

# Interim Default Guideline Values (DGVs) for Aquatic Ecosystems of Groundwater of Tasmania

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## Introduction

The interim default guideline values (DGVs) for aquatic ecosystems presented herein have been derived for Tasmanian groundwater in accordance with the National Water Quality Management Strategy ([NWQMS](#)). The NWQMS recommends routine monitoring on a monthly basis for a minimum of two years for the production of guideline values. The majority of groundwater data has been collected at a frequency and for a time period relevant to the needs of the primary research project rather than for the production of guideline values. The guideline values presented in this report should therefore be viewed as interim DGVs for aquatic ecosystems for groundwater. These values related to the Protected Environmental Value (PEV) - community value of Protection of Aquatic Ecosystems.

The interim DGVs are based on the degree of connectivity between groundwater and surface water. Connectivity refers to the direction and magnitude of flow between water located above and below ground. Factors such as topography, geology and climate can change the direction and magnitude of these flows.

## I. Regionalisation

In addition to a state-wide set of interim DGVs for aquatic ecosystems, two spatial scales have been selected for presenting more refined interim DGVs for aquatic ecosystems ([Sheldon \(2011\)](#)). The first being the connectivity classification which provides a broad classification and characterisation with four separate regions (Figure 1) for flows between surface and ground water sources. The second, the connected water regions (Figure 2), provides a more refined classification with thirteen distinct groupings. The relationship between the two spatial scales is provided in Table 1 and the distribution of regions in Figures 1 and 2.

Table 1. Connectivity classification ([Sheldon \(2011\)](#))

Connectivity classification	Descriptor	Connected Water Region
Low	Non basalt fractured rock aquifers	Huon and Bruny Rolling Hills, East Coast Rolling Hills, North East Highlands, Southern Midland Rolling Hills, South East Plateaus and Escarpments, Central Plateaus, West Coast Plateaus, Western Ridges and Valleys, and Mid North Rolling Hills
Moderate	Alluvial basins and basalt fracture rock aquifers	North West Basalt Plateaus and Valleys, and Basins
High	Sand aquifers	Coastal Sands
Very High	Conduit aquifers	Karst

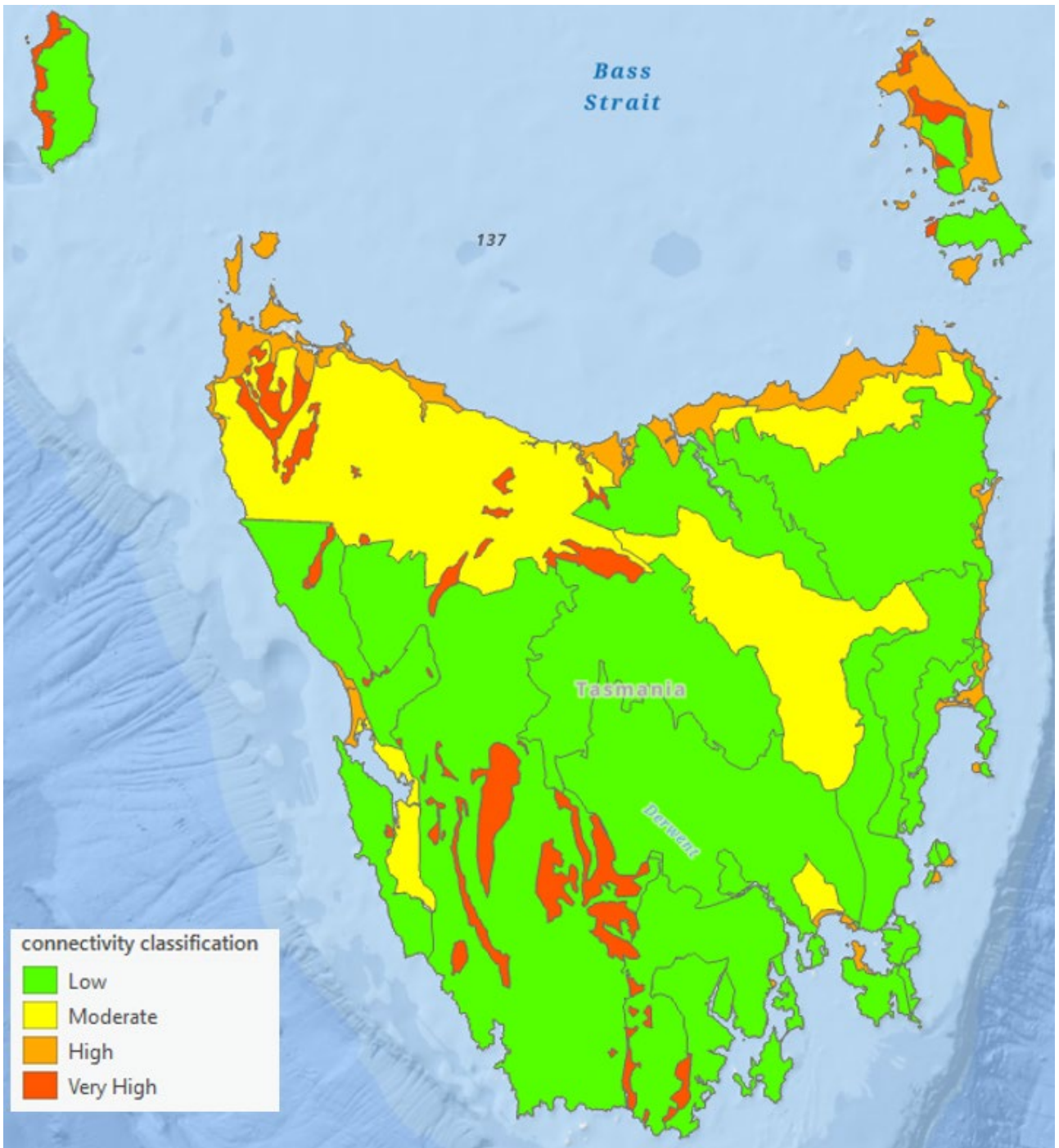
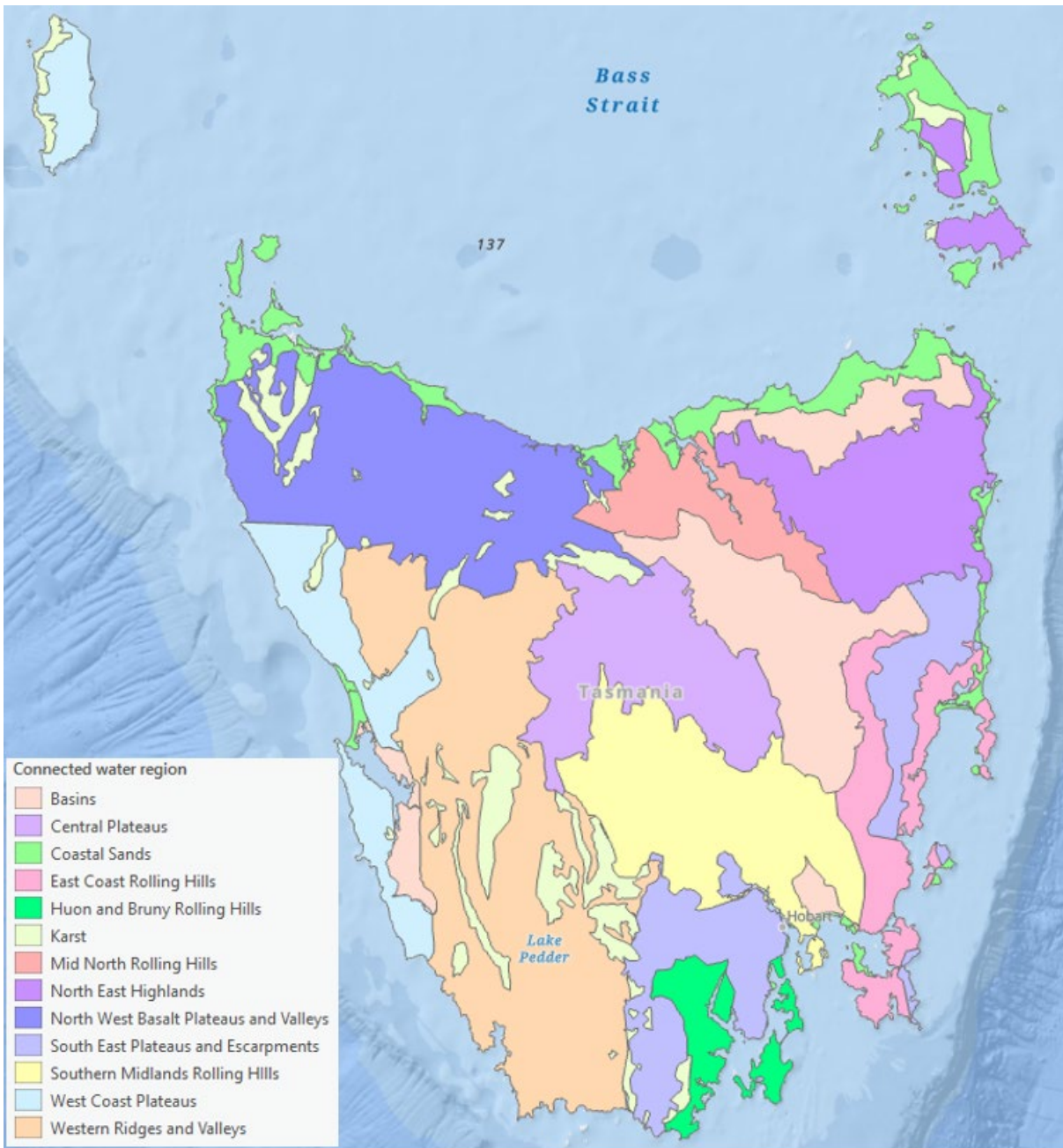


