

Appendix E

Lake Curalo ecosystem health report card from Estuary Processes Study. Based on the report card system used in State of the Marine Environment Report (SOMER, Zann 1995).

SEDIMENTS						
INDICATOR	STATE				PRESSURE	
	Current Value	Reference value	Status	Trend	Sources	Trend
Geomorphology						
Fluvial sedimentation rate	?	100 m ³ /year over last 6,500 years	C	↔	Catchment clearing for agriculture Urban development	☞ (<i>slight</i>)
Marine sedimentation rate	Flood tide delta growth when entrance open	Delta growth affected by opening regime	C	↔	More frequent artificial entrance opening	☞ (<i>slight</i>)
Extent of foreshore and riparian bank erosion	Negligible foreshore erosion	Reclamation of south and western shores for recreation and development	B	☞	Removal of vegetation, increased recreational activity, increased urban runoff	☞
Bank modification	Stormwater structures, bridge		B	↔	Urban development	☞
Sediment quality						
Toxicant levels (Arsenic, Chromium, Copper, Lead, Zinc)	no data available	Arsenic 20; Chromium 81; Copper 65; Lead 50; Zinc 200 (mg/L) ¹	?	?	Roads, agricultural chemicals	☞ (<i>slight</i>)
Total Phosphorus	no data available	<420 mg/kg non-polluted ² 420 – 650 mg/kg moderately polluted ² >650 mg/kg contaminated ² (typical in south coast estuaries)	?	?	Sewage, rural and native animals, rural and urban fertilisers, catchment and creek bank erosion	☞ (<i>slight</i>)
Total Nitrogen	no data available	<1000 mg/kg non-polluted ² 1000-2000 mg/kg moderately polluted ² >2000 mg/kg contaminated ² (typical in south coast estuaries)	?	?		☞ (<i>slight</i>)
Total Organic Carbon	no data available	No specific criteria	?	?		?

WATER						
INDICATOR	STATE				PRESSURE	
	Current Value	Reference value	Status	Trend	Sources	Trend
<i>Water flows</i>						
Tidal prism	0 – 100 x 10 ³ m ³	Lake volume ≅ 400 x 10 ³ m ³	C	↔	More frequent artificial entrance opening	↔
Environmental flows	?	No specific criteria	B	↔	Groundwater use reducing dry weather baseflow	⬇
<i>Water quality</i>						
pH	7.3 – 8.5 ³	<0.2 pH unit change, 5 – 9 ²	B	↔	Changing nutrient and algal levels, artificial entrance opening	↔
Total Nitrogen	550 µg/L ³	100 – 750 µg/L ⁴	B - C	⬇	Eutrophication, organic and inorganic pollution from elevated nutrients, contaminants and suspended solids from poor rural water quality, urban stormwater, sewage	⬇
Total Phosphorus	25 µg/L ³	10 – 100 µg/L ⁴	B	⬇		⬇
Chlorophyll <i>a</i>	0.1 – 2.4 µg/L ³	1 – 10 µg/L ⁴	B - C	⬇		⬇
Total Suspended Solids	?	<5 NTU = Low ⁴ 5 – 25 NTU = Medium ⁴ 25 – 50 NTU = High ⁴ >50 NTU = Very High ⁴ <10% change in seasonal mean NTU ²	?	↔	Sourced mainly from soil and stream bank erosion and run-off	⬇
Turbidity	0.5 – 40 (15 avg) NTU ^{3,5}		C	↔		⬇
Faecal coliforms (<i>fc</i>)	?	1° contact <150 fc/100 mL ² 2° contact <1000 fc/100 mL ² Edible seafood <14 fc/100 mL ²	?	?	Rural and native animals, urban stormwater, sewage	?
Salinity	15 - 35 g/L ³	<5% change from background levels ²	B	↔	More frequent artificial entrance opening, altered tidal prism, modified catchment runoff	↔
Potential acid sulphate soils (<i>PASS</i>)	Low	No specific criteria	B	↔	?	↔

BIOTA						
INDICATOR	STATE				PRESSURE	
	Current Value	Reference value	Status	Trend	Sources	Trend
<i>Aquatic and riparian flora</i>						
Seagrass area, composition and distribution (<i>depth limits</i>)	Area = 0.058 – 0.30 km ² ⁶ Species composition = Zostera, Ruppia, Halophila? Depth < 2m	Observation suggests depth may be shallower than comparable lakes in region	Fair → Poor	⬇	Variable distribution may be due to temporal changes in entrance conditions, water quality, nutrients loads and epiphytic and macroalgae reducing light penetration	⬇
Saltmarsh area and distribution	Area = 0.116 km ² ⁶ Includes 6 SEPP 14 Wetlands	No specific criteria but large area of regionally significant wetland	Excellent → Poor	↔	Appears to be few pressures aside from small patches of potential weed invasion. Area may be increasing due to sedimentation near mouth of Palestine Creek.	↔
Vegetation distribution and condition along tidal foreshores	50-55% dense cover ⁷ 30-35% sparse cover ⁷ 15% absent ⁷	No specific criteria. Sparse cover probably due to large amount of saltmarsh.	Fair → Poor	↔	Potential clearing/grazing pressures.	⬇
<i>Aquatic fauna</i>						
Macroinvertebrate distribution and abundance	High species richness and evenness ⁸	No specific criteria	?	?	Taxa found suggest possible oxygen depleted sediments ⁹	?
Fish distribution and abundance	34 species of commercial importance, no other information available	No specific criteria	?	?	Water quality degradation, fish passage limited by entrance conditions, damage to subtidal and intertidal habitats	?
Exotic fauna distribution and abundance (<i>known or likely to occur</i>)	17 species in far south New South Wales	No specific criteria	?	?	Almost all are unintentionally introduced species with the potential to compete/replace/exclude native species, damage local fisheries and aquaculture	?

1: ANZECC (1998)

2: ANZECC (1992)

3: EPA Data (1994-95)

4: EPA Water Quality Objectives Towamba River

5: MHL (1998)

6: West *et al.* (1985).

7: Tony Roper DLWC

8: Moverly and Hirst (in press)

9: TEL (current study)

