COCKBURN SOUND MANAGEMENT COUNCIL

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 20th and 80th percentiles of the WS4 historical dataset

	Chlorophyll *a* (micrograms per litre [µg/L])	LAC (log_{10} m^{-1})
Historical dataset 20th percentile	0.400	0.067
Historical dataset 80th percentile	0.900	0.091
2019–20 median	0.600	0.080
Assessment	Met criteria specified in the *Environmental Quality Criteria Reference Document for Cockburn Sound* (EPA 2017)	Met criteria specified in the *Environmental Quality Criteria Reference Document for Cockburn Sound* (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 80th percentile	Moderate protection rolling six-year 95th percentile
Chlorophyll *a* (µg/L)	1.000	1.500
LAC (log_{10} m^{-1})	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 80th percentile
Chlorophyll *a* (µg/L)	0.70	1.00
Conversion factor	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 80th 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 20th percentiles of seagrass shoot density (shoots/m^2)	Rolling four-year 5th percentiles of seagrass shoot density (shoots/m^2)	Rolling four-year 1st percentiles of seagrass shoot density (shoots/m^2)
Warnbro Sound 2.0 m	2	720	686	677
Warnbro Sound 2.5 m	92	480	183	25
Warnbro Sound 3.2 m	49	165	25	25
Warnbro Sound 5.2 m	96	350	225	195
Warnbro 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 Warnbro Sound 3.2 m are calculated using the data from five transects.