Figure 1. Tasmanian connectivity classification, Sheldon (2011)



**Figure 2. Tasmanian connected water regions, Sheldon (2011)**

## 2 Protected Environmental Values (PEVs) – Community Values

Protected Environmental Values (PEVs) or community values have not yet been set at a State level for groundwater at the date of publication of these guidelines. The PEVS for groundwater could be determined on the basis of current uses and values consistent with the process used for surface waters. However, there is limited knowledge around the uses and values and an inherent complexity in connectivity between groundwater and surface waters, so interim PEVS are proposed on the basis of potential use until better scientific information is available.

The proposed interim PEVs likely to be possible, given a level of total dissolved solids (detailed below and in the State Policy), for groundwater are:

A. Protection of Aquatic Ecosystems

- (i) Groundwater ecosystems

B: Recreational Water Quality & Aesthetics

- (ii) Primary contact water quality (specify sites – e.g. karst systems)  
(iii) Secondary contact water quality  
(iv) Aesthetic water quality

C: Raw Water for Drinking Water Supply

D: Raw water for homestead supply (Subject to coarse screening plus disinfection)

E: Agricultural Water Uses

- (i) Irrigation  
(ii) Stock watering

F: Industrial Water Supply (Selected areas that have land based commercialised aquaculture)

That is, as a minimum, water quality management strategies should, where groundwater has TDS levels below 500 mg/L, maintain below these levels wherever practicable and seek to provide water of a physical and chemical nature to support a healthy aquatic ecosystem; that is suitable as a raw water for drinking water supply subject to coarse screening plus disinfection at the points of extraction (if TDS < 1000mg/L); that is acceptable for irrigation (if TDS is < 1000-3500mg/L; affected by crop salt tolerance) and stock watering purposes (if TDS < 3500-13000mg/L; affected by animal species salt tolerance); which will allow people to safely engage in primary contact recreation activities such as body immersion at specific karst system sites and secondary contact recreation activities in aesthetically pleasing waters; and which is suitable for industrial waters such as terrestrial based aquaculture at specific locations.

Ecosystem condition as a reflection of the departure of an ecosystem for natural or pre-European condition is not extensively understood for subterranean groundwater supported ecosystems (as distinct from surface water ecosystems supported through groundwater expression which is more likely included in surface water management goals). Some resources, however, have been used to start the process to assess the condition of Groundwater Dependent Ecosystems (GDEs) and implement protection measures, i.e.,

- Conservation of Freshwater Ecosystems Values (CFEV) Project (by DPIPW)
- Ground Water Information Management System (GWIMS) database
- Expert opinion from within the public and private sector
- [National Guidelines for Groundwater Quality Protection in Australia.](#)

The level of protection as a minimum management goal would be to maintain water quality or improve wherever practical and reasonable water quality if significant impact has occurred from anthropogenic activities. Responses of water quality indicators are the measure for achieving management goals.



### 3 Sites in Groundwater

The location of all groundwater sites was verified in GDA94. In some instances, the same location was monitored by multiple organisations or under many projects by a single organisation. Under such instances the location became a single site with monitoring data differentiated on the basis of project or data provider. Each site was assigned to one of thirteen broad scale connected water regions on the basis of spatial information (Table 2). This assignment to a connected water region (Figure 1) is based on information from the Groundwater and Surface water Connectivity in Tasmania report ([Sheldon \(2011\)](#)).

**Table 2. Connected water regions and associated bores**

Final Connected Water Region	Bores
Basins	Hagley, Cressy, Ross, Pawleena, Pipers and Jetsonville
Central Plateaus	Osmaston
Coastal Sands	Waterhouse and Bicheno
East Coast Rolling Hills	Port Arthur, Buckland, and Little Swanport
Karst	Chudleigh and Togari
Mid North Rolling Hills	Nil
North East Highlands	St Marys, Lilydale, Branxholm and Winnaleah
North West Basalt Plateaus and Valleys	Montagu, Trowutta, South Forest, Calder, Hampshire, Mooreville, Barrington, Spreyton, and Beula.
South East Plateaus and Escarpments	Lower Snug
Southern Midland Rolling Hills	Melton Mowbray, Tunnack, and Bothwell
West Coast Plateaus	Nil
Western Ridges and Valleys	Nil
Huon and Bruny Rolling Hills	Huonville

### 4 Key indicators for water types

The Parameters or indicators measured at a site are dependent on the water type and the question being asked by the monitoring program. Those indicators widely monitored (spatially and temporally) were selected for the derivation of DGVs for aquatic ecosystems. These are outlined in Table 3.

**Table 3: Indicators for which interim DGVs were derived for groundwater**

Water Type	Indicator
Groundwater	Physico-chemical: Conductivity, pH, and TDS. Metals: Iron, Calcium, Magnesium, Aluminium, Sodium, and Potassium. Other: Nitrate, Sulphate, Chloride, Fluoride, Bicarbonates, Carbonates, Temporary Hardness, Permanent hardness, and Alkalinity.



## 5 Data requirements

In order for data from a site to be considered for the derivation of site-specific Guideline Values (GVs) or DGVs, the period over which the data was collected, frequency of collection and quality of the data were considered ([Ezzy, 2004](#)).

### 5.1 Period of Record

Data collected post 1990 was considered to be appropriate for determining site-specific GV and for DGVs for groundwater. Data collected from 1991 to 2008 was used for deriving the interim DGVs for aquatic ecosystems of groundwater.

### 5.2 Frequency of sampling

Water quality measurements represent a random sample from a statistical population (the water body). In order to have a degree of confidence that the water quality measurements provide a true reflection of a water body an acceptable level of sampling frequency is required. A confidence interval of 95% was deemed appropriate as this provides 95% certainty that the GV and DGVs which are based on the 80th<sup>th</sup>ile or 20th and 80th<sup>th</sup>ile values provide a true percentile value. In order for this a minimum sample number is required for each percentile being estimated (Table 4).

