Claise Brook

Claise Brook was first named in 1827 (as Clause's Brook) after the naval surgeon, Frederick Clause who was present on Captain James Stirling's expedition of the Swan River. It was a seasonal waterway, typically dry in summer and flowing in winter with numerous interconnected freshwater lakes which drained to the Swan Estuary. During the 1800s land was reclaimed from the feeder lakes, enabling the development of East Perth. The drain now consists almost exclusively of closed pipes with the Hyde Park lakes being the largest area of open water.

During the late 1880s to early 1900s the brook was used as the main effluent outlet of Perth. Historical landuses in the area include the East Perth Gasworks, East Perth Power Station and East Perth railway yards and workshops, these have all since ceased. In the 1990s it was determined that the East Perth Gasworks site and adjacent waterways were extensively contaminated. Large scale remediation was undertaken in 1994–95.

The predominant soil types in Claise Brook Main Drain are Spearwood Sands with a small area of Bassendean Sands in the north-western corner and neutral red and yellow earths near the Swan Estuary. Most of the soils in the catchment have poor nutrient-retention capacities.

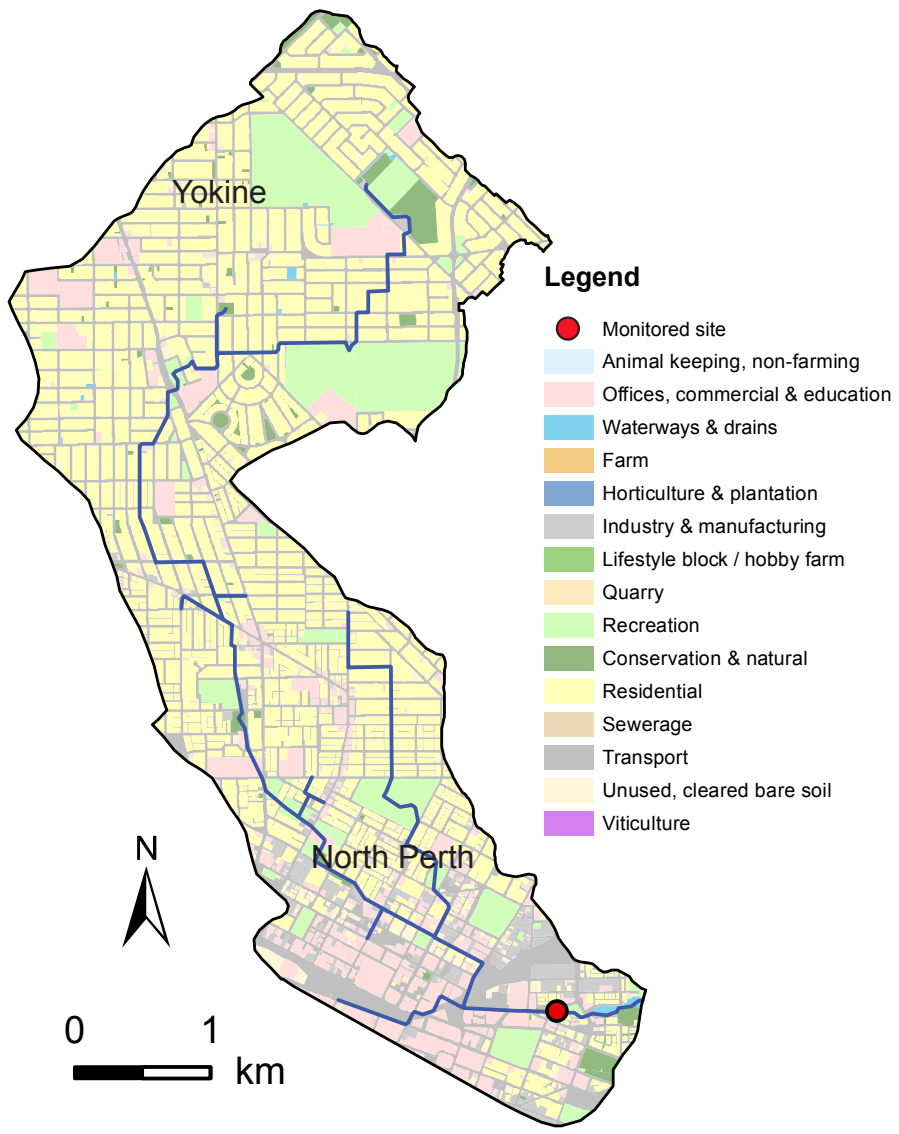
Water quality samples are collected fortnightly near the discharge point of the drain into the Swan Estuary. This site gives an indication of the nutrient concentrations leaving the catchment and entering the estuary. It does not represent nutrient concentrations in upstream areas.

