

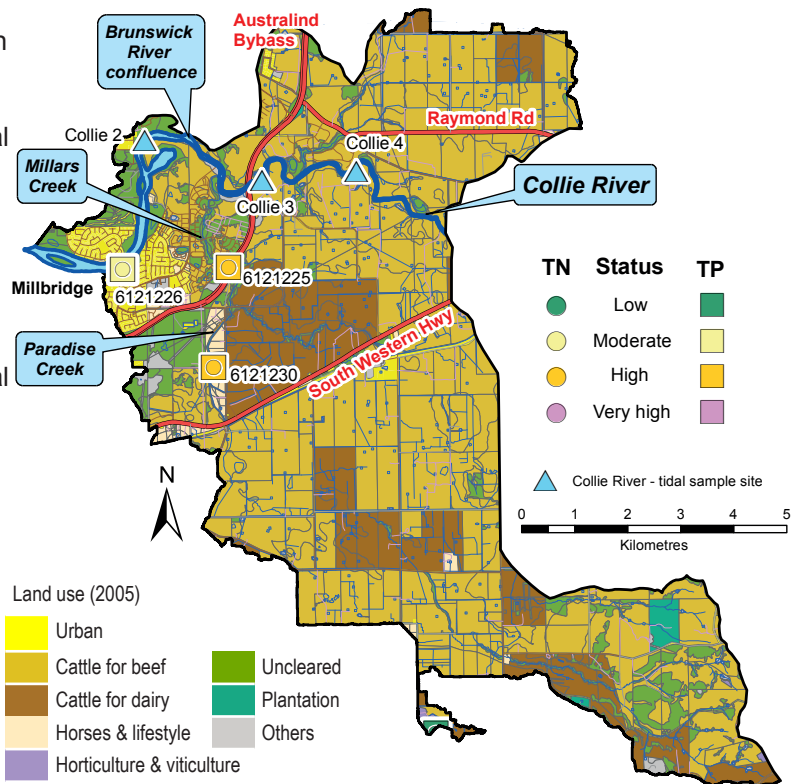


Tidal Collie River

The tidal Collie River catchment lies on the Swan Coastal Plain. The Brunswick River enters from the north while Millars Creek and Paradise Creek drain much of the south of the catchment. Most of the land has been cleared for agriculture (e.g. stock grazing) and residential developments.

In 2006 water quality monitoring commenced at Hands Creek (sampling site 6121226), an outlet from the urban development of Eaton, and Millars Creek (sampling site 6121225), downstream of its confluence with Paradise Creek. In 2007 sampling started in Paradise Creek (sampling site 6121230), located in the Hynes Road rural residential area between South Western Highway and the Forrest Highway. Only Millars Creek was sampled in 2009. As of mid-2012 nutrient sampling stopped at all three sites when funding ceased.

Three tidal sites within the Collie River were sampled as part of the Leschenault Estuary monitoring program. Collie 2 is downstream of the Collie River's confluence with the Brunswick River while Collie 4 (to June 2010) and Collie 3 (from July 2010) are upstream of Millars Creek. Detailed results will be presented elsewhere however, between 2007–11, a greater percentage of surface concentrations exceeded ANZECC 2000 guidelines for the protection of estuarine systems downstream of Millars Creek than upstream during the dry season (October–May).



Performance against targets

TN concentrations failed the water quality target at both Hands Creek (2006–08) and Millars Creek (2009–11) while TP concentrations passed. There was not enough data to test for compliance at Paradise Creek (sampling site 6121230).

The tidal Collie River catchment falls within the Collie Lower 1 catchment reported in the *Leschenault Estuary water quality improvement plan (WQIP)*. The entire Collie Lower 1 catchment is, however, twice as large as the tidal Collie River catchment. The WQIP reports the Collie Lower 1 catchment as a recovery catchment as modelled winter TN and TP concentrations failed the targets (1998–2007).

2007–11 (October–May)	Collie 2	Collie 3–4
Total nitrogen (TN) > 0.75 mg/L	49%	6.2%
Total phosphorus (TP) > 0.03 mg/L	89%	28%

Status and trends

Millars Creek and Paradise Creek had a high nutrient status for both TN and TP, while Hands Creek had a moderate status (2009–11).

Millars Creek was the only site with enough data to test for trends. There was no trend in TN concentration however an emerging increasing trend in TP concentration (0.015 mg/L/year) was detected (2007–11).

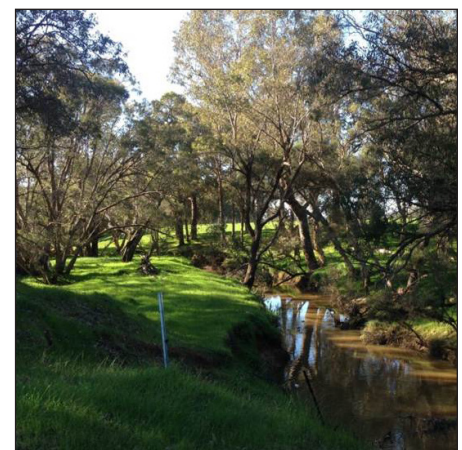
Annual concentrations, flow and target performance

	Site	2006	2007	2008	2009	2010	2011
TN median (mg/L)	6121226	1.1	1.3	1.7		1.2	0.91
	6121225	1.1	1.8	1.6	1.6	1.4	1.7
	6121230		2.0	2.4		1.8	2.1
TP median (mg/L)	6121226	0.03	0.02	0.02		0.03	0.03
	6121225	0.11	0.08	0.10	0.12*	0.09	0.15*
	6121230		0.21	0.17		0.11	0.14

insufficient data to test target passing target failing target

TN concentration target = 1.0 mg/L TP concentration target = 0.10 mg/L

* 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.