**Table 4. Minimum sample number required for 95% confidence for percentiles ([Goudey, 1999](#))**

Sample Number required for 95% confidence Interval	Description
0	No Data (ND)
1-5	Insufficient Data (ID)
≥ 6	Median/50 <sup>th</sup> ile
≥ 14	20 <sup>th</sup> , 50 <sup>th</sup> , 80 <sup>th</sup> ile
≥ 29	10 <sup>th</sup> , 20 <sup>th</sup> , 50 <sup>th</sup> , 80 <sup>th</sup> , 90 <sup>th</sup> ile
≥ 35	5 <sup>th</sup> , 10 <sup>th</sup> , 20 <sup>th</sup> , 50 <sup>th</sup> , 80 <sup>th</sup> , 90 <sup>th</sup> , 95 <sup>th</sup> ile

### 5.3 Data quality and parameter standardisation

The ability of the data provided to be used for its intended purpose relies on the quality of the data. Data quality was categorised as either good, average, poor or unknown. In-situ measurements made in accordance with the manufacturers specifications for the field instrument were deemed to be of good quality. Laboratory samples taken, stored, transported and analysed at an approved laboratory in accordance with the sampling guidelines for the particular parameter were deemed to be of good quality. Where a result was reported as below the Limit of Reporting (LoR) by a laboratory the value was halved. Data that was unable to have the quality ascertained was deemed of unknown quality. Obvious errors and duplicates were removed from each dataset prior to incorporation in the database. A key component in collating data from multiple sources is the standardisation of parameter names and units. All parameters were matched to an existing parameter on the EPA Water Database where possible. Where a parameter could not be matched due to being either a new parameter or having a different measurement unit an additional parameter was created. All parameters on the Water database were assigned globally accepted identifiers depending on the indicator type. (eg: [CAS Registry Number for chemicals](#)).

Due to the frequency of sampling the quantity of groundwater data available is deemed suitable for the derivation of interim annual DGVs. A single set of data is provided for the State, each connectivity classification and each connected water region. The interim annual DGVs are shaded in Tables 5 to 22 overleaf. These have been deemed as equivalent to Slightly Modified Ecological Value (SMEV) condition DGVs. For the decision process and selection criteria for identifying ecosystem condition refer to the EPA document, [Technical Guidance for Water Quality Objectives \(WQOs\) Setting for Tasmania](#).

## 6 Interim DGVs for aquatic ecosystems

### 6.1 State

Table 5. State-wide

Parameter	5 <sup>th</sup> %ile	10 <sup>th</sup> %ile	20 <sup>th</sup> %ile	Median	80 <sup>th</sup> %ile	90 <sup>th</sup> %ile	95 <sup>th</sup> %ile	Sample Number
Field Cond @ TRef25 µS/cm	71.0	105.0	150.0	530.0	1886.0	3384.0	4236.0	683
pH field - sensor TC	4.9	5.2	5.9	7.2	8.0	8.4	8.6	568
Total Dissolved Solids mg/L	47.0	70.7	102.4	324.5	1190.0	2087.8	3282.5	568
Iron as Fe mg/L	0.1	0.1	0.1	0.1	0.1	0.4	0.7	548
Calcium as Ca mg/L	0.6	1.3	3.3	17.8	84.0	115.0	153.8	566
Magnesium as Mg mg/L	1.1	1.5	4.2	14.0	61.8	115.0	175.0	567
Aluminium as Al mg/L	0.1	0.1	0.1	0.1	0.1	0.2	0.5	548
Sodium as Na mg/L	6.7	9.4	14.7	66.0	256.0	461.0	686.5	568
Potassium as K mg/L	0.3	0.6	1.1	3.2	7.6	10.0	19.0	566
Chloride as Cl mg/L	10.5	12.5	19.0	99.0	430.0	940.0	1218.0	567
Fluoride as F mg/L	0.2	0.2	0.2	0.2	0.2	0.3	0.5	567
Sulphate as S mg/L	2.5	2.5	2.5	16.5	77.8	110.0	140.0	567
Nitrate as N mg/L	0.3	0.3	2.0	5.0	10.0	25.0	50.0	587
Carbonates as C mg/L	2.5	2.5	2.5	2.5	2.5	8.0	13.8	365
Bicarbonates as C mg/L	2.5	2.5	7.6	76.0	340.0	490.0	600.8	553
Perm Hardness mg/L	2.5	5.0	10.3	52.0	240.0	410.0	570.0	649
Temp Hardness mg/L	2.5	2.5	4.3	52.5	274.8	379.4	492.9	562
Alkalinity mg/L	2.5	2.5	6.7	64.5	280.0	400.0	493.7	554

### 6.2 Connectivity Classification

Table 6. Low

Parameter	5 <sup>th</sup> %ile	10 <sup>th</sup> %ile	20 <sup>th</sup> %ile	Median	80 <sup>th</sup> %ile	90 <sup>th</sup> %ile	95 <sup>th</sup> %ile	Sample Number
Field Cond @ TRef25 µS/cm	101.5	170.0	360.0	1090.0	1888.0	2844.0	4083.0	287
pH field - sensor TC	4.9	5.2	6.2	7.3	8.0	8.4	8.9	237
Total Dissolved Solids mg/L	65.0	183.0	241.0	750.0	1140.0	1300.0	2826.0	237
Iron as Fe mg/L	0.1	0.1	0.1	0.1	0.1	0.3	0.5	237
Calcium as Ca mg/L	0.6	1.0	4.0	37.0	89.8	115.0	136.0	237
Magnesium as Mg mg/L	0.4	1.7	6.4	24.0	59.0	70.4	136.0	237
Aluminium as Al mg/L	0.1	0.1	0.1	0.1	0.1	0.2	0.7	237
Sodium as Na mg/L	12.0	20.0	60.2	98.0	248.0	320.0	630.0	237
Potassium as K mg/L	0.5	1.1	1.9	4.1	7.8	9.9	18.2	237
Chloride as Cl mg/L	18.0	20.4	28.8	162.0	428.0	514.0	1162.0	237
Fluoride as F mg/L	0.2	0.2	0.2	0.2	0.2	0.2	0.4	237
Sulphate as S mg/L	2.5	2.5	13.5	53.0	105.0	120.0	340.0	237
Nitrate as N mg/L	0.3	0.3	0.3	5.0	5.0	10.0	100.0	244
Carbonates as C mg/L	2.5	2.5	2.5	2.5	2.5	7.9	14.1	158
Bicarbonates as C mg/L	2.5	2.5	16.3	130.0	410.0	530.0	598.0	229
Perm Hardness mg/L	2.5	2.5	22.0	110.0	270.0	384.0	454.0	257
Temp Hardness mg/L	2.5	2.5	7.4	62.0	326.0	430.0	471.5	238
Alkalinity mg/L	2.5	2.5	14.9	111.0	330.0	430.0	475.5	230

