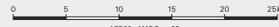


NORTHWEST TASMANIA GROUNDWATER MAP

SCALE 1:250000



AQUIFER TYPE	PROSPECTIVITY (range of success)	ROCK GROUPS	NUMBER OF BORES	PERCENTAGE SUCCESSFUL (YIELD > 0.05)	AVERAGE YIELD (L/s)	PERCENT SUCCESSFUL (YIELD > 1.5)	SALINITY RANGE (mg/L)	GENERAL AQUIFER CHARACTERISTICS	VULNERABILITY TO POLLUTION	
POROUS (INTERGRANULAR)	HIGH	Quaternary aeolian deposits marginal to the coast consisting of fine to medium grain size sand.	60	95	0.65 (11)	1.3	0 - 270	These aquifers are contained in surface sand deposits of limited thickness - usually up to a maximum thickness of 10-15 metres, but often much less. Yields depend on grain size, clay content and the thickness of saturated material. Yields decrease with an increase in the clay content. Groundwater is usually extracted from these aquifers using sewer bores installed to a depth of 7.5 metres. A single bore in a prospective area may yield 0.75 L/s (e.g. Currie area) which would be sufficient for domestic, garden, and stock use. A fleet of sewer bores (10-20) using a central pump may yield irrigation or small town supplies (1-1.5 L/s). Significant extraction from these deposits takes place at Currie, where the town supply comes from dune sand, and at Stanley where the golf club installed a system to water the course. Other areas including Woodnorth, Stanley, Arthur River and Hogg Beach bores proved to have potential for useful aquifers. Quality of water in these aquifers is usually good enough for a wide range of uses. There are many sewer bores installed for investigation and production purposes in coastal sand deposits in the region. Aquifers are mostly unconfined.	High	
POROUS (INTERGRANULAR)	MODERATE-HIGH	Quaternary coastal plain deposits consisting of sand, clayey sand, gravel and shaly deposits. Possible marine origin.	54	51.9	2.19 (24)	15.2	33.3	These aquifers are contained in surface deposits of limited thickness (10-15 metres or less). Yields depend on grain size, clay content and the thickness of saturated material. Some high yielding bores have been established around the coast line near Devonport and Burnie where some coarse sediments occur. In the north west, coastal influences appear to sometimes have a bearing on the slightly increased salinity near the shoreline compared to bores remote from the coast line. Extensive areas of saline deposits occur in the Smithton area and on King Island. Bore often extend through these materials and draw water from underlying strata. Aquifers are unconfined to confined.	Moderate to high. Depends on whether low permeability material (e.g. clay) overlies the aquifer.	
POROUS (INTERGRANULAR)	LOW-MODERATE	Quaternary alluvium, lake and fill. The alluvium consists of clay, sand and gravel with variable clay content. The lake consists of boulders, usually with a moderate to high clay content. The fill comprises boulders with a higher content of fine-grained material. Minor windward sand on sloping bedrock.	40	35.0	2.06 (14)	7.6	42.9	These aquifers are contained in surface deposits, usually of limited thickness. Yields in alluvium are variable, but where coarse sediments occur with a low clay content, outputs from bores can be high (e.g. Ralton area). Talus and windward sands are usually in elevated locations on the side of slopes and groundwater prospects are usually low. Fill has low prospects as a result of its usually limited thickness and the fine grained nature of the material between the boulders. In many areas where these deposits occur, the potential for obtaining useful bore yields are from bores that extend through these deposits into the underlying material. In many cases the material underlying these deposits will be the same as that surrounding this unit at the surface. Water quality in the coarse grained sediments will usually be good. Recharge to aquifers in the alluvium may take place from surface streams in some cases. Aquifers are unconfined to confined.	Low to high. Clay content overlying aquifers will offer protection to underlying aquifers, e.g. Shellford - Devonport area. Coarse grained aquifers without such protection are highly vulnerable, as are aquifers underlying such materials.	
POROUS (INTERGRANULAR)	LOW-HIGH (High on the map)	Tertiary sediments consisting of clay, sand and gravel of non-marine origin, usually interbedded with or underlying basalt. Tertiary limestone, often close to metamorphosed (Rocks) Marine origin.	122	70.5	2.43 (80)	30.3	41 - 65	Tertiary sediments are exposed at the surface mainly in the Devonport - Shellford regions, but they occur as under surface horizons in many areas e.g. interbedded with and underlying basalt. Tertiary limestone occurs at the surface or underlying basalt at Riddo, Woodnorth. Success rates are moderate to high in most cases where these materials have been drilled. As they are usually unconsolidated, care needs to be taken by drillers to stabilise these aquifers with screens or cased casing with appropriate test size and gravel pack. Small irrigation supplies have been obtained from a large proportion of the bores where yields have been reported. A very saline bore (17500 mg/L) occurs in limestone at Woodnorth. Aquifers are often confined and occasionally unconfined.	Low to high. Clay content of the surface will give some protection to underlying aquifers, e.g. Shellford - Devonport area. Tertiary limestone in the Riddo - Woodnorth area and at the surface at some locations will in these situations, vulnerability is high.	
