

## Appendix D NSW Water quality objectives for the Tuross River

| Protection Category        | Indicator  |
|----------------------------|--|
| Aquatic ecology            | <ul style="list-style-type: none"> <li>total phosphorus: 25 µg/L</li> <li>total nitrogen: 350 µg/L</li> <li>chlorophyll-<i>a</i>: 5 µg/L</li> <li>turbidity: 6–50 NTU</li> <li>(salinity) electrical conductivity: 125–2200 µS/cm</li> <li>dissolved oxygen: 85–110 per cent</li> <li>pH: 6.5–8.5</li> <li>chemical contaminants or toxicants: in accordance with Table 3.4.1 of the ANZECC 2000 Guidelines.</li> </ul>  |
| Visual amenity             | <ul style="list-style-type: none"> <li>visual clarity and colour: <ul style="list-style-type: none"> <li>natural visual clarity should not be reduced by more than 20 per cent</li> <li>natural hue of the water should not be changed by more than 10 points on the Munsell Scale</li> <li>the natural reflectance of the water should not be changed by more than 50 per cent</li> </ul> </li> <li>surface films and debris: <ul style="list-style-type: none"> <li>oils and petrochemicals should not be noticeable as a visible film on the water, nor should they be detectable by odour</li> <li>waters should be free from floating debris and litter</li> </ul> </li> <li>nuisance organisms: macrophytes, phytoplankton scums, filamentous algal mats, blue-green algae, sewage fungus and leeches should not be present in unsightly amounts.</li> </ul>   |
| Primary contact recreation | <ul style="list-style-type: none"> <li>turbidity: a 200 mm diameter black disc should be able to be sighted horizontally from a distance of more than 1.6 m (equates to approximately 6 NTU)</li> <li>faecal coliforms: <ul style="list-style-type: none"> <li>BeachWatch considers waters are unsuitable for swimming if the median faecal coliform density exceeds 150 colony forming units per 100 millilitres (cfu/100 mL) across five samples taken at regular intervals not exceeding one month, or the second highest sample contains equal to or greater than 600 faecal coliform cfu/100 mL across five samples taken at regular intervals not exceeding one month</li> <li>ANZECC 2000 Guidelines recommend a median over the bathing season of &lt; 150 faecal coliforms per 100 mL, with four out of five samples &lt;600/100 mL (minimum of five samples taken at regular intervals not exceeding one month)</li> </ul> </li> <li>Enterococci: <ul style="list-style-type: none"> <li>BeachWatch considers waters are unsuitable for swimming if the median enterococci density exceeds 35 cfu/100 mL across five samples taken at regular intervals not exceeding one month, or the second highest sample contains equal to or greater than 100 cfu/100 mL (enterococci) for five samples taken at regular intervals not exceeding one month</li> <li>ANZECC 2000 Guidelines recommend median over bathing season of &lt; 35 enterococci per 100 mL (maximum number in any one sample: 60-100 organisms/100 mL)</li> </ul> </li> <li>Protozoans: pathogenic free-living protozoans should not be present in bodies of fresh water</li> </ul> |