**Table 7. Moderate**

Parameter	5 <sup>th</sup> %ile	10 <sup>th</sup> %ile	20 <sup>th</sup> %ile	Median	80 <sup>th</sup> %ile	90 <sup>th</sup> %ile	95 <sup>th</sup> %ile	Sample Number
Field Cond @ TRef25 µS/cm	63.1	100.0	130.0	241.5	1692.0	2839.0	3810.0	302
pH field - sensor TC	4.8	5.0	5.5	7.1	7.9	8.3	8.5	257
Total Dissolved Solids mg/L	42.0	68.0	87.2	180.0	1166.0	2006.0	2328.8	257
Iron as Fe mg/L	0.1	0.1	0.1	0.1	0.2	0.5	1.0	237
Calcium as Ca mg/L	0.5	1.4	2.6	10.5	42.0	94.6	113.0	255
Magnesium as Mg mg/L	1.2	1.9	3.6	7.8	71.0	105.0	141.3	256
Aluminium as Al mg/L	0.1	0.1	0.1	0.1	0.1	0.2	0.4	237
Sodium as Na mg/L	7.8	8.9	11.0	21.0	201.0	350.0	586.0	257
Potassium as K mg/L	0.3	0.5	0.9	1.7	5.2	9.1	19.0	256
Chloride as Cl mg/L	9.0	10.5	14.0	25.0	460.0	895.0	970.5	256
Fluoride as F mg/L	0.2	0.2	0.2	0.2	0.2	0.5	0.5	256
Sulphate as S mg/L	2.5	2.5	2.5	6.1	18.0	35.0	80.5	256
Nitrate as N mg/L	0.3	0.4	5.0	5.0	25.0	25.0	50.0	266
Carbonates as C mg/L	2.5	2.5	2.5	2.5	2.5	6.8	15.5	159
Bicarbonates as C mg/L	2.5	2.5	2.5	53.0	210.0	490.0	642.5	251
Perm Hardness mg/L	2.5	2.5	7.7	21.7	172.0	341.0	540.5	300
Temp Hardness mg/L	2.5	2.5	2.5	43.0	170.0	410.0	540.0	251
Alkalinity mg/L	2.5	2.5	2.5	45.0	180.0	410.0	540.0	251

**Table 8. High**

Parameter	5 <sup>th</sup> %ile	10 <sup>th</sup> %ile	20 <sup>th</sup> %ile	Median	80 <sup>th</sup> %ile	90 <sup>th</sup> %ile	95 <sup>th</sup> %ile	Sample Number
Field Cond @ TRef25 µS/cm	480.0	503.6	520.0	614.0	6166.0	6270.0	6296.0	45
pH field - sensor TC	6.2	6.3	6.5	7.2	7.6	7.8	8.0	38
Total Dissolved Solids mg/L	295.0	303.5	320.8	3820.0	4500.0	4665.0	4862.6	38
Iron as Fe mg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.1	38
Calcium as Ca mg/L	10.5	10.9	12.0	108.0	210.0	220.0	221.5	38
Magnesium as Mg mg/L	12.9	13.0	13.5	185.0	256.0	270.0	280.0	38
Aluminium as Al mg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.2	38
Sodium as Na mg/L	60.7	67.4	71.4	620.0	810.0	825.1	870.0	38
Potassium as K mg/L	2.4	2.7	2.8	7.2	9.5	9.7	10.1	38
Chloride as Cl mg/L	103.5	118.5	130.0	262.5	2032.0	2103.0	2130.5	38
Fluoride as F mg/L	0.2	0.2	0.2	0.2	0.2	0.2	0.2	38
Sulphate as S mg/L	22.5	29.0	30.4	42.0	140.0	145.3	150.8	38
Nitrate as N mg/L	0.3	0.3	0.3	5.0	5.0	5.0	5.0	39
Carbonates as C mg/L	2.5	2.5	2.5	2.5	2.5	2.5	2.5	24
Bicarbonates as C mg/L	20.6	25.4	33.4	187.5	350.0	360.0	361.5	38
Perm Hardness mg/L	52.0	53.2	57.8	73.0	1282.0	1371.0	1406.0	45
Temp Hardness mg/L	20.9	24.0	28.0	197.5	290.0	290.0	300.0	38
Alkalinity mg/L	20.9	24.0	28.0	197.5	290.0	290.0	300.0	38

**Table 9. Very High**

Parameter	5 <sup>th</sup> %ile	10 <sup>th</sup> %ile	20 <sup>th</sup> %ile	Median	80 <sup>th</sup> %ile	90 <sup>th</sup> %ile	95 <sup>th</sup> %ile	Sample Number
Field Cond @ TRef25 µS/cm	50.2	57.6	62.0	354.0	964.0	1022.0	1086.0	49
pH field - sensor TC	4.9	5.1	6.0	7.3	8.3	8.5	8.6	36
Total Dissolved Solids mg/L	31.3	45.5	50.0	122.5	710.0	735.0	787.5	36
Iron as Fe mg/L	0.1	0.1	0.1	0.1	0.6	0.9	1.0	36
Calcium as Ca mg/L	1.7	2.3	3.6	32.5	98.0	105.0	107.5	36
Magnesium as Mg mg/L	0.7	0.9	1.2	1.8	42.0	43.0	45.8	36
Aluminium as Al mg/L	0.1	0.1	0.1	0.1	0.2	0.2	0.4	36
Sodium as Na mg/L	4.6	4.7	5.1	6.1	49.0	51.0	52.5	36
Potassium as K mg/L	0.1	0.1	0.2	1.0	10.3	20.3	25.2	35
Chloride as Cl mg/L	8.4	8.9	10.5	16.0	120.0	125.0	130.0	36
Fluoride as F mg/L	0.2	0.2	0.2	0.2	0.2	0.2	0.2	36
Sulphate as S mg/L	2.5	2.5	2.5	15.0	67.0	82.0	93.0	36
Nitrate as N mg/L	3.6	5.0	5.0	5.0	10.0	10.0	11.5	38
Carbonates as C mg/L	2.5	2.5	2.5	2.5	5.1	11.2	11.9	24
Bicarbonates as C mg/L	2.5	2.5	2.5	90.0	340.0	356.0	369.0	35
Perm Hardness mg/L	7.2	8.0	9.9	31.4	150.8	202.0	221.9	47
Temp Hardness mg/L	2.5	2.5	6.6	73.0	280.0	296.0	309.0	35
Alkalinity mg/L	2.5	2.5	6.6	73.0	280.0	296.0	309.0	35

### 6.3 Connected Water Regions

**Table 10. Huon and Bruny Rolling Hills**

Parameter	5 <sup>th</sup> %ile	10 <sup>th</sup> %ile	20 <sup>th</sup> %ile	Median	80 <sup>th</sup> %ile	90 <sup>th</sup> %ile	95 <sup>th</sup> %ile	Sample Number
Field Cond @ TRef25 µS/cm	876.3	914.0	952.0	980.0	1029.0	1064.0	1083.0	19
pH field - sensor TC	6.2	6.2	6.6	7.3	8.1	8.2	8.3	19
Total Dissolved Solids mg/L	627.4	670.4	680.0	697.0	784.0	793.6	809.2	19
Iron as Fe mg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.4	19
Calcium as Ca mg/L	26.8	49.0	63.8	74.0	76.8	82.0	83.6	19
Magnesium as Mg mg/L	17.3	17.9	18.5	19.0	22.0	22.4	24.1	19
Aluminium as Al mg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.1	19
Sodium as Na mg/L	90.9	91.0	95.2	100.0	105.0	107.6	110.5	19
Potassium as K mg/L	5.7	6.0	6.3	6.7	7.9	8.3	9.9	19
Chloride as Cl mg/L	218.0	220.0	226.0	230.0	240.0	242.0	253.0	19
Fluoride as F mg/L	0.2	0.2	0.2	0.2	0.2	0.2	0.2	19
Sulphate as S mg/L	37.9	38.8	41.2	47.0	50.4	51.2	52.1	19
Nitrate as N mg/L	0.3	0.3	0.3	5.0	5.0	5.0	5.0	19
Carbonates as C mg/L	2.5	2.5	2.5	2.5	2.5	2.5	5.2	11
Bicarbonates as C mg/L	50.7	106.2	128.0	145.0	167.0	172.0	181.5	19
Perm Hardness mg/L	109.5	118.0	120.0	135.0	156.6	162.6	174.7	19
Temp Hardness mg/L	98.7	105.0	110.0	120.0	137.0	140.0	142.0	19
Alkalinity mg/L	98.7	105.0	110.0	120.0	137.0	140.0	142.0	19