Claise Brook – facts and figures

Average rainfall (2012–16)	~ 680 mm per year (Perth metro)
Catchment area	16 km^2
Per cent cleared area (2005)	98%
River flow	Dries intermittently throughout the year No major water supply dams in catchment
Main land uses (2005)	Residential and transport (roads)

Houses in Claisebrook Cove, March 2010.

Revegetated urban wetland in Dog Swamp Reserve, August 2010.



Nutrient Summary: concentrations, rainfall and targets

Year	Site	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Annual rainfall (mm)	009225	466.8	703.0	807.8	607.2	503.8	860.8	608.2	782.4	674.4	617.8	715.8
TN median (mg/L)	CB13						1.40	1.40	1.40	1.40	1.20	1.20
TP median (mg/L)	CB13						0.035	0.029	0.047	0.045	0.053	0.045

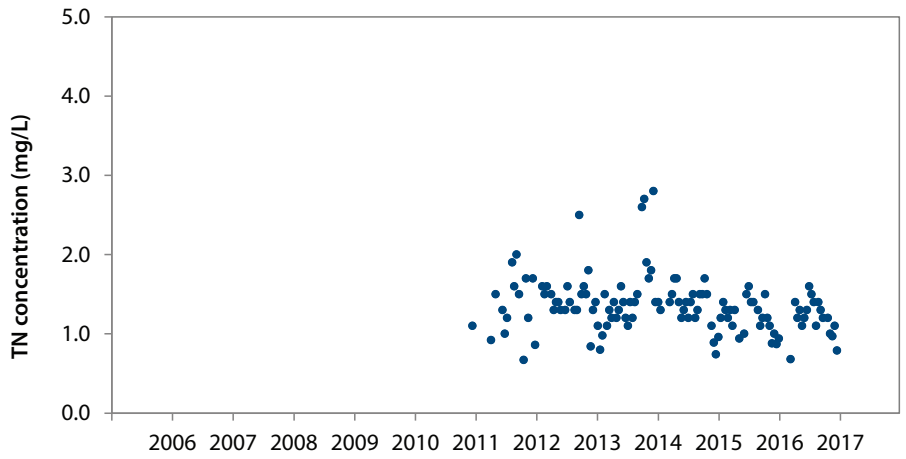
TN short term target = 2.0 mg/L TN long term target = 1.0 mg/L TP short term target = 0.2 mg/L TP long term target = 0.1 mg/L

insufficient data to test target failing both short and long-term target passing short but failing long-term target passing both short and long-term target

* 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 Claise Brook

Total nitrogen concentrations over the 2006 to 2016 monitoring period



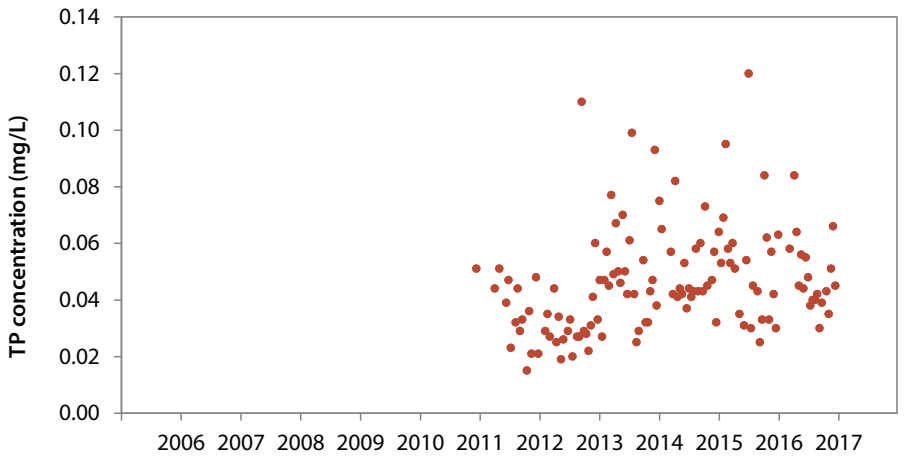
Trend

Total nitrogen (TN) concentrations appear to have decreased slightly. Trend testing detected a slight emerging decreasing trend of 0.06 mg/L/yr over the 2012–16 period. The occasional high concentrations consisted mostly of dissolved forms of N and may indicate the presence of a point source in the catchment.

