**Ellis Brook**

Ellis Brook is a largely natural, ephemeral system, drying out in summer. It was named after T.T. Ellis, a soldier who was involved in the Pinjarra massacre. Its headwaters are situated on the Darling Scarp from where it flows westwards, towards the Canning River in Gosnells.

Around half the catchment remains uncleared, though the western portion is taken up by lifestyle blocks and urban areas. The eastern edge of the catchment also has lifestyle blocks as well as some horticulture. There is a hardrock quarry on the southern boundary of the catchment as well as a decommissioned quarry in the centre. Ellis Brook Valley is in the central portion of the catchment and is recognised as one of the richest wildflower locations in the Perth Metropolitan area.

Soils types in the western portion of the catchment are red gravels and earths. As the brook flows over the scarp it passes through shallow red and yellow earths. On the coastal plain the soils are predominantly acidic yellow and red sands. These types of soils have better nutrient-retention capacities than the leached sands found further west on the coastal plain.

Water quality is monitored fortnightly at a site near the end the catchment, close to the Gosnells City Council Offices. This site was chosen to estimate the nutrient concentrations leaving the catchment, so the data may not accurately represent nutrient concentrations in upstream tributaries or other streams in the catchment.

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**Ellis Brook – facts and figures**

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<tbody>
<tr>
<td>Annual rainfall (mm)</td>
<td>009225</td>
<td>466.8</td>
<td>703.0</td>
<td>807.8</td>
<td>607.2</td>
<td>503.8</td>
<td>860.8</td>
<td>608.2</td>
<td>782.4</td>
<td>674.4</td>
<td>617.8</td>
<td>715.8</td>
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<tr>
<td>TN median (mg/L)</td>
<td>EBGS01</td>
<td>0.39</td>
<td>0.65</td>
<td>0.45</td>
<td>0.29</td>
<td>0.44</td>
<td>0.35</td>
<td>0.28</td>
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</tr>
<tr>
<td>TP median (mg/L)</td>
<td>EBGS01</td>
<td>0.015</td>
<td>0.033</td>
<td>0.019</td>
<td>0.013</td>
<td>0.022</td>
<td>0.019</td>
<td>0.022</td>
<td>0.017</td>
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* TN short term target = 2.0 mg/L  
* TN long term target = 1.0 mg/L  
* TP short term target = 0.2 mg/L  
* TP long term target = 0.1 mg/L

* Best estimate using available data.  
* Statistical tests that account for the number of samples and large data variability are used for testing against targets on three years of winter data. Thus the annual median value can be above the target even when the site passes the target (or below the target when the site fails).
Changes in nutrient concentrations over time in Ellis Brook

**Trend**

Total nitrogen (TN) concentrations appear to have decreased since 2011. An emerging decreasing trend of 0.04 mg/L/yr was detected over the 2011–16 period. 2010 and 2012 were dry years and the brook was only flowing on one sampling occasion in each year.

**Target**

Ellis Brook has been passing the short- and long-term TN targets since monitoring commenced.

Nutrient fractions in Ellis Brook

**Nitrogen**

More than three-quarters of the nitrogen (N) in Ellis Brook was present as organic N which consists of both dissolved (DON) and particulate (PON) fractions. DON largely comprises organic compounds leached from peaty subsoils and degrading plant and animal matter and is available for uptake by plants, algae and bacteria. PON is composed of plant and animal debris and needs to be further broken down to become available to plants and algae. The remaining N was present as dissolved inorganic N (DIN, consisting of ammonium – NH₄⁺ and N oxides – NOₓ). This form of N is readily available for plant and algal uptake and is most likely sourced from fertilisers used on lifestyle blocks, hobby farms, and urban areas as well as septic tank leachate and animal waste.

There were no flow data for Ellis Brook so loads have not been calculated.

**Phosphorus**

Nearly two-thirds of the phosphorus (P) in Ellis Brook was in the form of particulate P, which includes sediment-bound forms of P and degrading plant and animal matter. This form of P is not readily available for plant and algal uptake, but some may become available as particles decompose and bound phosphate is released. The remainder of the P was present as soluble reactive phosphorus (SRP) which is derived from fertilisers used in the catchment, animal waste and septic tank leachate. SRP is readily available for plant and algal uptake.

