Upper Brunswick River

The upper Brunswick River catchment lies on the Darling Plateau and consists of land draining to the Brunswick River upstream of the South Western Highway. The Lunenburgh River drains the south of the catchment and the Augustus River reservoir is located in the east, downstream of the Worsley Alumina Refinery.

To the east, the catchment remains relatively undisturbed with the exception of the Worsley Alumina Refinery. To the west, the land has been cleared, mostly for agriculture (e.g. stock grazing and plantations). Nutrients were monitored in the Upper Brunswick River (gauging station 612047) from 2004 and flow was measured between May 2000 and February 2010. Nutrient sampling stopped at this site in mid-2012 when funding ceased. Flow and rainfall are recorded upstream at gauging station 612022 (1981–2012), however nutrient sampling at this site only occurred between May 1996 and November 2000.

The upper Brunswick River generally flows all year; however flows are highly dependent on rainfall to recharge groundwater levels. For example 2001 was a low rainfall year and consequently the river ceased to flow in the summers of 2002 and 2003.

In recent years (2007–11) no statistical trend in TN concentrations were detected despite the 2011 annual median being higher than in previous years. In contrast an emerging increasing trend in TP concentration was evident (0.003 mg/L/year).

**Performance against targets**

TN and TP concentrations passed the water quality targets (2009–11).

In the Leschenault Estuary water quality improvement plan (WQIP), the Upper Brunswick River is comprised of two subcatchments: Brunswick Upper 1 and 2.

The Brunswick Upper 1 has an intervention classification as the modelled winter TN concentrations for the catchment failed the target (1998–2007). The Brunswick Upper 2 is classified as protection as both the modelled TN and TP concentrations passed the targets.

**Annual concentrations, flow and target performance (612047)**

<table>
<thead>
<tr>
<th>Year</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow (GL)</td>
<td>39</td>
<td>65</td>
<td>20</td>
<td>43</td>
<td>46</td>
<td>55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TN median (mg/L)</td>
<td>0.37</td>
<td>0.31</td>
<td>0.26</td>
<td>0.46*</td>
<td>0.31</td>
<td>0.44</td>
<td>0.42</td>
<td>0.53*</td>
</tr>
<tr>
<td>TP median (mg/L)</td>
<td>0.017</td>
<td>0.014</td>
<td>0.010</td>
<td>0.012</td>
<td>0.015</td>
<td>0.021*</td>
<td>0.028*</td>
<td>0.019</td>
</tr>
</tbody>
</table>

* Statistical tests that account for the number of samples and large data variability are used for compliance testing on three years of winter data. Thus the annual median value can be above the target even when the site passes the compliance test.
An emerging decreasing trend in TP (2007–11) was detected.

TN and TP status classifications were low.

The Brunswick River was passing the TN and TP targets.

Riverbank erosion is an issue in the catchment.

Fencing stock from waterways and revegetating the riparian zone are the best methods for reducing nitrogen and phosphorus concentrations and improving water quality.