FRACTURED ROCK (Disseminated on some horizons)	HIGH	Premian mudstone, siltstone, sandstone and tillite. Mainly marine origin, deposited under glacial conditions. Triassic sediments (no bores in this unit).	207	88.9	2.35 (175)	18.95	41.1 - 82	Premian age rocks occur only in the eastern half of the region and are mainly regarded as fractured rock aquifers, although some of the coarse grained horizons (sandstone and conglomerate) are likely to have some intergranular storage. In most cases the permeability is probably through fractures and bedding planes. In the northwest, the success rates for bores drilled in these rocks is particularly high, with a high proportion of high yielding bores (outputs up to almost 20 L/s). Lower lying areas are usually more favourable for siting bores than elevated areas such as the slopes of the Great Western Tiers in the southeast of the region. In the north west, quality is almost always very good and a wide range of uses are possible. Aquifers are mainly unconfined to confined locally. Of particular interest is a zone around Sempson where artesian water can be obtained from the base of the Permian (greenstone) at about 120-150 metres. Aquifers are often confined and occasionally unconfined.	High. Low permeability layers at the surface - clay and silt - will give some protection to underlying aquifers, e.g. Shellford - Devonport area. High yielding bores can be very high in hard areas. Where thick clayey tillite overlies these aquifers vulnerability will be reduced.	
FRACTURED ROCK	MODERATE-HIGH	Ordovician sediments, Cambrian limestone, Cambrian sediments and Neoproterozoic sediments. Devonian. Precambrian mudstone slate and quartzite.	21 63 39.7 85.1 42.2 1986	61.9 67.1 65.4 85.1 83.9	4.18 (17) 3.52 (30) 1.68 (72) 2.56 (184) 1.48 (238)	28.27 12.87 25.31 25.27 17.05	63.9 65.0 28.7 54.3 22.4	61 - 820 100 - 176 85 - 1620 280 - 3700 105 - 97.2	Ordovician rocks occur only in the eastern part of the north west region, while dolomite occurs only in the north west corner near Smithton, Cambrian, Neoproterozoic and Precambrian rocks occur throughout the region. In the northwest, the Ordovician rocks are the least prospective, but of those where water was obtained, yields are high with a high proportion giving amounts of > 1.5 L/s or small irrigation quantities. Many bores in the Ordovician in the Smithton - Riddo - Ralton area are high yielding. Precambrian rocks have a lower proportion of bores yielding small irrigation quantities. Yields are up to 25 L/s and the water is used for domestic, garden, stock and irrigation purposes. Rocks outside the agricultural areas are largely untested. Quality is generally very good for a wide range of uses in other prospects. Near coastal areas may have groundwater with slightly higher salinity levels. Aquifers are semi-confined to confined and occasionally unconfined.	High. Dolomite can be very high in hard areas. Where thick clayey tillite overlies these aquifers vulnerability will be reduced.
FRACTURED ROCK	HIGH	Tertiary basalt.	1100	87.2	1.90 (1417)	25.27	32.7	80 - 950	In the northwest, basalt has had by far the most bores installed in it of all rock units in the region. The basalt is wide spread. Intensive farm production activities are predominantly on the basalt derived soils. Yields can be high (up to 25 L/s) and the proportion of bores with small irrigation yields is also high. Many of the irrigation bores in the Devonport - Port Sorell area are in basalt. In some localised areas, such as the Mowbray Basalt at Northburn where the basalt has been weathered to clay and Central Mowbray Basalt has lower success rate. Basalt also has greater storage capacity than other fractured rock aquifers as a result of more extensive and closely spaced jointing and the presence of widespread vesicularity (gas holes). Quality of the groundwater in the basalt is generally very good. Slightly higher salinity is possible in water from bores near the coastline. Aquifers are mainly confined to unconfined locally.	High. Dolomite can be very high in hard areas. Where thick clayey tillite overlies these aquifers vulnerability will be reduced.
FRACTURED ROCK	MODERATE	Jurassic dolomite.	16	56.3	1.12 (9)	1.52	11.1 - 187	Jurassic dolomite in the northwest region is of limited extent and only a few bores have been drilled in it. Success rates is moderate as at most other locations in the State. Average output is moderate to low and only one bore has been recorded with small irrigation quantities. Dolomite also has less fracturing than other fractured rock aquifers and fractures can be less open, causing lower permeability and storage capacity. Water quality is likely to be good at most locations in north west Tasmania. Aquifers are often unconfined, semi-confined to confined.	Moderate. As a result of the possible lower integrity of dolomite at other locations and slight jointing, vulnerability at most locations will be only moderate. The development of clay soils will add to protection. Low to moderate.	
FRACTURED ROCK	LOW-MODERATE (Low on the map)	Devonian and Precambrian granite. Peridotite (no bores in this unit).	31	38.7	0.50 (11)	1.01	0	770	Devonian granite occurs in areas adjacent to agricultural areas or outside them and only a few bores have penetrated the granite. Precambrian granite on King Island has been drilled at several locations. Bore success rates are generally of both good to relatively poor and this is probably largely due to the coarse nature of the jointing. Peridotite and serpentinite outside the agricultural areas are untested and little is known of their potential. Aquifers are unconfined to confined.	Low to moderate. Deep clayey soils developed on the granite will add to the protection.