**Table 11. East Coast Rolling Hills**

Parameter	5 <sup>th</sup> %ile	10 <sup>th</sup> %ile	20 <sup>th</sup> %ile	Median	80 <sup>th</sup> %ile	90 <sup>th</sup> %ile	95 <sup>th</sup> %ile	Sample Number
Field Cond @ TRef25 $\mu$ S/cm	273.0	363.0	504.0	1465.0	4056.0	4417.0	5067.5	74
pH field - sensor TC	5.0	5.2	6.0	7.1	7.7	7.9	8.5	58
Total Dissolved Solids mg/L	194.7	213.1	290.0	725.0	2838.0	3680.0	3840.0	58
Iron as Fe mg/L	0.1	0.1	0.1	0.1	0.3	0.6	0.9	58
Calcium as Ca mg/L	0.9	1.2	4.7	11.0	133.0	163.0	186.8	58
Magnesium as Mg mg/L	6.0	6.6	7.5	14.0	138.0	161.5	203.2	58
Aluminium as Al mg/L	0.1	0.1	0.1	0.1	0.1	0.5	1.0	58
Sodium as Na mg/L	43.0	49.7	67.0	225.0	630.0	693.0	714.5	58
Potassium as K mg/L	0.3	0.4	0.5	3.9	6.9	7.9	8.1	58
Chloride as Cl mg/L	41.0	53.5	79.6	380.0	1166.0	1513.4	1587.5	58
Fluoride as F mg/L	0.2	0.2	0.2	0.2	0.2	0.2	0.3	58
Sulphate as S mg/L	9.9	11.0	13.5	18.3	100.0	111.5	117.2	58
Nitrate as N mg/L	0.3	0.3	0.3	5.0	5.0	5.0	5.0	60
Carbonates as C mg/L	2.5	2.5	2.5	2.5	2.5	2.5	12.7	38
Bicarbonates as C mg/L	2.5	2.5	4.6	92.0	578.0	660.6	696.0	55
Perm Hardness mg/L	2.5	2.5	30.0	92.5	390.0	545.0	741.5	66
Temp Hardness mg/L	2.5	2.5	4.2	64.5	470.0	541.0	565.0	56
Alkalinity mg/L	2.5	2.5	4.2	76.0	470.0	541.0	565.0	56

**Table 12. North East Highlands**

Parameter	5 <sup>th</sup> %ile	10 <sup>th</sup> %ile	20 <sup>th</sup> %ile	Median	80 <sup>th</sup> %ile	90 <sup>th</sup> %ile	95 <sup>th</sup> %ile	Sample Number
Field Cond @ TRef25 $\mu$ S/cm	77.0	89.5	109.6	331.5	1350.0	1510.0	1666.5	82
pH field - sensor TC	4.3	4.8	5.6	7.4	8.4	8.9	9.0	68
Total Dissolved Solids mg/L	45.0	52.6	67.6	230.5	841.6	974.0	1079.5	68
Iron as Fe mg/L	0.1	0.1	0.1	0.1	0.1	0.3	0.5	68
Calcium as Ca mg/L	0.1	0.3	0.8	3.3	46.4	56.3	74.9	68
Magnesium as Mg mg/L	0.1	0.2	0.4	4.8	40.6	48.2	57.0	68
Aluminium as Al mg/L	0.1	0.1	0.1	0.1	0.1	0.6	0.9	68
Sodium as Na mg/L	9.6	10.4	12.0	77.5	210.0	220.0	240.0	68
Potassium as K mg/L	1.0	1.1	1.4	2.1	8.1	9.0	9.9	68
Chloride as Cl mg/L	17.5	17.9	18.0	22.0	296.0	333.0	413.0	68
Fluoride as F mg/L	0.2	0.2	0.2	0.2	0.2	0.2	0.2	68
Sulphate as S mg/L	2.5	2.5	2.5	12.0	71.0	78.2	83.7	68
Nitrate as N mg/L	0.3	0.3	2.3	5.0	10.0	10.5	25.0	70
Carbonates as C mg/L	2.5	2.5	2.5	2.5	7.7	13.2	28.5	50
Bicarbonates as C mg/L	2.5	2.5	2.5	145.0	294.0	320.0	330.0	64
Perm Hardness mg/L	2.5	2.5	3.1	10.7	56.0	78.4	169.7	62
Temp Hardness mg/L	2.5	2.5	2.5	11.0	209.0	260.0	270.0	72
Alkalinity mg/L	2.5	2.5	4.4	135.0	232.2	260.0	270.0	64

**Table 13. Southern Midland Rolling Hills**

Parameter	5 <sup>th</sup> %ile	10 <sup>th</sup> %ile	20 <sup>th</sup> %ile	Median	80 <sup>th</sup> %ile	90 <sup>th</sup> %ile	95 <sup>th</sup> %ile	Sample Number
Field Cond @ TRef25 µS/cm	900.0	970.0	1030.0	1150.0	1980.0	2130.0	2190.0	71
pH field - sensor TC	6.1	6.4	6.8	7.6	8.0	8.1	8.2	58
Total Dissolved Solids mg/L	718.5	752.1	780.0	880.0	1200.0	1213.0	1251.5	58
Iron as Fe mg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.2	58
Calcium as Ca mg/L	34.7	44.9	55.4	82.0	110.0	120.0	125.8	58
Magnesium as Mg mg/L	39.0	42.0	48.0	52.5	63.6	66.0	68.2	58
Aluminium as Al mg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.2	58
Sodium as Na mg/L	54.7	61.7	68.4	80.5	290.0	313.0	320.0	58
Potassium as K mg/L	2.3	2.4	2.6	3.5	5.0	5.7	6.0	58
Chloride as Cl mg/L	71.7	75.0	95.4	147.5	430.0	430.9	440.0	58
Fluoride as F mg/L	0.2	0.2	0.2	0.2	0.3	0.4	0.7	58
Sulphate as S mg/L	56.0	57.7	60.0	110.0	340.0	420.0	471.5	58
Nitrate as N mg/L	0.3	0.3	0.3	5.0	5.0	5.0	5.0	60
Carbonates as C mg/L	2.5	2.5	2.5	2.5	2.5	2.5	2.5	36
Bicarbonates as C mg/L	15.2	47.8	78.8	400.0	484.0	530.0	542.0	57
Perm Hardness mg/L	6.2	30.4	46.4	155.0	330.0	413.0	436.5	68
Temp Hardness mg/L	12.3	39.2	67.4	330.0	373.2	430.0	442.0	57
Alkalinity mg/L	12.3	39.2	67.4	330.0	396.0	434.0	452.0	57

