Middle Murray River

The middle Murray River starts on the Darling Plateau south of Dwellingup and flows towards Pinjarra. The Marrinup and Oakley brooks also start on the plateau north of Dwellingup, both flowing west to join the Murray River.

The sampling site on the Murray River at Pinjarra Road (614065) is one of three long-term monitoring sites within the Peel-Harvey catchment. Nutrients have been monitored at the site since 1983 (except for 1994 and 1995) and flow since 1992. The Murray River flows year-round with river height varying by more than 4 m in some years (e.g. 2009).

Much of the catchment lies on the Darling Plateau where the soils are mostly ironstone gravel with hard acidic red or yellow soils, although to the west, sandy acidic yellow mottled soils dominate. The catchment is not subject to seasonal inundation and only a small percentage has a high or very high risk of phosphorus leaching to waterways (7.5%).

To the east of the Darling Scarp the catchment is relatively undisturbed. West of the scarp the land has been cleared, mostly for agriculture such as stock grazing, as well as for plantations). Industrial land uses within the catchment include roads, railways and the southern end of Alcoa’s alumina refinery. Most of the refinery is located in the lower Murray catchment to the north.

In 2014 the Murray River had the lowest median TN and TP concentrations of all the 13 sites sampled in the Peel-Harvey catchment.

Nutrient summary: median concentrations, loads and status classification at 614065

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</thead>
<tbody>
<tr>
<td>Annual flow (GL)</td>
<td>81</td>
<td>184</td>
<td>293</td>
<td>244</td>
<td>334</td>
<td>85</td>
<td>228</td>
<td>237</td>
<td>314</td>
<td>61</td>
<td>189</td>
<td>109</td>
<td>173</td>
<td>153</td>
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<tr>
<td>TN median (mg/L)</td>
<td>0.45</td>
<td>0.45</td>
<td>0.51</td>
<td>0.32</td>
<td>0.39</td>
<td>0.35</td>
<td>0.67</td>
<td>0.53</td>
<td>0.49</td>
<td>0.54</td>
<td>0.74</td>
<td>0.49</td>
<td>0.59</td>
<td>0.57</td>
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<tr>
<td>TP median (mg/L)</td>
<td>0.015</td>
<td>0.021</td>
<td>0.017</td>
<td>0.017</td>
<td>0.019</td>
<td>0.014</td>
<td>0.015</td>
<td>0.019</td>
<td>0.014</td>
<td>0.016</td>
<td>0.022</td>
<td>0.009</td>
<td>0.010</td>
<td>0.014</td>
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<tr>
<td>TN load (t/yr)</td>
<td>50</td>
<td>161</td>
<td>308</td>
<td>255</td>
<td>347</td>
<td>57</td>
<td>229</td>
<td>261</td>
<td>389</td>
<td>34</td>
<td>196</td>
<td>75</td>
<td>159</td>
<td>130</td>
</tr>
<tr>
<td>TP load (t/yr)</td>
<td>1.3</td>
<td>4.0</td>
<td>7.5</td>
<td>5.9</td>
<td>8.6</td>
<td>1.4</td>
<td>5.5</td>
<td>6.3</td>
<td>9.1</td>
<td>0.93</td>
<td>4.5</td>
<td>1.8</td>
<td>3.8</td>
<td>3.1</td>
</tr>
</tbody>
</table>

Status classification:
- Green = Low
- Yellow = Moderate
- Orange = High
- Pink = Very high

Status reported for three-year period end (i.e. 2012–14 reported in 2014)

TN = total nitrogen    TP = total phosphorus
DIN is also derived from animal wastes and fertilisers but is readily available to plants and algae.

The sampling site on the Murray River had the third-highest percentage of DIN and equal second-highest NO\textsubscript{x} of the 13 sites routinely sampled in the Peel-Harvey catchment, and highest of those flowing to the Peel Inlet. However, in 2014 this site also had the lowest median TN concentration of all the sites sampled.

TP concentration:

Between 2001 and 2014 only 2% of TP samples exceeded the ANZECC\textsuperscript{3} guideline for lowland rivers (0.065 mg/L). In the years with exceedances (2002, 2005 and 2014), only one or two samples had concentrations greater than 0.065 mg/L.

TP trend:

Trend analysis\textsuperscript{2} was not undertaken between 2010 and 2014 as the data appears to show a decrease in concentrations in 2012 before increasing again.

Five years of continuously increasing, decreasing or consistent concentrations are needed to calculate a trend.

Nutrient fractions (2010–14) at 614065

Nitrogen:

Most of the nitrogen (N) was organic in nature. Organic N consists of both dissolved organic and particulate N. It is derived from degrading plant and animal matter and fertilisers. It often needs to be further broken down before it can be used by plants and algae.

The remaining N was dissolved inorganic N (DIN) such as ammonium (NH\textsubscript{4}\textsuperscript{+}) and N oxides (NO\textsubscript{x}).

Phosphorus:

Just under two-thirds of the phosphorus (P) was present as particulate P, which consists of sediment-bound forms of P and organic waste materials.

Particulate P is not readily available for uptake by plants and algae, but may become available over time as organic matter decomposes or soil particles release bound P.

The remaining P was present as soluble reactive phosphorus (SRP). SRP is derived from fertilisers and animal wastes and is readily available for uptake by plants and algae.

The sampling site had the second-lowest percentage of SRP of the seven routine sampling sites flowing to the Peel Inlet. It also had the lowest median TP concentration of the 13 sites sampled in the Peel-Harvey catchment in 2014.
Average monthly TN and NOx concentrations did not exceed ANZECC guidelines, with NOx concentrations exceeding the guideline from the first flush in May, throughout winter (June–August) and in December with an increase in flow. NO3 concentrations increased with flow, possibly due to excess fertilisers and animal wastes being mobilised and flushed into the system.

TN concentrations exceeded ANZECC3 guidelines during July. NH4+ did not exceed guideline concentrations.

Phosphorus: Average monthly phosphorus concentrations were low throughout the year with average particulate P concentrations being greater than SRP each month. Phosphorus was present mostly as particulate P throughout the year with a slight increase in SRP during winter.

Murray River – estuarine water quality

Water quality along the estuarine section of the Murray River was monitored at three sites between 2001 and 2014. Annual surface median TN concentrations rarely exceeded the ANZECC3 guidelines for estuarine waters (0.75 mg/L). However, annual surface median TP concentrations rarely fell below the guidelines (0.03 mg/L).

Most of the nitrogen present was organic however DIN concentrations increased substantially with winter flows. Between 2001 and 2014, 17 fish death incidents were reported in the Murray River’s estuarine reaches. One event involved 2000 bream (2010). Most deaths were attributed to algal blooms, scum events or low oxygen conditions following storms. On a few occasions ichthyotoxic dinoflagellates were responsible for the deaths. 


Murray River: Nutrient report 2015
How the Middle Murray River fits within the Peel-Harvey catchment: location and statistics

Total nitrogen (TN) classification

Legend

Low
Moderate
High
Very high

2010–14 TN trend

Emerging increase
Emerging decrease

2012–14 TN classification

Km

Total phosphorus (TP) classification

Legend

Low
Moderate
High
Very high

2010–14 TP trend

Emerging increase
Decreasing trend

2012–14 TP classification

Km

References


www.water.wa.gov.au For further information please contact the Water Science Branch, Department of Water catchmentnutrients@water.wa.gov.au

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