



Summary of water quality statistics for the Tolo Harbour WCZ in 2010

Parameter	Harbour Subzone			Buffer Subzone		Channel Subzone	
	TM2	TM3	TM4	TM5	TM6	TM7	TM8
Number of samples	12	12	12	12	12	12	12
Temperature (°C)	23.9 (16.3 - 30.7)	24.1 (16.9 - 30.4)	23.8 (16.3 - 30.3)	24.1 (17.5 - 30.7)	23.5 (16.1 - 29.7)	23.5 (16.2 - 30.0)	23.2 (16.4 - 30.4)
Salinity	30.5 (24.7 - 32.4)	31.0 (27.9 - 32.4)	31.1 (27.7 - 32.5)	31.1 (27.4 - 32.4)	31.6 (30.1 - 32.8)	31.6 (28.7 - 33.1)	32.0 (29.0 - 33.1)
Dissolved Oxygen (mg/L)	6.7 (4.5 - 8.5)	6.7 (5.1 - 8.4)	6.8 (5.0 - 8.2)	6.6 (5.4 - 8.0)	6.1 (4.1 - 7.9)	6.4 (4.9 - 7.6)	5.9 (3.4 - 7.4)
	Bottom						
	6.7 (2.8 - 8.5)	5.0 (0.2 - 7.4)	6.0 (1.5 - 7.4)	5.0 (0.1 - 7.8)	5.2 (1.4 - 7.4)	5.5 (2.4 - 9.4)	5.3 (2.8 - 7.6)
Dissolved Oxygen (% Saturation)	94 (68 - 126)	95 (73 - 125)	96 (78 - 122)	93 (80 - 120)	86 (64 - 115)	91 (76 - 105)	83 (52 - 96)
	Bottom						
	94 (43 - 119)	68 (3 - 94)	83 (23 - 107)	68 (2 - 98)	73 (21 - 109)	76 (34 - 117)	73 (42 - 106)
pH	8.0 (7.7 - 8.5)	8.1 (7.7 - 8.4)	8.1 (7.7 - 8.3)	8.1 (7.7 - 8.5)	8.0 (7.7 - 8.3)	8.1 (7.7 - 8.4)	8.0 (7.7 - 8.3)
Secchi Disc Depth (m)	2.6 (1.3 - 4.0)	2.4 (1.5 - 3.7)	2.6 (1.5 - 4.2)	2.7 (1.2 - 4.0)	2.5 (1.5 - 3.5)	2.7 (2.0 - 3.8)	3.1 (2.5 - 4.6)
Turbidity (NTU)	2.1 (0.9 - 5.9)	3.6 (1.1 - 13.1)	2.0 (0.9 - 6.7)	2.1 (0.6 - 6.5)	2.4 (1.0 - 6.5)	2.0 (0.6 - 6.9)	2.5 (0.9 - 7.1)
Suspended Solids (mg/L)	1.9 (0.9 - 3.3)	2.1 (0.8 - 4.3)	1.7 (0.5 - 2.7)	1.6 (0.8 - 3.2)	2.2 (1.0 - 5.4)	1.5 (<0.5 - 2.9)	1.8 (0.9 - 3.6)
5-day Biochemical Oxygen Demand (mg/L)	1.7 (0.8 - 2.6)	1.9 (0.8 - 3.0)	1.6 (0.6 - 2.3)	1.7 (0.6 - 2.3)	1.3 (0.8 - 2.6)	1.3 (0.6 - 2.0)	0.8 (0.5 - 1.4)
Ammonia Nitrogen (mg/L)	0.049 (0.014 - 0.115)	0.046 (0.015 - 0.113)	0.039 (0.008 - 0.103)	0.039 (0.010 - 0.090)	0.039 (0.019 - 0.070)	0.028 (0.009 - 0.067)	0.032 (0.009 - 0.053)