**Table 14. South East Plateaus and Escarpments**

Parameter	5 <sup>th</sup> %ile	10 <sup>th</sup> %ile	20 <sup>th</sup> %ile	Median	80 <sup>th</sup> %ile	90 <sup>th</sup> %ile	95 <sup>th</sup> %ile	Sample Number
Field Cond @ TRef25 µS/cm	1152.5	1260.0	1332.0	1525.0	1700.0	1855.0	2319.0	18
pH field - sensor TC	6.0	6.2	6.2	6.8	8.3	9.0	9.3	18
Total Dissolved Solids mg/L	644.9	756.7	890.8	965.0	1208.0	1272.0	1319.4	18
Iron as Fe mg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.1	18
Calcium as Ca mg/L	13.7	14.0	17.6	34.0	54.8	73.1	106.6	18
Magnesium as Mg mg/L	27.0	31.5	36.4	42.0	52.2	62.4	75.5	18
Aluminium as Al mg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.1	18
Sodium as Na mg/L	148.5	164.0	175.0	197.5	226.0	240.4	261.5	18
Potassium as K mg/L	3.7	3.9	4.3	5.3	6.1	6.9	11.8	18
Chloride as Cl mg/L	292.5	321.0	368.0	420.0	490.0	523.0	541.0	18
Fluoride as F mg/L	0.2	0.2	0.2	0.2	0.2	0.2	0.3	18
Sulphate as S mg/L	42.0	53.2	69.6	91.5	98.0	107.2	110.0	18
Nitrate as N mg/L	0.3	0.3	0.3	5.0	5.0	5.0	5.7	18
Carbonates as C mg/L	2.5	2.5	2.5	2.5	5.2	8.1	12.8	11
Bicarbonates as C mg/L	12.3	15.4	16.7	28.0	80.8	149.2	256.5	18
Perm Hardness mg/L	95.3	141.5	166.4	215.0	340.0	436.0	453.9	18
Temp Hardness mg/L	13.9	14.4	17.0	25.0	58.0	82.6	116.2	18
Alkalinity mg/L	13.9	14.4	17.0	25.0	58.0	82.6	116.2	18

**Table 15. Central Plateaus**

Parameter	5 <sup>th</sup> %ile	10 <sup>th</sup> %ile	20 <sup>th</sup> %ile	Median	80 <sup>th</sup> %ile	90 <sup>th</sup> %ile	95 <sup>th</sup> %ile	Sample Number
Field Cond @ TRef25 µS/cm	410.2	448.8	560.0	710.0	944.0	1538.0	1660.0	23
pH field - sensor TC	5.2	5.2	5.2	6.5	7.4	7.8	8.1	16
Total Dissolved Solids mg/L	402.8	428.5	440.0	561.0	620.0	670.0	760.0	16
Iron as Fe mg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.1	16
Calcium as Ca mg/L	5.8	6.6	7.3	20.3	33.0	54.5	74.3	16
Magnesium as Mg mg/L	13.4	13.8	16.0	19.0	22.0	26.5	30.3	16
Aluminium as Al mg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.1	16
Sodium as Na mg/L	58.0	60.0	66.0	84.5	100.0	117.5	125.0	16
Potassium as K mg/L	13.3	15.0	16.0	18.0	20.0	20.5	21.8	16
Chloride as Cl mg/L	70.3	79.0	88.0	142.5	162.0	195.0	265.0	16
Fluoride as F mg/L	0.2	0.2	0.2	0.2	0.2	0.2	0.2	16
Sulphate as S mg/L	18.8	19.3	19.5	24.0	26.0	37.0	48.5	16
Nitrate as N mg/L	40.0	80.0	100.0	150.0	200.0	220.0	250.0	17
Carbonates as C mg/L	2.5	2.5	2.5	2.5	2.5	2.5	4.9	12
Bicarbonates as C mg/L	1.9	2.5	2.5	17.3	41.0	66.5	96.5	16
Perm Hardness mg/L	65.5	70.4	81.4	105.0	146.0	177.0	189.0	23
Temp Hardness mg/L	1.9	2.5	2.5	14.8	34.0	54.5	79.8	16
Alkalinity mg/L	1.9	2.5	2.5	14.8	34.0	54.5	79.8	16

**Table 16. West Coast Plateaus\***

Parameter	5 <sup>th</sup> %ile	10 <sup>th</sup> %ile	20 <sup>th</sup> %ile	Median	80 <sup>th</sup> %ile	90 <sup>th</sup> %ile	95 <sup>th</sup> %ile	Sample Number
Field Cond @ TRef25 µS/cm	101.5	170.0	360.0	1090.0	1888.0	2844.0	4083.0	287
pH field - sensor TC	4.9	5.2	6.2	7.3	8.0	8.4	8.9	237
Total Dissolved Solids mg/L	65.0	183.0	241.0	750.0	1140.0	1300.0	2826.0	237
Iron as Fe mg/L	0.1	0.1	0.1	0.1	0.1	0.3	0.5	237
Calcium as Ca mg/L	0.6	1.0	4.0	37.0	89.8	115.0	136.0	237
Magnesium as Mg mg/L	0.4	1.7	6.4	24.0	59.0	70.4	136.0	237
Aluminium as Al mg/L	0.1	0.1	0.1	0.1	0.1	0.2	0.7	237
Sodium as Na mg/L	12.0	20.0	60.2	98.0	248.0	320.0	630.0	237
Potassium as K mg/L	0.5	1.1	1.9	4.1	7.8	9.9	18.2	237
Chloride as Cl mg/L	18.0	20.4	28.8	162.0	428.0	514.0	1162.0	237
Fluoride as F mg/L	0.2	0.2	0.2	0.2	0.2	0.2	0.4	237
Sulphate as S mg/L	2.5	2.5	13.5	53.0	105.0	120.0	340.0	237
Nitrate as N mg/L	0.3	0.3	0.3	5.0	5.0	10.0	100.0	244
Carbonates as C mg/L	2.5	2.5	2.5	2.5	2.5	7.9	14.1	158
Bicarbonates as C mg/L	2.5	2.5	16.3	130.0	410.0	530.0	598.0	229
Perm Hardness mg/L	2.5	2.5	22.0	110.0	270.0	384.0	454.0	257
Temp Hardness mg/L	2.5	2.5	7.4	62.0	326.0	430.0	471.5	238
Alkalinity mg/L	2.5	2.5	14.9	111.0	330.0	430.0	475.5	230

\* Based on Low connectivity classification



**Table 17. Western Ridges and Valleys\***

Parameter	5 <sup>th</sup> %ile	10 <sup>th</sup> %ile	20 <sup>th</sup> %ile	Median	80 <sup>th</sup> %ile	90 <sup>th</sup> %ile	95 <sup>th</sup> %ile	Sample Number
Field Cond @ TRef25 µS/cm	101.5	170.0	360.0	1090.0	1888.0	2844.0	4083.0	287
pH field - sensor TC	4.9	5.2	6.2	7.3	8.0	8.4	8.9	237
Total Dissolved Solids mg/L	65.0	183.0	241.0	750.0	1140.0	1300.0	2826.0	237
Iron as Fe mg/L	0.1	0.1	0.1	0.1	0.1	0.3	0.5	237
Calcium as Ca mg/L	0.6	1.0	4.0	37.0	89.8	115.0	136.0	237
Magnesium as Mg mg/L	0.4	1.7	6.4	24.0	59.0	70.4	136.0	237
Aluminium as Al mg/L	0.1	0.1	0.1	0.1	0.1	0.2	0.7	237
Sodium as Na mg/L	12.0	20.0	60.2	98.0	248.0	320.0	630.0	237
Potassium as K mg/L	0.5	1.1	1.9	4.1	7.8	9.9	18.2	237
Chloride as Cl mg/L	18.0	20.4	28.8	162.0	428.0	514.0	1162.0	237
Fluoride as F mg/L	0.2	0.2	0.2	0.2	0.2	0.2	0.4	237
Sulphate as S mg/L	2.5	2.5	13.5	53.0	105.0	120.0	340.0	237
Nitrate as N mg/L	0.3	0.3	0.3	5.0	5.0	10.0	100.0	244
Carbonates as C mg/L	2.5	2.5	2.5	2.5	2.5	7.9	14.1	158
Bicarbonates as C mg/L	2.5	2.5	16.3	130.0	410.0	530.0	598.0	229
Perm Hardness mg/L	2.5	2.5	22.0	110.0	270.0	384.0	454.0	257
Temp Hardness mg/L	2.5	2.5	7.4	62.0	326.0	430.0	471.5	238
Alkalinity mg/L	2.5	2.5	14.9	111.0	330.0	430.0	475.5	230