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|------------------------------|--|
|                              | <ul style="list-style-type: none"> <li>algae, including blue-green algae: &lt; 15 000 cells/mL</li> <li>nuisance organisms: <ul style="list-style-type: none"> <li>use visual amenity guidelines</li> <li>large numbers of midges and aquatic worms are undesirable</li> </ul> </li> <li>pH: 5.0-9.0</li> <li>temperature: 15-35 °C for prolonged exposure</li> <li>chemical contaminants: <ul style="list-style-type: none"> <li>waters containing chemicals that are either toxic or irritating to the skin or mucus membranes are unsuitable for recreation</li> <li>toxic substances should not exceed the concentrations provided in Table 5.2.3 and Table 5.2.4 of the ANZECC 2000 Guidelines</li> </ul> </li> <li>visual clarity and colour: use visual amenity guidelines</li> <li>surface films: use visual amenity guidelines.</li> </ul>  |
| Secondary contact recreation | <ul style="list-style-type: none"> <li>faecal coliforms: median bacterial content in fresh and marine waters of &lt; 1000 faecal coliform cfu/100 mL, with four out of five samples &lt; 4000 cfu/100 mL (minimum of five samples taken at regular intervals not exceeding one month)</li> <li><i>Enterococci</i>: median bacterial content in fresh and marine waters of &lt; 230 enterococci cfu/100 mL (maximum number in any one sample: 450-700 cfu/100 mL)</li> <li>algae, including blue-green algae: &lt; 15 000 cells/mL</li> <li>nuisance organisms: <ul style="list-style-type: none"> <li>use visual amenity guidelines</li> <li>large numbers of midges and aquatic worms are undesirable</li> </ul> </li> <li>chemical contaminants: <ul style="list-style-type: none"> <li>waters containing chemicals that are either toxic or irritating to the skin or mucous membranes are unsuitable for recreation</li> <li>toxic substances should not exceed values in tables 5.2.3 and 5.2.4 of the ANZECC 2000 Guidelines</li> </ul> </li> <li>visual clarity and colour: use visual amenity guidelines</li> <li>surface films: use visual amenity guidelines.</li> </ul> |
| Livestock water supply       | <ul style="list-style-type: none"> <li>algae, including blue-green algae: increasing risk to livestock health is likely when cell counts of microcystins exceed 11,500 cells/mL and/or concentrations of microcystins exceed 2.3 µg/L expressed as microcystin-LR toxicity equivalents</li> <li>salinity (electrical conductivity): recommended concentrations of total dissolved solids in drinking water for livestock are given in Table 4.3.1 of the ANZECC 2000 Guidelines</li> <li>faecal coliforms: drinking water for livestock should contain less than 100 cfu/100 mL (median value)</li> <li>chemical contaminants: <ul style="list-style-type: none"> <li>refer to Table 4.3.2 of the ANZECC 2000 Guidelines for heavy metals and metalloids in livestock drinking water</li> <li>refer to Australian Drinking Water Guidelines (NHMRC and NRMCC 2004) for information regarding pesticides and other organic contaminants, using criteria for raw drinking water.</li> </ul> </li> </ul>  |
| Irrigation water supply      | <ul style="list-style-type: none"> <li>algae, including blue-green algae: should not be visible; no more than low algal levels are desired to protect irrigation equipment</li> </ul>  |

