ISC Water Quality sub-index

Index of Stream Condition (ISC3)

The ISC Water Quality sub-index has four indicators:

1. Electrical Conductivity (EC)
2. pH
3. Total Phosphorus
4. Turbidity

The water quality sub-index score is based on 6 years of (usually) monthly data. This data is taken from the state wide network of gauges (known as the Regional Watering Monitoring Partnership program). For the Port Phillip region, data has been sourced from Melbourne Water. Data was only used where there was a minimum of 50 months of data spread over the 6 years of interest (2004 – 2009).

As there are a limited number of permanent water quality gauges across the State (data was obtained from 217 gauges), this information was supplemented by data collected by Waterwatch Victoria volunteers, who collected data for 12 months during 2009 at 107 locations across the State.

Regionalisation

The EPA has divided the State into regions based on specific water quality indicators. The regionalisation process developed by the EPA involved the classification of sites using a combination of numerical and qualitative (expert opinion) methods. The regionalisation for each of the four water quality indicators is presented below (Figures 1 – 4).

Figure 1. Electrical conductivity (EC) reference regionalisation

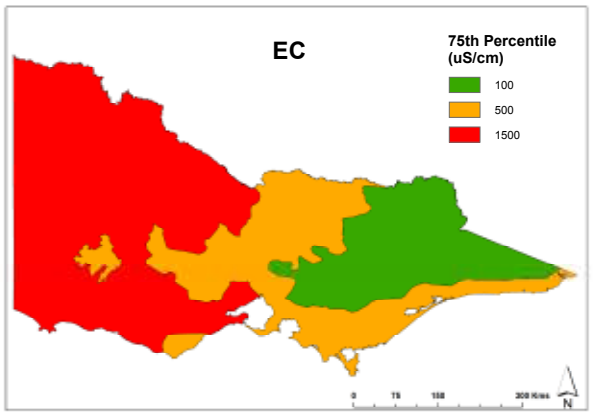

Figure 2. pH reference regionalisation

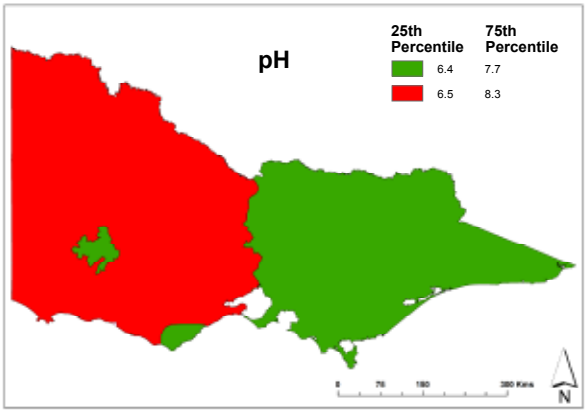

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Figure 3. Total Phosphorus reference regionalisation

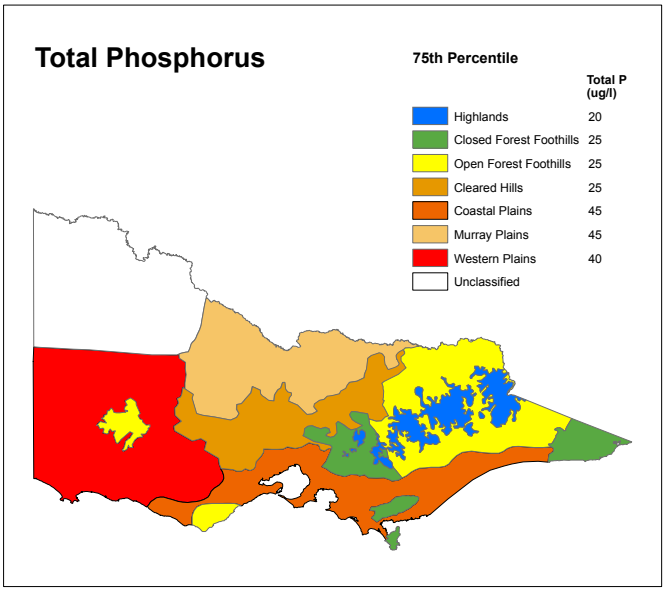
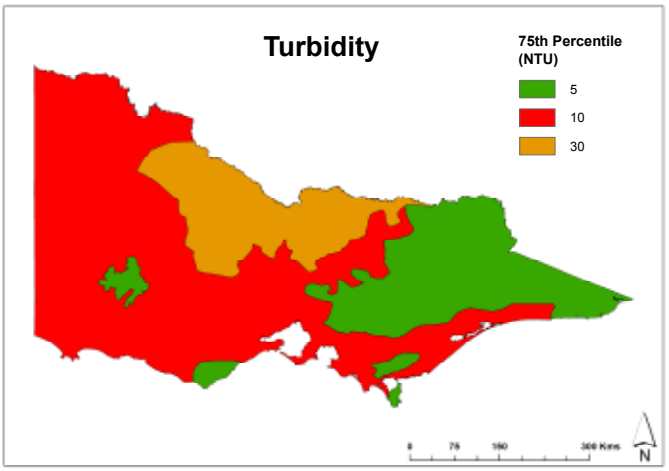