Unionised Ammonia (mg/L)	0.002 (<0.001 - 0.006)	0.003 (<0.001 - 0.007)	0.002 (<0.001 - 0.005)	0.002 (<0.001 - 0.005)	0.002 (<0.001 - 0.010)	0.001 (<0.001 - 0.005)	0.001 (<0.001 - 0.004)
Nitrite Nitrogen (mg/L)	0.005 (<0.002 - 0.019)	0.004 (<0.002 - 0.015)	0.004 (<0.002 - 0.019)	0.003 (<0.002 - 0.007)	0.007 (<0.002 - 0.021)	0.005 (<0.002 - 0.020)	0.011 (<0.002 - 0.029)
Nitrate Nitrogen (mg/L)	0.026 (<0.002 - 0.060)	0.014 (<0.002 - 0.055)	0.014 (<0.002 - 0.057)	0.012 (<0.002 - 0.041)	0.013 (<0.002 - 0.051)	0.012 (<0.002 - 0.050)	0.016 (0.003 - 0.054)
Total Inorganic Nitrogen (mg/L)	0.08 (0.02 - 0.15)	0.06 (0.02 - 0.15)	0.06 (0.01 - 0.13)	0.05 (0.01 - 0.14)	0.06 (0.03 - 0.11)	0.05 (0.01 - 0.11)	0.06 (0.03 - 0.10)
Total Kjeldahl Nitrogen (mg/L)	0.24 (0.17 - 0.32)	0.25 (0.17 - 0.35)	0.23 (0.13 - 0.34)	0.21 (0.12 - 0.30)	0.22 (0.14 - 0.32)	0.19 (0.12 - 0.27)	0.17 (0.11 - 0.23)
Total Nitrogen (mg/L)	0.27 (0.17 - 0.33)	0.26 (0.17 - 0.36)	0.25 (0.14 - 0.34)	0.22 (0.12 - 0.30)	0.24 (0.15 - 0.33)	0.21 (0.12 - 0.29)	0.20 (0.13 - 0.30)
Orthophosphate Phosphorus (mg/L)	0.006 (<0.002 - 0.014)	0.006 (<0.002 - 0.017)	0.005 (<0.002 - 0.012)	0.005 (0.002 - 0.016)	0.008 (0.003 - 0.039)	0.006 (0.003 - 0.027)	0.007 (0.003 - 0.017)
Total Phosphorus (mg/L)	0.03 (<0.02 - 0.04)	0.03 (<0.02 - 0.04)	0.02 (<0.02 - 0.03)	0.02 (<0.02 - 0.04)	0.03 (<0.02 - 0.07)	0.02 (<0.02 - 0.05)	0.02 (<0.02 - 0.04)
Silica (as SiO ₂) (mg/L)	0.85 (0.07 - 2.00)	0.67 (0.05 - 1.93)	0.64 (0.05 - 1.77)	0.66 (0.06 - 1.90)	0.79 (0.27 - 1.57)	0.62 (0.10 - 1.57)	0.78 (0.40 - 1.43)
Chlorophyll-a (µg/L)	6.1 (0.4 - 20.5)	8.0 (0.6 - 18.3)	6.1 (0.5 - 15.3)	5.5 (0.4 - 11.0)	5.5 (0.3 - 19.3)	4.6 (0.2 - 11.6)	2.6 (0.5 - 4.8)
<i>E.coli</i> (count/100mL)	10 (1 - 390)	4 (1 - 28)	4 (<1 - 120)	2 (<1 - 14)	1 (<1 - 4)	1 (<1 - 2)	1 (<1 - 2)
Faecal Coliforms (count/100mL)	85 (3 - 700)	18 (1 - 160)	24 (1 - 480)	9 (1 - 100)	5 (1 - 39)	2 (<1 - 34)	1 (<1 - 5)

