



## Water Quality Report Card 2019

### Recreational use water quality

Water quality for recreational use at the six sampling locations was considered suitable for swimming most of the time. However, the water may be susceptible to pollution from potential sources of faecal contamination occasionally.

### Aquatic health water quality

Chlorophyll a was graded from good to very good, and turbidity was graded fair to very good throughout the estuary. Other supporting water quality indicators were also sampled but not graded. These results are displayed on the back page.

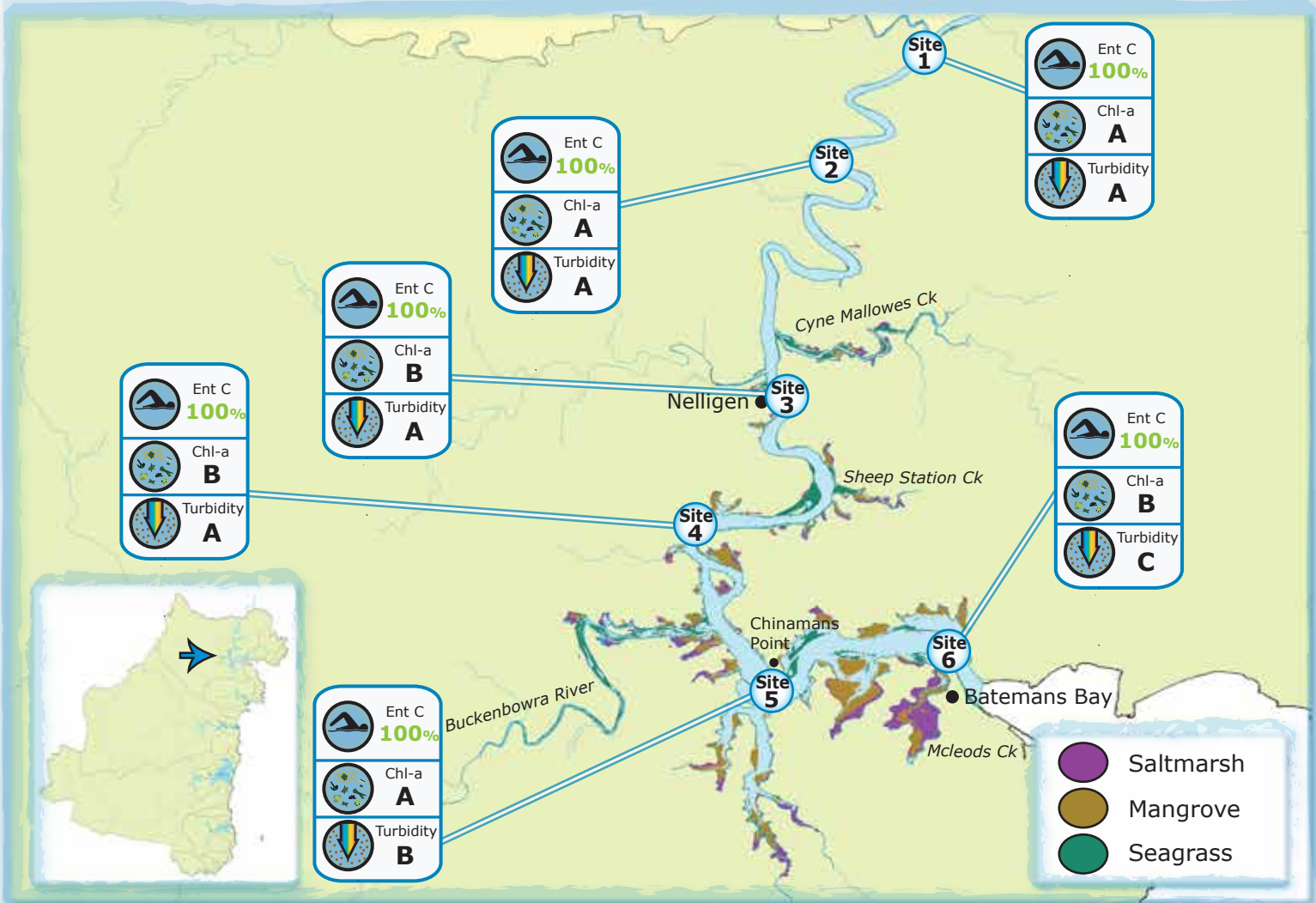
These grades provide an insight into the water quality of Clyde River assessed by Council for the year 2019. Future monitoring will enable us to track how well we are managing the water quality of the River, as well as help determine management actions to improve water quality.

For more detailed information about Council's sampling program, please refer to the accompanying technical report on Council's website.