Modelled nutrient loads (1998–2007)

The Collie Lower 1 catchment (which includes the tidal Collie River catchment) had the second-largest nutrient loads within the Leschenault catchment. There was an average of 56 tonnes of nitrogen and 6.5 tonnes of phosphorous exported from the catchment each year.

The nutrient loads in the Collie Lower 1 catchment came from two main sources - cattle for beef and cattle for dairy. These two land uses accounted for 61% of the area, 75% of the nitrogen and 71% of the phosphorus load.

Within the catchment cattle for beef occupied approximately five times the area of cattle for dairy however only exported approximately twice as much nitrogen and phosphorus. Septics, urban and dairy sheds contributed 19% of the nitrogen and 25% of the phosphorus load.

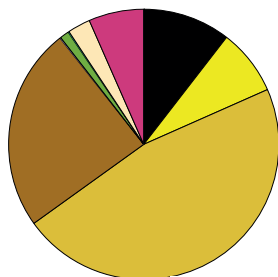
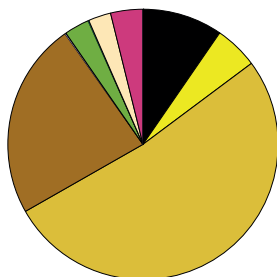
To achieve water quality targets a 35% reduction in nitrogen load and a 46% reduction in phosphorus load is required.

Nitrogen

annual load = 56 tonnes
load reduction target = 35%

Phosphorus

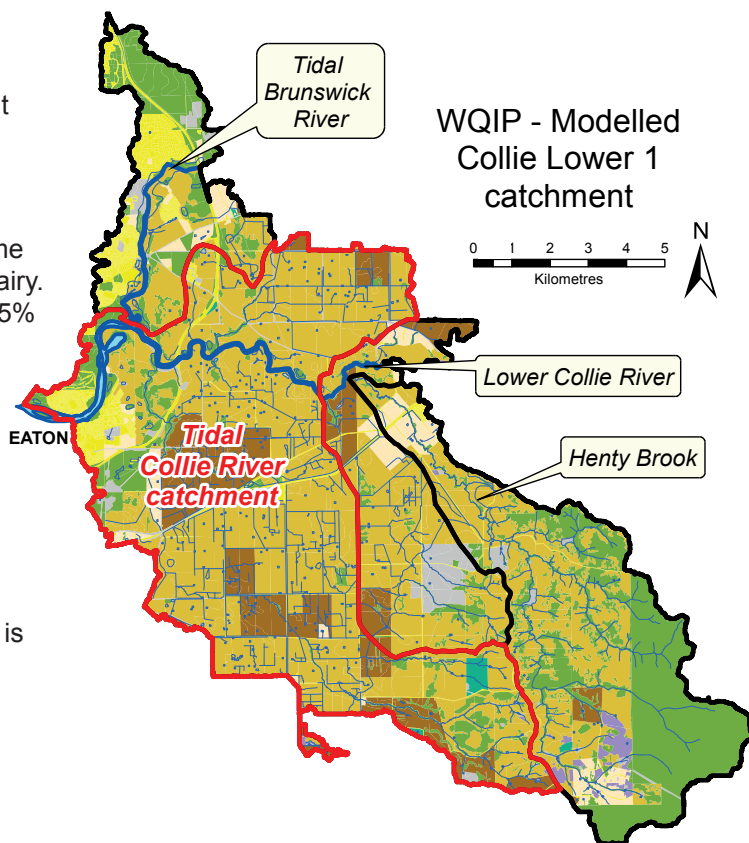
annual load = 6.5 tonnes
load reduction target = 46%



The Leschenault Estuary water quality improvement plan (WQIP)

The WQIP outlines a range of management actions which have the potential to improve water quality and prevent further decline. These fall under the following categories:

- Nutrient and contaminant reduction.
- Environmental water management.
- Assess condition and measure progress.



Nutrient reduction strategies

The best management practices (BMPs) that will result in improved water quality in the Collie Lower 1 catchment in descending order of effectiveness for N and P are as follows:

Nitrogen reduction

1. Riparian zone restoration and creation of buffers (includes removal of stock from waterways).
2. Improved septic systems or removal of septic.
3. Dairy effluent management.
4. Improved fertiliser management.

Phosphorus reduction

1. Soil amendments (when available).
2. Use of slow release phosphorus fertiliser (when available).
3. Improved septic systems or removal of septic.
4. Improved fertiliser management.

Key messages

- The Collie Lower 1 catchment had the second-largest nutrient load in the Leschenault catchment.
- An emerging increasing TP trend was detected in Millars Creek.
- Both Millars Creek and Hands Creek failed the TN target.
- The TN and TP status classifications were moderate at Hands Creek.
- High TN and TP concentrations in Paradise Creek are possibly being diluted by Millars Creek before entering the Collie River.
- Fencing stock from waterways, revegetating the riparian zone and using approved soil amendments are the best methods for reducing nitrogen and phosphorus concentrations and improving water quality.