Note : 1. Unless otherwise specified, data presented are depth-averaged (A) values calculated by taking the means of three depths: Surface (S), Mid-depth (M), Bottom (B).

2. Data presented are annual arithmetic means of the depth-averaged results except for *E. coli* and faecal coliforms which are annual geometric means.

3. Data in brackets indicate the ranges.

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Parameter	Harbour Subzone			Buffer Subzone		Channel Subzone	
	TM2	TM3	TM4	TM5	TM6	TM7	TM8
Number of samples	12	12	12	12	12	12	12
Temperature (°C)	23.6 (15.5 - 30.2)	23.4 (15.5 - 30.2)	23.3 (15.4 - 29.8)	23.7 (15.8 - 30.6)	22.8 (15.3 - 29.8)	23.0 (15.2 - 29.8)	22.3 (15.0 - 29.4)
Salinity	31.2 (27.2 - 32.6)	31.6 (28.9 - 32.7)	31.6 (27.8 - 33.1)	31.8 (29.8 - 32.8)	32.3 (30.4 - 33.1)	32.4 (31.0 - 33.2)	32.7 (31.3 - 33.5)
Dissolved Oxygen (mg/L)	6.5 (2.1 - 9.2)	6.2 (3.0 - 8.1)	5.9 (2.2 - 8.2)	6.4 (3.9 - 8.6)	5.7 (3.0 - 7.7)	6.0 (3.4 - 7.9)	5.7 (3.1 - 8.0)
	Bottom						
	6.4 (2.1 - 8.7)	4.6 (1.6 - 7.5)	4.5 (1.1 - 7.2)	6.2 (3.8 - 7.7)	4.8 (1.1 - 7.4)	5.3 (2.0 - 7.6)	4.9 (1.0 - 7.8)
Dissolved Oxygen (% Saturation)	90 (32 - 136)	86 (45 - 113)	82 (33 - 108)	90 (54 - 125)	79 (45 - 104)	83 (48 - 104)	79 (46 - 100)
	Bottom						
	90 (33 - 127)	63 (23 - 92)	61 (16 - 95)	87 (52 - 113)	64 (16 - 93)	72 (28 - 98)	66 (14 - 95)
pH	7.9 (7.6 - 8.4)	8.0 (7.8 - 8.3)	8.0 (7.7 - 8.3)	8.0 (7.9 - 8.4)	8.0 (7.8 - 8.2)	8.0 (7.9 - 8.2)	8.0 (7.8 - 8.2)
Secchi Disc Depth (m)	2.6 (1.9 - 3.5)	2.5 (1.9 - 3.1)	2.8 (2.3 - 3.4)	2.8 (2.1 - 3.6)	3.0 (2.0 - 5.0)	3.6 (2.4 - 5.0)	3.8 (2.0 - 6.0)
Turbidity (NTU)	1.7 (0.7 - 5.0)	1.6 (0.8 - 6.0)	1.1 (0.4 - 1.9)	1.4 (0.4 - 5.1)	1.3 (0.5 - 4.4)	0.8 (0.5 - 1.5)	1.5 (0.8 - 2.8)
Suspended Solids (mg/L)	2.1 (0.9 - 6.4)	1.7 (1.0 - 2.3)	1.3 (0.6 - 2.7)	1.4 (<0.5 - 4.8)	1.8 (0.8 - 7.5)	1.0 (0.6 - 1.4)	1.7 (1.0 - 3.8)
5-day Biochemical Oxygen Demand (mg/L)	1.7 (0.8 - 2.9)	1.7 (1.0 - 2.4)	1.5 (0.8 - 2.6)	1.7 (0.8 - 3.7)	1.2 (0.6 - 2.0)	1.1 (0.7 - 1.8)	0.9 (0.5 - 2.0)
