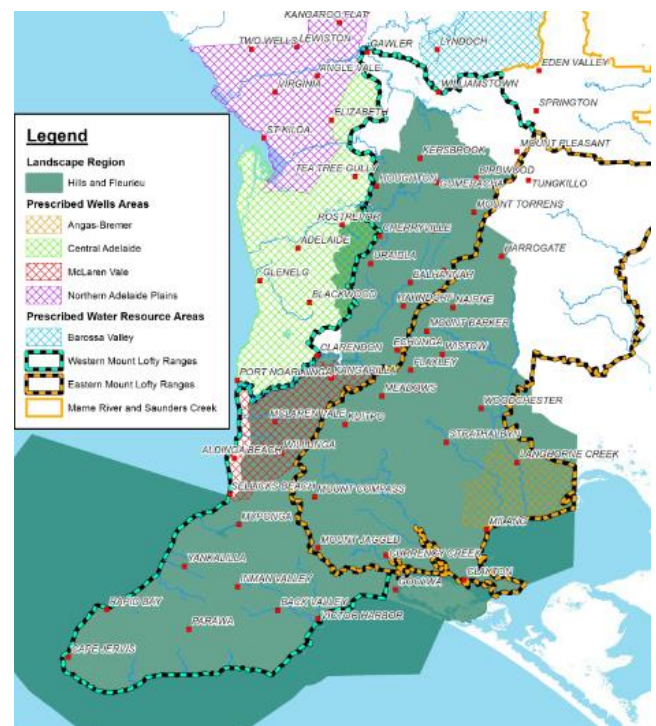


Fig. 1. Prescribed water resources in and around the region

## W1. Water resource planning

In the Hills and Fleurieu, water resource planning is an essential part of managing a range of water needs. Economic activity, ecosystem health, public and urban water supply as well as cultural values and recreation all depend on secure water at a suitable quality. Good water planning also aims to ensure ongoing equity by forecasting and preparing for changes in supply and demand over time.

A key mechanism of water resource planning in the region is the designation and management of 'prescribed areas'. Prescribed areas are set by the SA government where high demand and competing interests for water exists. Much of the region's water resources are in prescribed areas (Fig. 1). These include the Eastern and Western Mount Lofty Ranges prescribed water resources areas, and the Angas-

### About this document

This snapshot summarises regional conditions relevant to the 'Water Priority' – one of five priorities in the [Hills and Fleurieu Landscape Plan 2021-2026](#).

To read the Landscape Plan or the other regional snapshot documents on land, nature, climate and community, follow the links and go to [www.landscape.sa.gov.au/hf](http://www.landscape.sa.gov.au/hf)

## ANNUAL SURFACE WATER FLOWS

Surface water flows refers to water in rivers, lakes, wetlands and estuaries and is largely determined by rainfall. Surface water is measured by stream flow monitoring. Stream flows have been declining across the region due primarily to lower rainfall. The unusually high 2016 Spring rainfall was an exception to this downward trend and has skewed the decadal average. The 2016 rain is the reason why regional surface flows were recorded as stable in the [2018 State Environmental report cards](#).



The decline in rainfall is consistent with the expected impacts of climate change and is likely to become worse. Climate change projections indicate the region will become hotter and drier with lower average rainfall (particularly in spring) interspersed with more intense rain events. These conditions will increase the difficulty of managing surface water resources. (For more, see the [Climate Snapshot](#)).

The timing and intensity of rainfall and flow events has important economic, ecological and water planning implications. For example, low winter rainfall tends to reduce annual streamflow. Low spring and summer rainfall can increase the need for irrigation, leading to higher water extraction. This in turn can drive up salinity levels in rivers and streams. Conversely, higher summer rainfall reduces irrigation demand and can 'freshen' up rivers and streams, lowering or stabilising salinity.

## GROUNDWATER LEVELS



Groundwater in the region is important for irrigation, town water supplies and water dependent ecosystems.