Figure 4. Turbidity reference regionalisation



Calculating the water quality sub-index score

Ratings or scores are determined by comparing measurements of actual water quality and comparing against defined 'reference' water quality for the relevant region. Each indicator is scored out of 4 (see Table 1). The greater the departure from reference, the lower the score. Over the period of record, the 75th percentile (and the 25th percentile score for pH) score is used to compare against the reference scores.

The water quality sub-index score is a score out of 10 and is calculated by adding the four water quality indicator scores according to the following formula:

Water quality sub-index = 10/16 (EC score + pH score + Total Phosphorus score + Turbidity score).

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Table 1. Scoring table for the Water Quality indicators

Segments		Indicator							
		Total Phosphorus (µg/L)		Turbidity (NTU)		EC (µs/cm)		pH (pH units)	
		75th percentile	Score	75th percentile	Score	75th percentile	Score	75th percentile	Score
Highlands	Mountain reaches of the Upper Murray, Mitta Mitta, Kiewa, Ovens, Goulburn, Yarra, LaTrobe, Thomson, Macalister, Mitchell, Tambo, and Snowy catchments	<10	4	<4	4	<75	4	6.6/7.5	4
		10 – 20	3	4 – 5	3	75 – 100	3	6.4/7.7	3
		21 – 30	2	6 – 8	2	101 – 125	2	6.2/7.9	2
		31 – 40	1	9 – 12	1	126 – 150	1	6.0/8.1	1
		>40	0	>12	0	>150	0	<6.0/>8.1	0
Forest A	Wilsons Promontory, Strezlecki Ranges, and far East Gippsland	<20	4	<4	4	<300	4	6.6/7.5	4
		20 – 25	3	4 – 5	3	300 – 500	3	6.4/7.7	3
		26 – 35	2	6 – 8	2	501 – 700	2	6.2/7.9	2
		36 – 50	1	9 – 12	1	701 – 1000	1	6.0/8.1	1
		>50	0	>12	0	>1000	0	<6.0/>8.1	0
	Upland reaches of the Upper Murray, Mitta Mitta, and Kiewa catchments	<20	4	<4	4	<75	4	6.6/7.5	4
		20 - 25	3	4 – 5	3	75 – 100	3	6.4/7.7	3
		26 - 35	2	6 – 8	2	101 – 125	2	6.2/7.9	2
		36 - 50	1	9 – 12	1	126 – 150	1	6.0/8.1	1
		>50	0	>12	0	>150	0	<6.0/.8.1	0
	The Grampians	<20	4	<4	4	<300	4	6.6/7.5	4
		20 – 25	3	4 – 5	3	300 - 500	3	6.4/7.7	3
		26 – 35	2	6 – 8	2	501 - 700	2	6.2/7.9	2
		36 – 50	1	9 – 12	1	701 - 1000	1	6.0/8.1	1
		>50	0	>12	0	>1000	0	<6.0/>8.1	0
	Upland reaches of the Goulburn, Yarra, LaTrobe, and Thomson catchments	<20	4	<4	4	<75	4	6.6/7.5	4
		20 – 25	3	4 – 5	3	75 – 100	3	6.4/7.7	3
		26 – 35	2	6 – 8	2	101 – 125	2	6.2/7.9	2
		36 – 50	1	9 – 12	1	126 – 150	1	6.0/8.1	1
		>50	0	>12	0	>150	0	<6.0/>8.1	0
Forest B	Otway Ranges	<20	4	<4	4	<300	4	6.6/7.5	4
		20 – 25	3	4 – 5	3	300 - 500	3	6.4/7.7	3
		26 – 35	2	6 – 8	2	501 - 700	2	6.2/7.9	2
		36 – 50	1	8 – 12	1	701 – 1000	1	6.0/8.1	1
		>50	0	>12	0	>1000	0	<6.0/>8.1	0
	Upland reaches in the Ovens, Broken, Goulburn, Macalister, Mitchell, Tambo, and Snowy catchments	<20	4	<4	4	<75	4	6.6/7.5	4
		20 – 25	3	4 – 5	3	75 – 100	3	6.4/7.7	3
		26 – 35	2	6 – 8	2	101 – 125	2	6.2/7.9	2
		36 – 50	1	9 – 12	1	126 – 150	1	6.0/8.1	1
		>50	0	>12	0	>150	0	<6.0/>8.1	0