Target

Claise Brook has been passing the short-term but failing the long-term TN targets since monitoring commenced.

Total phosphorus concentrations over the 2006 to 2016 monitoring period



Trend

Visually total phosphorus (TP) concentrations have increased over the reporting period. This was verified by trend testing which detected a small increasing trend of 0.003 mg/L/yr over the 2011–16 period.

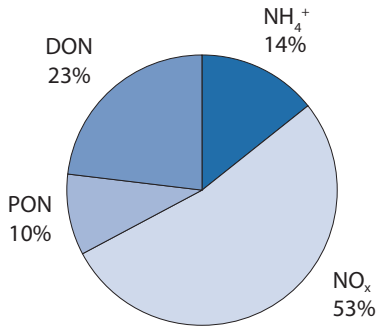
Target

Claise Brook has been passing both the short- and long-term TP targets since monitoring commenced.

Dog Swamp Reserve, August 2010

Nutrient fractions in Claise Brook

Average composition of nitrogen (N) in Claise Brook over the 2012 to 2016 monitoring period

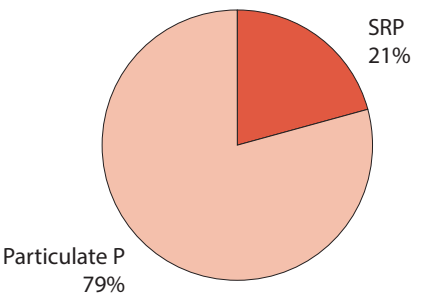


Nitrogen

About two-thirds of the N was present as dissolved inorganic N (DIN, consisting of ammonium - NH_4^+ and N oxides - NO_x). This form of N is derived from fertilisers used on home gardens and parks, industrial discharges and animal wastes and is readily available for plant and algal uptake. The remaining N 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.

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

Average composition of phosphorus (P) in Claise Brook over the 2012 to 2016 monitoring period



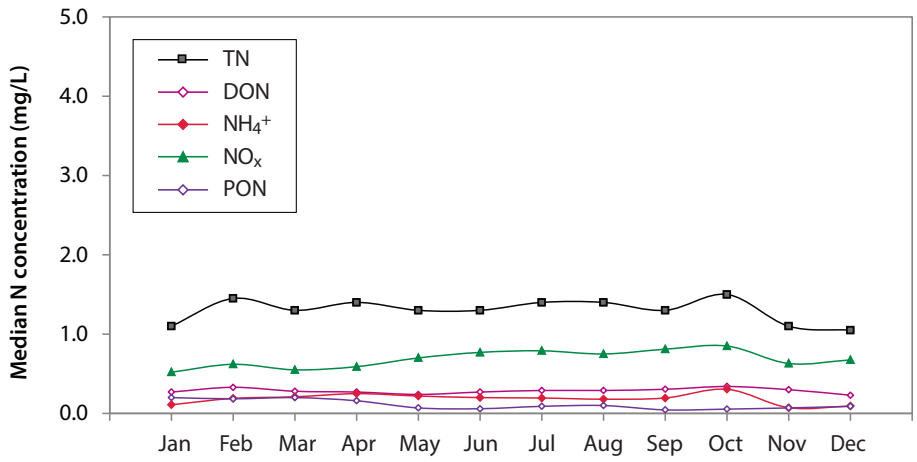
Phosphorus

Over three-quarters of the phosphorus (P) was present in the form of particulate P which is derived from organic material and sediment-bound forms of P. This form of P is not readily available for use by plants or algae, but may be broken down to available forms over time. The remainder of the P was present as soluble reactive phosphorus (SRP) which is readily available for plant and algal uptake. Likely sources of this form of P are fertilisers used on home gardens and parklands, animal waste and industrial discharge.