\* Based on Low connectivity classification

**Table 18. Mid North Rolling Hills\***

Parameter	5 <sup>th</sup> %ile	10 <sup>th</sup> %ile	20 <sup>th</sup> %ile	Median	80 <sup>th</sup> %ile	90 <sup>th</sup> %ile	95 <sup>th</sup> %ile	Sample Number
Field Cond @ TRef25 µS/cm	101.5	170.0	360.0	1090.0	1888.0	2844.0	4083.0	287
pH field - sensor TC	4.9	5.2	6.2	7.3	8.0	8.4	8.9	237
Total Dissolved Solids mg/L	65.0	183.0	241.0	750.0	1140.0	1300.0	2826.0	237
Iron as Fe mg/L	0.1	0.1	0.1	0.1	0.1	0.3	0.5	237
Calcium as Ca mg/L	0.6	1.0	4.0	37.0	89.8	115.0	136.0	237
Magnesium as Mg mg/L	0.4	1.7	6.4	24.0	59.0	70.4	136.0	237
Aluminium as Al mg/L	0.1	0.1	0.1	0.1	0.1	0.2	0.7	237
Sodium as Na mg/L	12.0	20.0	60.2	98.0	248.0	320.0	630.0	237
Potassium as K mg/L	0.5	1.1	1.9	4.1	7.8	9.9	18.2	237
Chloride as Cl mg/L	18.0	20.4	28.8	162.0	428.0	514.0	1162.0	237
Fluoride as F mg/L	0.2	0.2	0.2	0.2	0.2	0.2	0.4	237
Sulphate as S mg/L	2.5	2.5	13.5	53.0	105.0	120.0	340.0	237
Nitrate as N mg/L	0.3	0.3	0.3	5.0	5.0	10.0	100.0	244
Carbonates as C mg/L	2.5	2.5	2.5	2.5	2.5	7.9	14.1	158
Bicarbonates as C mg/L	2.5	2.5	16.3	130.0	410.0	530.0	598.0	229
Perm Hardness mg/L	2.5	2.5	22.0	110.0	270.0	384.0	454.0	257
Temp Hardness mg/L	2.5	2.5	7.4	62.0	326.0	430.0	471.5	238
Alkalinity mg/L	2.5	2.5	14.9	111.0	330.0	430.0	475.5	230

\* Based on Low connectivity classification

**Table 19. North West Basalt Plateaus and Valleys**

Parameter	5 <sup>th</sup> %ile	10 <sup>th</sup> %ile	20 <sup>th</sup> %ile	Median	80 <sup>th</sup> %ile	90 <sup>th</sup> %ile	95 <sup>th</sup> %ile	Sample Number
Field Cond @ TRef25 µS/cm	57.2	69.3	115.0	160.5	344.0	456.2	528.5	184
pH field - sensor TC	4.7	5.0	5.4	6.4	7.6	8.1	8.5	149
Total Dissolved Solids mg/L	37.0	45.8	78.6	115.0	197.0	272.0	290.0	149
Iron as Fe mg/L	0.1	0.1	0.1	0.1	0.3	0.6	1.3	148
Calcium as Ca mg/L	0.4	1.2	2.9	7.5	16.8	26.3	41.3	148
Magnesium as Mg mg/L	1.1	1.2	3.1	5.1	9.6	13.5	15.5	148
Aluminium as Al mg/L	0.1	0.1	0.1	0.1	0.1	0.2	0.4	148
Sodium as Na mg/L	7.0	7.9	9.3	15.5	23.0	44.2	54.0	149
Potassium as K mg/L	0.2	0.3	0.6	1.5	4.2	7.5	8.6	148
Chloride as Cl mg/L	7.4	10.1	11.0	20.0	25.0	81.3	99.3	148
Fluoride as F mg/L	0.2	0.2	0.2	0.2	0.2	0.2	0.2	148
Sulphate as S mg/L	2.5	2.5	2.5	2.5	13.3	26.3	33.7	148
Nitrate as N mg/L	0.3	0.3	2.0	5.0	10.0	22.5	25.0	156
Carbonates as C mg/L	2.5	2.5	2.5	2.5	2.5	2.5	2.5	97
Bicarbonates as C mg/L	2.5	2.5	2.5	29.0	83.0	166.0	238.6	145
Perm Hardness mg/L	2.5	2.5	5.6	14.8	26.0	51.7	67.7	174
Temp Hardness mg/L	2.5	2.5	2.5	21.0	60.4	84.4	160.2	145
Alkalinity mg/L	2.5	2.5	2.5	24.0	68.4	124.0	188.8	145

**Table 20. Basins**

Parameter	5 <sup>th</sup> %ile	10 <sup>th</sup> %ile	20 <sup>th</sup> %ile	Median	80 <sup>th</sup> %ile	90 <sup>th</sup> %ile	95 <sup>th</sup> %ile	Sample Number
Field Cond @ TRef25 µS/cm	112.8	137.8	395.8	1845.0	3368.0	3990.0	4072.0	118
pH field - sensor TC	4.9	5.2	6.1	7.5	8.1	8.4	8.5	108
Total Dissolved Solids mg/L	70.4	82.0	210.0	431.0	2056.0	2483.0	2605.5	108
Iron as Fe mg/L	0.1	0.1	0.1	0.1	0.1	0.3	0.4	89
Calcium as Ca mg/L	0.7	1.5	2.2	37.0	100.0	120.0	130.0	107
Magnesium as Mg mg/L	2.3	2.7	6.6	28.0	110.0	155.0	165.0	108
Aluminium as Al mg/L	0.1	0.1	0.1	0.1	0.1	0.2	0.4	89
Sodium as Na mg/L	10.7	18.4	31.4	89.0	370.0	620.0	646.5	108
Potassium as K mg/L	0.8	0.9	1.0	1.9	9.2	20.0	21.0	108
Chloride as Cl mg/L	19.1	32.0	46.8	180.0	936.0	980.0	1080.0	108
Fluoride as F mg/L	0.2	0.2	0.2	0.2	0.5	0.5	0.6	108
Sulphate as S mg/L	2.5	2.5	2.5	10.0	26.8	82.0	85.0	108
Nitrate as N mg/L	0.4	2.0	5.0	10.0	26.0	50.0	50.0	110
Carbonates as C mg/L	2.5	2.5	2.5	2.5	9.2	19.5	28.0	62
Bicarbonates as C mg/L	2.5	2.5	6.0	175.0	520.0	660.0	710.0	106
Perm Hardness mg/L	3.1	8.5	16.0	88.5	359.0	550.0	568.0	126
Temp Hardness mg/L	2.5	2.5	5.1	142.5	430.0	545.0	580.0	106
Alkalinity mg/L	2.5	2.5	5.1	150.0	430.0	545.0	580.0	106

**Table 21. Coastal Sands**

Parameter	5 <sup>th</sup> %ile	10 <sup>th</sup> %ile	20 <sup>th</sup> %ile	Median	80 <sup>th</sup> %ile	90 <sup>th</sup> %ile	95 <sup>th</sup> %ile	Sample Number
Field Cond @ TRef25 $\mu$ S/cm	480.0	503.6	520.0	614.0	6166.0	6270.0	6296.0	45
pH field - sensor TC	6.2	6.3	6.5	7.2	7.6	7.8	8.0	38
Total Dissolved Solids mg/L	295.0	303.5	320.8	3820.0	4500.0	4665.0	4862.6	38
Iron as Fe mg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.1	38
Calcium as Ca mg/L	10.5	10.9	12.0	108.0	210.0	220.0	221.5	38
Magnesium as Mg mg/L	12.9	13.0	13.5	185.0	256.0	270.0	280.0	38
Aluminium as Al mg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.2	38
Sodium as Na mg/L	60.7	67.4	71.4	620.0	810.0	825.1	870.0	38
Potassium as K mg/L	2.4	2.7	2.8	7.2	9.5	9.7	10.1	38
Chloride as Cl mg/L	103.5	118.5	130.0	262.5	2032.0	2103.0	2130.5	38
Fluoride as F mg/L	0.2	0.2	0.2	0.2	0.2	0.2	0.2	38
Sulphate as S mg/L	22.5	29.0	30.4	42.0	140.0	145.3	150.8	38
Nitrate as N mg/L	0.3	0.3	0.3	5.0	5.0	5.0	5.0	39
Carbonates as C mg/L	2.5	2.5	2.5	2.5	2.5	2.5	2.5	24
Bicarbonates as C mg/L	20.6	25.4	33.4	187.5	350.0	360.0	361.5	38
Perm Hardness mg/L	52.0	53.2	57.8	73.0	1282.0	1371.0	1406.0	45
Temp Hardness mg/L	20.9	24.0	28.0	197.5	290.0	290.0	300.0	38
Alkalinity mg/L	20.9	24.0	28.0	197.5	290.0	290.0	300.0	38