The two common groundwater aquifers (fractured rock and sedimentary) are recharged by rainfall that percolates through the soil or from adjacent aquifers. Water levels in fractured rock aquifers fluctuate with the seasons, recovering quickly when it rains. Water levels in sedimentary aquifers are less influenced by seasonal conditions and more affected by groundwater extraction and long-term rainfall trends.

There has been a decline in water levels in fractured rock aquifers in recent decades consistent with rainfall decline.

In the Eastern Mt Lofty Ranges (42%) of wells in fractured rock aquifers had average recovered water levels in 2018–19 when compared to historic levels.

In the Western Mt Lofty Ranges water levels in the Permian Sand and Tertiary limestone aquifers were generally at average levels when compared to their historic levels. These levels are being managed by the [water allocation planning process](#). Water levels in over 50% of monitoring wells in fractured rock aquifers recorded below-average to lowest-on-record levels compared to their historic levels, with the median well recording below average levels.

Continued declines in rainfall will have a significant impact on water recharge in fractured rock aquifers and also affect sedimentary aquifers over the long-term. Lower water levels in fractured rock aquifers will impact aquatic ecosystems by reducing groundwater contribution to rivers. Higher temperatures during the summer irrigation season will likely see increased extraction, particularly from sedimentary aquifers.

## GROUNDWATER SALINITY

| Groundwater salinity | Good | Stable |
|----------------------|------|--------|
|----------------------|------|--------|

Salinity is an important indicator of groundwater quality. High salinity water can be unsuitable for agricultural production and may impact ecosystem health.

Although salinity varies across the region and between aquifers, in general the region's groundwater is good quality. Groundwater salinity in fractured rock aquifers is influenced by rock type and can be highly variable. In sedimentary aquifers, salinity is often influenced by water extraction rates and inflow from adjacent or overlying aquifers.

In the Eastern Mt Lofty Ranges the majority of irrigation wells with salinity data show stable salinities over the period of 2015 to 2019.

In the Western Mt Lofty Ranges all monitoring wells with salinity data in the fractured rock aquifers show decreasing or stable salinities over the period 2015–2019.

Records of groundwater salinity records began in 2015 for some wells. Additional water sampling began in 2017 and trends will be available in future years.

## W2. Water management

Where water planning aims to ensure equity and adequacy of supply for a variety of water needs, water management aims to protect and maintain water quality to a level that aquatic ecosystems need.

Water quality can be influenced by multiple factors including flow characteristics, sedimentation, temperature, pH, nutrients, pests, native vegetation and habitat structure. In practical terms, managing water quality involves trying to prevent or influence activities that degrade these characteristics.

In the Hills and Fleurieu, rural land management practices, historic urban design and current urban development are key causes of poor water quality and ecosystem health.

### ECOLOGICALLY RELEVANT FLOW CHARACTERISTICS



Many aquatic flora and fauna in the region depend on a specific range of flow conditions in streams to survive. These conditions include factors such as the magnitude, timing and duration of stream flows as well as the frequency and rate they change.

Results from the 35 stream flows monitoring sites across the region indicate flow conditions can be rated fair or poor in terms of their ecological value and are on a downward trend. Site conditions are heavily influenced by climate – meaning conditions are worse during droughts and are expected to worsen due to climate change.

### FISH

The condition of fish communities is a good indication of overall ecosystem health. Improving the health of fish populations is a high priority for many stakeholder groups in the region.

Results from fish surveys conducted in the Eastern Mount Lofty Ranges show that of the 55 sites surveyed only 4 (15%) are in good condition. 31 (52%) are in moderate and 25 (42%) are in poor condition<sup>i</sup>.

Results also show that conditions are better in the south of the region. This north to south gradient of condition is consistent with the prolonged dry experienced in the northern areas. There has been a

near total loss of fish in the northern Hills and Fleurieu region.

In addition to the north-south trend, monitoring shows different trends over time. Results from 2012 to 202 show fish populations have declined in 24 sites, remained stable in 20 sites and improved in 16. Of those sites that have improved, only two are in the northern catchments.