There were no flow data for Ellis Brook so loads have not been calculated.

Ellis Brook: Nutrient report 2016
Seasonal variation in nutrient concentrations in Ellis Brook

Nitrogen seasonal variation over the 2012 to 2016 monitoring period

A seasonal pattern is apparent in TN, DON and NO₃. Concentrations were highest when the brook started to flow and then decrease. This pattern is probably due to comparatively nutrient-rich surface runoff entering the brook after the first rain events of the season. PON and NH₄⁺ concentrations did not show a seasonal response, being fairly constant throughout the year. The data in June is from one sampling event only, in 2014, when the brook was flowing at a time when it is usually dry.

Photographs of Ellis Brook:
- (Top left) The Ellis Brook sampling site, August 2017.
- (Bottom left) A small pool on Ellis Brook, July 2015.
- (Right) 60 ft falls in the Ellis Brook valley, August 2016.

Phosphorus seasonal variation over the 2012 to 2016 monitoring period

TP and Particulate P exhibited a slight seasonal response, increasing during winter before dropping as flows reduce due to decreasing rainfall. SRP remained fairly constant throughout the year. It is likely that all forms of P are entering the brook predominantly through surface and sub-surface runoff.

Photographs of Ellis Brook:
- (Top left) The city of Perth from Ellis Brook Valley, August 2017.
- (Bottom left) The Ellis Brook Valley is known for its diversity of wildflowers, August 2017.

The Ellis Brook Valley is known for its diversity of wildflowers, August 2017.
Local nutrient reduction strategies for Ellis Brook

Nutrient reduction strategies being undertaken or recently completed in the Ellis Brook catchment include but are not limited to:

- The Ellis Brook Valley Strategic Management Plan is being drafted for the City of Gosnells and restoration works are being progressed.
- Friends of Ellis Brook Valley completed many successful conservation projects at Ellis Brook Valley Reserve. Regular work days are held to revegetate degraded areas by planting trees and shrubs, conduct erosion control and clean up rubbish and graffiti. The group also advises the council regarding future developments and projects and actively seeks funding for future projects.
- The Department of Biodiversity, Conservation and Attractions (DBCA) Healthy Catchments Program aims to protect the environmental health and community benefit of the Swan Canning river system by improving water quality in the catchments. This is achieved through engaging partners and focusing the effort of local governments, sub-regional groups, the community and other organisations in water quality improvement activities.
- Ongoing sub-regional projects: Coordination and support of community led projects to reduce nutrient inputs into the Canning River in the south sub-region led by the South East Regional Centre for Urban Landcare and funded by DBCA.
- The Phosphorus Awareness Project which aims to assist the community in reducing their nutrient outputs through education, promotion and behaviour change programs.

Swan Canning water quality improvement plan

The Swan Canning water quality improvement plan (SCWQIP) complements the delivery of other major programs and presents a roadmap for reducing nutrient inputs into the river system. It uses sophisticated modelling to identify nutrient sources and provides nutrient-reduction targets for each of the subcatchments.

SCWQIP load and concentration targets for Ellis Brook

<table>
<thead>
<tr>
<th></th>
<th>Max. acceptable load (t/yr)</th>
<th>Concentration target (mg/L)</th>
<th>% reduction required</th>
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<tbody>
<tr>
<td>TN</td>
<td>0.7</td>
<td>1.0</td>
<td>0%</td>
</tr>
<tr>
<td>TP</td>
<td>0.02</td>
<td>0.1</td>
<td>0%</td>
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For further information on the SCWQIP contact: rivers.info@dbca.wa.gov.au

Summary: Ellis Brook

- Ellis Brook is currently passing both the short- and long-term TN and TP targets.
- Nutrient loads leaving Ellis Brook are currently satisfactory and no nutrient reduction is required to meet the SCWQIP targets.
- Of the 33 sites sampled, Ellis Brook has the lowest median TN concentration and the equal third-lowest median TP concentration.
- There was an emerging decreasing long term trend in TN concentrations.