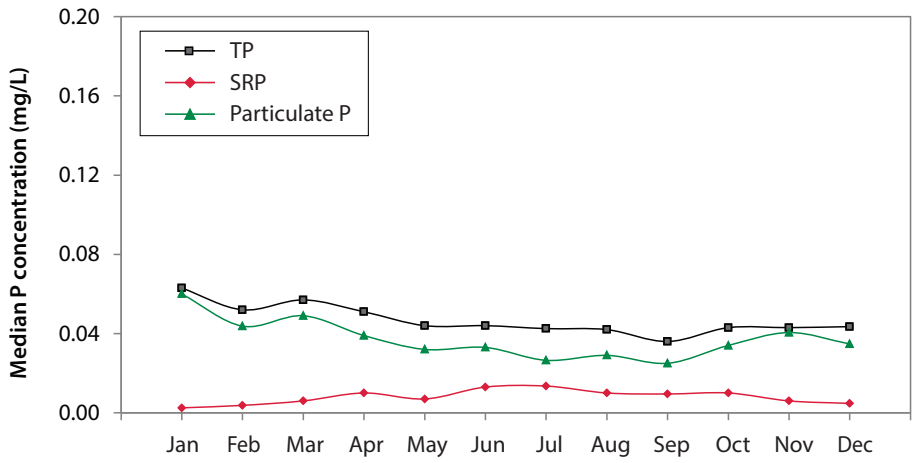
There were no flow data for Claise Brook so loads have not been calculated.

Seasonal variation in nutrient concentrations in Claise Brook

Nitrogen seasonal variation over the 2012 to 2016 monitoring period



Phosphorus seasonal variation over the 2012 to 2016 monitoring period



Nitrogen

Total N and NO_x increased slightly from March to October indicating that there may be a very weak seasonal response with concentrations increasing with increased flow following the onset of winter rainfall.

The other forms of N did not show a seasonal response.

It is likely that N was entering the drain from land use in the catchment (such as fertilisers and industrial discharges) year round.

Stormwater treatment in drainline at Robertson Park, August 2010.

Phosphorus

Soluble reactive P concentrations showed a slight seasonal pattern, increasing over winter when rainfall and flow were at their highest. This suggests that SRP was entering the drain via surface and sub-surface flows.

Particulate P and TP showed a reverse seasonal response, being higher in summer and lower in winter. It is likely that the concentrations of these forms of phosphorus were being diluted by the increased flows during winter. Also, algae and aquatic plants probably contributed a large portion of the particulate P, especially in the warmer months.

Yokine Reserve in the Claise Brook catchment, August 2010.

Photo: Emma van Looij

Photo: Water Science Branch

Photo: Emma van Looij

Photographs of Claise Brook: (Top left) Treatment train in Hyde Park. This is designed to strip nutrients and sediments from stormwater entering the lake, July 2015. (Bottom left) The Claise Brook sampling site is at the footbridge in the centre of this photograph, August 2010. (Right) Hyde Park lake, the fountain is to increase water circulation and improve oxygen levels, July 2015.

Local nutrient reduction strategies for Claise Brook

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

- The Claise Brook Catchment Group (CBCG) work to restore wetlands for habitat and to improve the quality of water flowing into the Swan River from Perth City and inner-city areas. The CBCG holds monthly working bees and community plantings in winter. In the past few years, the CBCG have been working on rehabilitating Hamilton Lakes and Robertson Park.
- The City of Vincent being awarded Platinum Waterwise Council status.
- The city of Vincent hosting local native plant sales. The City provides subsidised local native plants to residents in the Claise Brook catchment.
- The City of Vincent's Adopt a Verge program which helps residents to create native gardens out of their verges. This program has many benefits to the local catchment including the greening of local streets, increasing local infiltration of stormwater, increasing and fostering local biodiversity, establishing biodiversity corridors, and reducing fertiliser and water use.
- The Department of Biodiversity, Conservation and Attractions 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.
- 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 Claise Brook

	Max. acceptable load (t/yr)	Concentration target (mg/L)	% reduction required
TN	1.3	0.5	72%
TP	0.3	0.05	0%

For further information on the SCWQIP contact:
rivers.info@dbca.wa.gov.au

Jetty in Claisebrook Cove. March 2010.

Summary: Claise Brook

- Claise Brook is passing the short-term TN target as well as the short- and long-term TP targets.
- Of the 33 sites sampled, Claise Brook has the highest percentage of N present as bioavailable DIN but the lowest percentage of P present as bioavailable SRP.
- Claise Brook requires a 72% reduction in TN to achieve the SCWQIP target.
- P loads are currently considered acceptable by the SCWQIP and no reduction is required.

www.dwer.wa.gov.au
www.dbca.wa.gov.au

For further information please contact the
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