### MACRO-INVERTEBRATES

The density and diversity of macroinvertebrates (small animals that have no back bone) are another indicator of aquatic ecosystem condition.

Monitoring results show a higher presence of macroinvertebrates in areas with more rainfall and remnant native vegetation such as the streams along the southern Fleurieu coast and around Mount Lofty<sup>ii</sup>. Results show poorer conditions in the dryer Eastern Mount Lofty Ranges<sup>iii</sup>.

Trends in the condition of macroinvertebrate communities are mixed. 12 out of 25 monitoring sites show some form of decreasing condition while monitoring of other sites also show conditions have improved since the Millennium Drought – correlating to better rainfall conditions.

From an analysis of 238 invertebrate data samples collected between 2016 and 2020, 100 samples were classed as poor or worse, 75 fair, and 63 as good or better. No sites were classed as excellent<sup>iv</sup>.

### Challenges

While there is a substantial amount of data collected on aquatic fauna and the ecosystems that support them in the region, this information is collected and maintained separately by different agencies, contactors and programs. This disparate approach to data collection requires great effort to collate and analyse from the data to understand conditions across the region. This lack of knowledge coordination and the long turn-around times to learn from it hampers efforts to protect and sustain aquatic communities and will become an increasing problem as increasingly hot and dry conditions further stress struggling aquatic ecosystems.

### W3. Understanding and valuing water resources

Because water resources are so important but also facing increasing pressures, community understanding and valuing of water will be critical to managing the impacts of urban growth and climate change.

In many ways, the region's water resources are valued implicitly, taken for granted and often misunderstood. For example, anecdotal evidence through conversations with community groups and landholders suggests many in the region value our waterways and aquatic ecosystems but don't understand how stressed they are.

Some landholders also struggle to recognise water is a shared resource or commons. This is sometimes seen where people express an entitlement to all the water that can be accessed on their properties without acknowledging that water provides multiple functions but needs to flow through the landscape in order for these functions to be realised. Downstream production, ecosystem health and landscape amenity can only occur where water is managed in a holistic way to protect all these outcomes.

Water resources and their supported ecosystems are also vital to the wellbeing of the region's First Nations people, as they have been for many generations. So far, this value has not been factored into water planning.

There is also evidence (again anecdotally) that some in the community are beginning to recognise the importance of water and good water planning. Positive stories include the role groups like the Angas Bremer Water Management Committee are playing to monitor and raise awareness about the impact of urban development on water quality. Volunteer-based citizen science events collecting data on water quality and aquatic macro-invertebrates are another.

Some primary producers and community groups are also pushing for water security planning to be more holistic and ambitious to help prepare for the growing stresses caused by climate change.

#### TRACKING COMMUNITY VALUES

While anecdotal evidence may give a rough indication of how community understands water issues, baseline data and repeat research is needed. The board is looking to develop a Landscape Awareness Survey to help track attitudes, knowledge and water use practices over time.

<sup>i</sup> Analysis of fish surveys 2021...

<sup>ii</sup> DEW analysed Macroinvertebrate records from 190 sites between 2008 and 2020, collected by a number of programs including: Angas and Finniss Catchments Waterbug Bioblitz Program

<sup>ii</sup>, EPA Aquatic Ecosystem Condition<sup>ii</sup>, Flows for the Future<sup>ii</sup> and the Securing Low Flows<sup>ii</sup>.

<sup>iii</sup> DEW analysed Macroinvertebrate records from 190 sites between 2008 and 2020, collected by a number of programs including: Angas and Finniss Catchments Waterbug Bioblitz Program <sup>iii</sup>, EPA Aquatic Ecosystem Condition<sup>iii</sup>, Flows for the Future<sup>iii</sup> and Securing Low Flows<sup>iii</sup>.

<sup>iv</sup> Department for Environment and Water (2022). Hills and Fleurieu Landscape Region PWRA ecological condition assessment DEW Technical report (in prep), Government of South Australia,