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|------------------------|--|
|                        | <ul style="list-style-type: none"> <li>salinity (electrical conductivity): to assess the salinity and sodicity of water for irrigation use, several interactive factors must be considered including irrigation water quality, soil properties, plant salt tolerance, climate, landscape and water and soil management; for more information, refer to Chapter 4.2.4 of the ANZECC 2000 Guidelines</li> <li>faecal coliforms: trigger values for faecal coliforms in irrigation water used for food and non-food crops are provided in Table 4.2.2 of the ANZECC 2000 Guidelines</li> <li>heavy metals and metalloids: long term trigger values (LTV) and short-term trigger values (STV) for heavy metals and metalloids in irrigation water are presented in Table 4.2.10 of the ANZECC 2000 Guidelines.</li> </ul>  |
| Homestead water supply | <ul style="list-style-type: none"> <li>blue-green algae: <ul style="list-style-type: none"> <li>recommend twice weekly inspections during danger period for storages with history of algal blooms</li> <li>no guideline values are set for cyanobacteria in drinking water</li> <li>in water storages</li> <li>counts of &lt; 100 algal cells/mL are of no concern</li> <li>counts of &gt;500 algal cells/mL - increase monitoring</li> <li>counts of &gt;2000 algal cells/mL - immediate action indicated; seek expert advice</li> <li>counts of &gt;6500 algal cells/mL - seek advice from health authority</li> </ul> </li> <li>turbidity: <ul style="list-style-type: none"> <li>guideline value is 5 NTU</li> <li>&lt;1 NTU desirable for effective disinfection</li> <li>&gt;1 NTU may shield some micro-organisms from disinfection</li> </ul> </li> <li>total dissolved solids: <ul style="list-style-type: none"> <li>&lt; 500 mg/L is regarded as good quality drinking water based on taste</li> <li>500 to 1000 mg/L is acceptable based on taste</li> <li>&gt;1000 mg/L may be associated with excessive scaling, corrosion and unsatisfactory taste</li> </ul> </li> <li>faecal coliforms: <ul style="list-style-type: none"> <li>zero faecal coliforms per 100 mL (0/100 mL)</li> <li>if micro-organisms are detected in water, advice should be sought from the relevant health authority</li> </ul> </li> <li>pH: 6.5-8.5</li> <li>chemical contaminants: see Guidelines for Inorganic Chemicals in the Australian Drinking Water Guidelines (NHMRC &amp; NRMCC 2004).</li> </ul> |
| Drinking water         | <ul style="list-style-type: none"> <li>blue-green algae: <ul style="list-style-type: none"> <li>recommend twice weekly inspections during danger period for storages with history of algal blooms</li> <li>counts &gt;500 algal cells/mL – increase monitoring</li> <li>counts &lt; 2000 algal cells/mL – water may be used for potable supply</li> <li>counts &gt;2000 algal cells/mL – immediate action indicated; seek expert advice</li> <li>counts &gt;6500 algal cells/mL – seek advice from health authority</li> <li>counts &gt;15 000 algal cells/mL – may not be used for potable supply except with full water treatment, which incorporates filtration and activated carbon</li> </ul> </li> <li>turbidity: site-specific determinant</li> <li>salinity (electrical conductivity):</li> </ul>  |

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|                        | <ul style="list-style-type: none"> <li>– &lt;1500 µS/cm</li> <li>– &gt; 800 µS/cm causes a deterioration in taste</li> <li>• faecal coliforms: zero faecal coliforms per 100 mL (0/100 mL)</li> <li>• total coliforms: <ul style="list-style-type: none"> <li>– 95 per cent of samples should be zero coliforms/ 100 mL throughout the year</li> <li>– up to 10 coliform organisms may be accepted occasionally in 100 mL</li> <li>– coliform organisms should not be detected in 100 mL in any two consecutive samples</li> </ul> </li> <li>• dissolved oxygen: &gt; 6.5 mg/L (&gt; 80 per cent saturation)</li> <li>• pH: 6.5 to 8.5</li> <li>• chemical contaminants: see ANZECC 2000 Guidelines, Section 6.2.2.</li> </ul>  |
| Aquatic foods (cooked) | <ul style="list-style-type: none"> <li>• algae, including blue-green algae: no guideline is directly applicable, but toxins present in blue-green algae may accumulate in other aquatic organisms</li> <li>• faecal coliforms: <ul style="list-style-type: none"> <li>– guideline in water for shellfish: the median faecal coliform concentration should not exceed 14 MPN/100 mL; with no more than 10 per cent of the samples exceeding 43 MPN/100 mL</li> <li>– standard in edible tissue: fish destined for human consumption should not exceed a limit of 2.3 MPN <i>E. coli</i> /g of flesh with a standard plate count of 100,000 organisms/g</li> </ul> </li> <li>• toxicants (as applied to aquaculture activities): <ul style="list-style-type: none"> <li>– metals: copper – less than 5 µgm/L; mercury – less than 1 µgm/L; zinc – less than 5 µgm/L</li> <li>– organochlorines: chlordane – less than 0.004 µgm/L (saltwater production); PCBs – less than 2 µgm/L</li> </ul> </li> <li>• physicochemical indicators (as applied to aquaculture activities): <ul style="list-style-type: none"> <li>– suspended solids: less than 40 micrograms per litre (freshwater)</li> <li>– temperature: less than 2 degrees Celsius change over one hour.</li> </ul> </li> </ul> |