**Table 22. Karsts**

Parameter	5 <sup>th</sup> %ile	10 <sup>th</sup> %ile	20 <sup>th</sup> %ile	Median	80 <sup>th</sup> %ile	90 <sup>th</sup> %ile	95 <sup>th</sup> %ile	Sample Number
Field Cond @ TRef25 $\mu$ S/cm	50.2	57.6	62.0	354.0	964.0	1022.0	1086.0	49
pH field - sensor TC	4.9	5.1	6.0	7.3	8.3	8.5	8.6	36
Total Dissolved Solids mg/L	31.3	45.5	50.0	122.5	710.0	735.0	787.5	36
Iron as Fe mg/L	0.1	0.1	0.1	0.1	0.6	0.9	1.0	36
Calcium as Ca mg/L	1.7	2.3	3.6	32.5	98.0	105.0	107.5	36
Magnesium as Mg mg/L	0.7	0.9	1.2	1.8	42.0	43.0	45.8	36
Aluminium as Al mg/L	0.1	0.1	0.1	0.1	0.2	0.2	0.4	36
Sodium as Na mg/L	4.6	4.7	5.1	6.1	49.0	51.0	52.5	36
Potassium as K mg/L	0.1	0.1	0.2	1.0	10.3	20.3	25.2	35
Chloride as Cl mg/L	8.4	8.9	10.5	16.0	120.0	125.0	130.0	36
Fluoride as F mg/L	0.2	0.2	0.2	0.2	0.2	0.2	0.2	36
Sulphate as S mg/L	2.5	2.5	2.5	15.0	67.0	82.0	93.0	36
Nitrate as N mg/L	3.6	5.0	5.0	5.0	10.0	10.0	11.5	38
Carbonates as C mg/L	2.5	2.5	2.5	2.5	5.1	11.2	11.9	24
Bicarbonates as C mg/L	2.5	2.5	2.5	90.0	340.0	356.0	369.0	35
Perm Hardness mg/L	7.2	8.0	9.9	31.4	150.8	202.0	221.9	47
Temp Hardness mg/L	2.5	2.5	6.6	73.0	280.0	296.0	309.0	35
Alkalinity mg/L	2.5	2.5	6.6	73.0	280.0	296.0	309.0	35

## 7 Resources

[Ezzy, A., \(2004\).](#) An overview of the Mineral Resources Tasmania statewide groundwater monitoring network. Mineral Resources Tasmania, Hobart.

[Goudey, R., \(1999\).](#) Assessing water Quality Objectives: Discussion Paper. EPA, Southbank, Vic.

[Sheldon, R., \(2011\).](#) Groundwater and Surface Water Connectivity in Tasmania: Preliminary Assessment and Risk Analysis. Water and Marine Resources Division, Department of Primary Industries, Parks, Water and Environment, Hobart.

## Appendix A Reference bore sites for Interim Groundwater

The sites in the following lists were those used in the derivation of the DGVs for groundwater aquatic ecosystems.

Bore	Region	Hydstra_ID	Easting	Northing	Data Provider
Huonville_16923	Huon and Bruny Rolling Hills	5514	504855.743	5238407.711	MRT
Chudleigh_16538	Karst	5501	455897.53	5397925.22	MRT and DPIPWE
Togari_16531	Karst	5532	322821.06	5465190.95	MRT and DPIPWE
Montagu Bore_16532	North West Basalt Plateaus and Valleys	5519	333617.52	5481097.72	MRT and DPIPWE
Trowutta Bore_16530	North West Basalt Plateaus and Valleys	5533	340208.22	5454912.73	MRT and DPIPWE
South Forest Bore_16527	North West Basalt Plateaus and Valleys	5502	351782.71	5471938.49	MRT and DPIPWE
Calder Bore_16533	North West Basalt Plateaus and Valleys	5509	390533.22	5458350.96	MRT and DPIPWE
Hampshire Bore_16534	North West Basalt Plateaus and Valleys	5513	399943.07	5437466.91	MRT and DPIPWE
Mooreville Bore_16535	North West Basalt Plateaus and Valleys	5520	404318.33	5448709.79	MRT and DPIPWE
Barrington Bore_16536	North West Basalt Plateaus and Valleys	5503	439439.64	5425824.36	MRT and DPIPWE
Spreyton Bore_18606	North West Basalt Plateaus and Valleys	5527	445373.32	5435462.415	MRT
Beulah Bore (after 2000)	North West Basalt Plateaus and Valleys	5540.2	446043.52	5409518.32	MRT and DPIPWE
Waterhouse Bore_16544	Coastal Sands	5535	541943.13	5460820.69	MRT and DPIPWE
Bicheno Bore_16548	Coastal Sands	5505	604274.98	5366692.1	MRT
Port Arthur Bore_16528	East Coast Rolling Hills	5524	566066.1	5223685.2	MRT
Buckland Bore_16551	East Coast Rolling Hills	5508	560926.87	5282615.06	MRT and DPIPWE
Little Swanport Bore_16549	East Coast Rolling Hills	5517	579353.74	5315783.66	MRT and DPIPWE
St Marys Bore_16526	North East Highlands	5528	594569.22	5396821.14	MRT and DPIPWE
Lilydale Bore_16542	North East Highlands	5516	517569.901	5432316.414	MRT
Branxholm Bore_16546	North East Highlands	5507	559942.21	5443211.49	MRT and DPIPWE
Winnaleah Bore_16547	North East Highlands	5536	568064.73	5448047.656	MRT
Hagley Bore_16540	Basins	5512	492828.36	5405391.63	MRT and DPIPWE
Cressy Bore_16541	Basins	5510	506749.33	5385874.5	MRT and DPIPWE
Ross Bore_16553	Basins	5525	541168.44	5347140.12	MRT and DPIPWE

<b>Bore</b>	<b>Region</b>	<b>Hydstra_ID</b>	<b>Easting</b>	<b>Northing</b>	<b>Data Provider</b>
Pawleena Rd Bore_16554	Basins	5522	547437.34	5264982.33	MRT and DPIPWE
Pipers River Bore_16543	Basins	5523	507017.114	5449672.26	MRT
Jetsonville Bore_16545	Basins	5515	541266.493	5448435.922	MRT
Melton Mowbray Bore_16529	Southern Midland rolling hills	5518	515294.14	5295640.17	MRT and DPIPWE
Tunnack Bore_16550	Southern Midland rolling hills	5534	537953.64	5298549.35	MRT and DPIPWE
Bothwell Bore_17772	Southern Midland rolling hills	5506	496578.021	5315623.428	MRT
Lower Snug Bore_17773	South East Plateaus and Escarpments	5526	520446.566	5229342.047	MRT
Osmaston Bore_16539	Central Plateaus	5521	480005.01	5398832.85	MRT and DPIPWE



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