### Estuary information

Catchment area (km <sup>2</sup> ):	1722.9
Estuary area (km <sup>2</sup> ):	17.5
Estuary volume (MI):	50736.6
Entrance:	Permanently open
Average Yearly Rainfall:	993.5mm
(Stn No:069052) 2019:	480mm (total)
Land Use (Area):	Urban: 0.5%
(2005 data)	Forest: 95.7%
	Rural: 3.3%
	Other: 0.5%

### Water quality grades



## Clyde River Recreational Use Water Quality



### Enterococci Coliform Indicator

Percentage number of samples within guideline values



The density of enterococci coliform units has been used as a suitability indicator for recreational use such as swimming. This measure has been used as studies have shown a direct relationship between the density of enterococci and the risk of gastrointestinal illness associated with swimming in the water. Where the density of enterococci is high, this indicates the water has been contaminated with faecal material from human and/or animal sources (e.g. sewerage overflows, livestock manure).

The chart to the left indicates the percentage of samples that fall within specific categories determined by the National Health and Medical Research Council guidelines. **Green** indicates enterococci levels are safe for bathing. **Light Green** indicates an increased risk of illness to bathers, particularly those with lower immune function such as the elderly and young children. Both **Orange** and **Red** indicate enterococci levels pose a substantially increased risk of illness to bathers.

## Clyde River Aquatic Health Water Quality



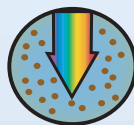
### Chlorophyll a Indicator

Percentage number of samples within guideline values



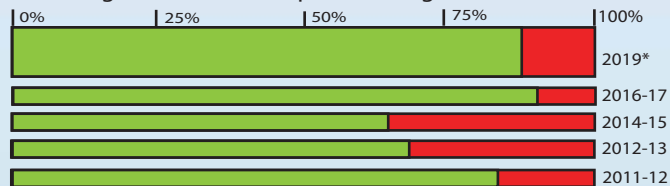
**Chlorophyll a** is a measure of the microscopic algae biomass in the water and is an important indicator of water quality. Having the right amount of microscopic algae is extremely important, as it is a major food source for many species. Excessive input of nutrients from catchment runoff (urban stormwater, agricultural runoff, and sewage overflows) can increase chlorophyll a levels however, leading to algal blooms and detrimental effects on estuarine plants and animals. To the left **Green** indicates the percentage of samples that lie within the acceptable NSW Monitoring, Evaluation and Reporting guideline values.

(\*Note: Chlorophyll-a guideline trigger values were updated in 2019)



### Turbidity Indicator

Percentage number of samples within guideline values



**Turbidity** is a measure of light scattered by suspended particles such as sediment, algae and dissolved material in the water which affect its colour or murkiness. Turbidity can increase from sediments transported in catchment runoff (particularly after heavy rainfall), shoreline erosion and increased microscopic algae. Having low turbidity levels in the estuary is important for the growth and survival of seagrasses, fish and other organisms. To the left **Green** indicates the percentage of samples that lie within the NSW Monitoring, Evaluation and Reporting guideline values.

(\*Note: Turbidity guideline trigger values were updated in 2019)



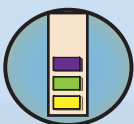
### Dissolved Oxygen Indicator

Percentage number of samples within guideline values



**Dissolved oxygen (DO)** is an indicator of how much oxygen is dissolved in the water. Nearly all aquatic animals and most aquatic plants require adequate levels of dissolved oxygen in the water to survive. Low DO levels are often a result of excess organic matter in the water, which can be from sewerage, agricultural runoff, and plant material including leaves and lawn clippings. It is the decomposition of this organic matter by microbes that uses up available DO. While fluctuation in DO is a natural process, excess organic matter has a major influence on DO levels in the estuary. To the left **Green** indicates the percentage of samples that lie within the acceptable ANZECC Water Quality guideline values.

(\*Note: DO guideline trigger values were updated in 2019)



### pH Indicator

Percentage number of samples within guideline values



**pH** also provides an indicator of water quality, and is a measure of the acidity or alkalinity of the water on a scale from 0 (extremely acidic) to 7 (neutral), through to 14 (extremely alkaline). Water with extremely high or low pH is lethal, and a pH below 4 or above 10 will kill most fish and invertebrates. Although pH naturally fluctuates within an estuary, pollutants from urban runoff and agriculture such as fertilisers will have a major impact. The disturbance of acid sulphate soils can also lead to acid runoff into the estuary and harmful low pH conditions. To the left **Green** indicates the percentage of samples that lie within the acceptable ANZECC Water Quality guideline values.

(\*Note: pH guideline trigger values were updated in 2019)