Ammonia Nitrogen (mg/L)	0.076 (0.035 - 0.165)	0.077 (0.031 - 0.137)	0.072 (0.032 - 0.123)	0.051 (0.015 - 0.100)	0.055 (0.018 - 0.103)	0.050 (0.022 - 0.107)	0.047 (0.017 - 0.102)
Unionised Ammonia (mg/L)	0.003 (<0.001 - 0.008)	0.004 (<0.001 - 0.012)	0.003 (<0.001 - 0.009)	0.002 (<0.001 - 0.005)	0.002 (<0.001 - 0.003)	0.002 (<0.001 - 0.004)	0.002 (<0.001 - 0.003)
Nitrite Nitrogen (mg/L)	0.003 (<0.002 - 0.008)	0.005 (<0.002 - 0.017)	0.006 (<0.002 - 0.028)	0.002 (<0.002 - 0.005)	0.009 (<0.002 - 0.042)	0.005 (<0.002 - 0.016)	0.010 (<0.002 - 0.037)
Nitrate Nitrogen (mg/L)	0.149 (<0.002 - 1.560)	0.012 (0.002 - 0.075)	0.013 (<0.002 - 0.092)	0.018 (0.002 - 0.101)	0.013 (0.002 - 0.071)	0.020 (0.002 - 0.105)	0.076 (<0.002 - 0.609)
Total Inorganic Nitrogen (mg/L)	0.23 (0.04 - 1.66)	0.09 (0.04 - 0.21)	0.09 (0.04 - 0.21)	0.07 (0.02 - 0.14)	0.08 (0.03 - 0.15)	0.07 (0.03 - 0.14)	0.13 (0.03 - 0.66)
Total Kjeldahl Nitrogen (mg/L)	0.26 (0.19 - 0.41)	0.25 (0.17 - 0.33)	0.23 (0.17 - 0.32)	0.20 (0.13 - 0.35)	0.19 (0.15 - 0.27)	0.17 (0.11 - 0.22)	0.17 (0.12 - 0.32)
Total Nitrogen (mg/L)	0.41 (0.20 - 1.86)	0.26 (0.18 - 0.39)	0.25 (0.17 - 0.41)	0.22 (0.14 - 0.36)	0.21 (0.15 - 0.32)	0.19 (0.11 - 0.28)	0.25 (0.13 - 0.77)
Orthophosphate Phosphorus (mg/L)	0.005 (<0.002 - 0.029)	0.005 (<0.002 - 0.007)	0.004 (<0.002 - 0.008)	0.005 (<0.002 - 0.009)	0.006 (0.002 - 0.011)	0.005 (<0.002 - 0.014)	0.008 (0.003 - 0.016)
Total Phosphorus (mg/L)	0.03 (<0.02 - 0.06)	0.03 (<0.02 - 0.05)	0.02 (<0.02 - 0.04)	0.02 (<0.02 - 0.04)	0.02 (<0.02 - 0.03)	0.02 (<0.02 - 0.03)	0.02 (<0.02 - 0.04)
Silica (as SiO ₂) (mg/L)	0.90 (0.17 - 1.85)	0.84 (0.11 - 1.77)	0.85 (0.09 - 1.77)	0.59 (0.09 - 1.30)	0.71 (0.24 - 1.23)	0.58 (0.21 - 1.04)	0.64 (0.39 - 1.19)
Chlorophyll-a (µg/L)	6.6 (3.0 - 13.7)	6.2 (3.2 - 17.3)	4.7 (2.2 - 8.4)	4.2 (1.9 - 6.7)	3.4 (1.3 - 5.5)	2.9 (1.0 - 5.5)	3.8 (0.8 - 17.7)
<i>E.coli</i> (count/100mL)	9 (<1 - 390)	6 (<1 - 55)	4 (<1 - 200)	2 (<1 - 18)	1 (<1 - 11)	1 (<1 - 5)	1 (<1 - 3)
Faecal Coliforms (count/100mL)	44 (2 - 2800)	16 (<1 - 210)	12 (1 - 800)	4 (1 - 300)	4 (1 - 140)	2 (<1 - 32)	1 (<1 - 4)

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