



## 2019–20: Updated Cockburn Sound Environmental Quality Criteria

### Chlorophyll *a* and light attenuation coefficient

The Environmental Quality Criteria (EQC) for chlorophyll *a*, light attenuation coefficient (LAC) and phytoplankton biomass are based on ‘rolling’ percentiles and are re-calculated and updated each year using the monitoring results collected at the Warnbro Sound Reference Site (WS4). The updated EQC are calculated from a database of approximately 100 values. The 2019–20 EQC were calculated using data from the 2019–20 summer and the five previous summers.

For the 2019–20 non river-flow period, the chlorophyll *a* and light attenuation coefficient annual medians at WS4 were between their respective historical ranges (Table 1). The 2019–20 data were therefore included in the re-calculation of the Environmental Quality Guidelines (EQG) (Table 2).

**Table 1. Assessment of the 2019–20 chlorophyll *a* concentration and light attenuation coefficient (LAC) medians against the 20<sup>th</sup> and 80<sup>th</sup> percentiles of the WS4 historical dataset**

	Chlorophyll <i>a</i> (micrograms per litre [µg/L])	LAC (log <sub>10</sub> m <sup>-1</sup> )
Historical dataset 20 <sup>th</sup> percentile	0.400	0.067
Historical dataset 80 <sup>th</sup> percentile	0.900	0.091
2019–20 median	0.600	0.080
<b>Assessment</b>	Met criteria specified in the <i>Environmental Quality Criteria Reference Document for Cockburn Sound</i> (EPA 2017)	Met criteria specified in the <i>Environmental Quality Criteria Reference Document for Cockburn Sound</i> (EPA 2017)
	2019–20 data included in the 2019–20 EQG calculations	

**Table 2. The 2019–20 high protection and moderate protection EQG for chlorophyll *a* concentration and light attenuation coefficient (LAC)**

Indicator	High protection rolling six-year 80 <sup>th</sup> percentile	Moderate protection rolling six-year 95 <sup>th</sup> percentile
Chlorophyll <i>a</i> (µg/L)	1.000	1.500
LAC (log <sub>10</sub> m <sup>-1</sup> )	0.097	0.115

## Phytoplankton biomass

The re-calculated EQC for phytoplankton biomass are presented in Table 3.

**Table 3. The 2019–20 high protection and moderate protection EQC for phytoplankton biomass**

	High protection rolling six-year median	Moderate protection rolling six-year 80 <sup>th</sup> percentile
Chlorophyll a (µg/L)	0.70	1.00
Conversion factor <sup>1</sup>	x 3	x 3
EQG	2.10	3.00

**Table 3 note:** The *Environmental Quality Criteria Reference Document for Cockburn Sound* (EPA 2017) sets out that the EQC is three times the median chlorophyll a concentration of the reference site for high ecological protection areas, and three times the 80<sup>th</sup> percentile of chlorophyll a concentrations at the reference site for moderate ecological protection areas.

## Seagrass shoot density

The Environmental Quality Standards (EQS) for *Posidonia sinuosa* shoot density are based on 'rolling' four-year percentiles and are re-calculated and updated each year using the monitoring results for each monitored depth at WS4. The EQS for each depth are presented in Table 4.

**Table 4. The 2020 high protection and moderate protection EQS for seagrass shoot density**

Reference site	Number of quadrats	Rolling four-year 20 <sup>th</sup> percentiles of seagrass shoot density (shoots/m <sup>2</sup> )	Rolling four-year 5 <sup>th</sup> percentiles of seagrass shoot density (shoots/m <sup>2</sup> )	Rolling four-year 1 <sup>st</sup> percentiles of seagrass shoot density (shoots/m <sup>2</sup> )
Wambro Sound 2.0 m	2	720	686	677
Wambro Sound 2.5 m	92	480	183	25
Wambro Sound 3.2 m	49	165	25	25
Wambro Sound 5.2 m	96	350	225	195
Wambro Sound 7.0 m	92	200	89	48

Notes:

- (1) Quadrats have been lost at some sites due to sediment scouring. A reduced number of quadrats were therefore used to calculate the 'rolling' four-year percentiles.
- (2) The 'rolling' four-year percentiles for Wambro Sound 3.2 m are calculated using the data from five transects.