Table 1. Scoring table for the Water Quality indicators (continued)

Segments		Indicator							
		Total Phosphorus (µg/L)		Turbidity (NTU)		EC (µs/cm)		pH (pH units)	
		75th percentile	Score	75th percentile	Score	75th percentile	Score	75th percentile	Score
Cleared Hills and Coastal Plains	Lowland reaches in the Barwon, Moorabool, Werribee and Maribyrnong catchments	<35	4	<5	4	<1200	4	6.7/8.0	4
		35 – 40	3	5 – 10	3	1200 - 1500	3	6.5/8.3	3
		41 – 50	2	11 – 20	2	1501 – 3000	2	6.3/8.5	2
		51 – 65	1	21 – 30	1	3001 – 5000	1	6.1/8.8	1
		>65	0	>30	0	>5000	0	<6.1/>8.8	0
	Lowland reaches of the Yarra, Westernport, LaTrobe, Mitchell, Tambo and Snowy catchments	<35	4	<5	4	<300	4	6.6/7.5	4
		35 – 40	3	5 – 10	3	300 – 500	3	6.4/7.7	3
		41 – 50	2	11 – 20	2	501 – 700	2	6.2/7.9	2
		51 – 65	1	21 – 30	1	701 – 1000	1	6.0/8.1	1
		>65	0	>30	0	>1000	0	<6.0/>8.1	0
	Upland reaches of the Wimmera, Hopkins, Moorabool, Werribee, Maribyrnong, Campaspe, Loddon and Avoca catchments	<20	4	<5	4	<300	4	6.7/8.0	4
		20 -25	3	5 – 10	3	300 – 500	3	6.5/8.3	3
		26 – 35	2	11 – 20	2	501 – 700	2	6.3/8.5	2
		36 – 50	1	21 – 30	1	701 – 1000	1	6.1/8.8	1
		>50	0	>30	0	>1000	0	<6.1/>8.8	0
	Mid reaches of the Ovens and Goulburn catchments	<20	4	<5	4	<300	4	6.6/7.5	4
		20 – 25	3	5 – 10	3	300 – 500	3	6.4/7.7	3
		26 – 35	2	11 – 20	2	501 – 700	2	6.2/7.9	2
		36 – 50	1	21 – 30	1	701 – 1000	1	6.0/8.1	1
		>50	0	>30	0	>1000	0	<6.0/>8.1	0
Murray and Western Plains	Lowland reaches of the Kiewa, Ovens, and Goulburn catchments	<35	4	<25	4	<300	4	6.6/7.5	4
		35 – 40	3	25 – 30	3	300 – 500	3	6.4/7.7	3
		41 – 50	2	31 – 40	2	501 – 700	2	6.2/7.9	2
		51 – 65	1	41 – 50	1	701 – 1000	1	6.0/8.1	1
		>65	0	>50	0	>1000	0	<6.0/>8.1	0
	Lowland reaches of the Campaspe, Loddon and Avoca catchments	<35	4	<25	4	<1200	4	6.7/8.0	4
		35 – 40	3	25 – 30	3	1200 – 1500	3	6.5/8.3	3
		41 – 50	2	31 – 40	2	1501 – 3000	2	6.3/8.5	2
		51 – 65	1	41 – 50	1	3001 – 5000	1	6.1/8.8	1
		>65	0	>50	0	>5000	0	<6.1/>8.8	0
	Lowland reaches of the Wimmera catchment	<35	4	<5	4	<1200	4	6.7/8.0	4
		35 - 40	3	5 – 10	3	1200 – 1500	3	6.5/8.3	3
		41 – 50	2	11 – 20	2	1501 – 3000	2	6.3/8.5	2
		51 - 65	1	21 – 30	1	3001 – 5000	1	6.1/8.8	1
		>65	0	>30	0	>5000	0	<6.1/>8.8	0
	Lowland reaches of the Glenelg, Hopkins, Portland and Corangamite catchments	<35	4	<5	4	<1200	4	6.7/8.0	4
		35 – 40	3	5 – 10	3	1200 – 1500	3	6.5/8.3	3
		41 – 50	2	11 – 20	2	1501 – 3000	2	6.3/8.5	2
		51 – 65	1	21 – 30	1	3001 – 5000	1	6.1/8.8	1
		>65	0	>30	0	>5000	0	<6.1/>8.8	0