1. Statistics provided in the legend are based on deep boreholes entered in MRT groundwater database (BORIS) by February 2003. Boreholes shown on the map are those with locations mainly supplied by filters and from location in the field by MRT staff.
 2. Boreholes with yields > 0.05 L/s have been considered as successful bores. Yield related statistics (average, maximum yield and percent irrigation successful) are based on the number of successful bores (number in brackets in the average yield column). Outputs of bores are those supplied by filters and are mostly the result of short term pumping measurements. Some bores have been successful but outputs have not been reported. These bores are included in the total percentage of successful bores but have not been used for other statistical calculations. Boreholes reported as dry holes usually have small unreported yields (< 0.05 L/s).
 3. Successful bores with reported yield > 1.5 L/s have potential for small irrigation purposes. Very limited irrigation is possible with lower yields.
 4. There are many sewer bores installed for investigation and production purposes in coastal sand deposits in Tasmania. Salinity ranges for some of the Quaternary aquifers have been obtained from these borehole records and included in the legend (marked with a star *).
 5. Small elevated areas of any hydrological unit will usually have lower prospectivity because of limited storage and high drainage rates.
 6. In areas where there is little or no water bore data, the groundwater prospectivity has been assumed to be similar to that in areas where data are widely available.

BOREHOLE YIELD (See groundwater quality map for borehole quality - TDS)

Bore Location Accuracy - 500 - 2000 m 1 - 500 m

Yield Unknown	Yield (L/s)	Potential use of groundwater based on borehole yield
○	0 (Dry borehole)	Limited use for domestic and stock
○	<= 0.05	Domestic, stock, garden
○	0.05 - 0.5	Domestic, stock, garden, limited irrigation
○	0.5 - 1.5	Domestic, stock, garden, small area irrigation
○	1.5 - 5.0	Domestic, stock, garden, moderate area irrigation, small communities
○	5.0 - 10.0	Domestic, stock, garden, larger area irrigation, small towns, supplement to larger towns
○	> 10.0	Domestic, stock, garden, larger area irrigation, small towns, supplement to larger towns

Outputs of bores are those supplied by filters and are mostly the result of short term pumping measurements. Outputs may not be sustained for long periods of continuous pumping. Boreholes reported as dry holes usually have small unreported yields e.g. < 0.05 L/s. The bores shown are those recorded in the Mineral Resources Tasmania groundwater database (BORIS). Conversion factors - 1 litre per second = 800 gallons per hour = 0.8 millimetres per hectare per day = 0.84 acre inches per day. 1 tonne per second = 8000 tonnes per hour = 8.6 millimetres per hectare per day = 8.64 acre inches per day.

GROUNDWATER QUALITY Expressed as Total Dissolved Solids (TDS)

TDS in mg/L

TDS in mg/L	Potential use of groundwater based on water quality
< 500	All purposes, domestic and irrigation
500 - 1000	Most purposes, general upper limit for irrigation
1000 - 1500	Most purposes, upper limit for drinking, limited irrigation
1500 - 3000	All livestock, very limited irrigation
3000 - 7000	Most livestock (not pigs or horses)
> 7000	Limited stock use (beef cattle, sheep)

Areas of similar groundwater quality across different rock types are shown by shading as shown. Solid lines indicate deep aquifers while broken lines - - - - - indicate shallow aquifers. Boundaries are approximate only. These are general limits for the use of groundwater. The use of water for irrigation with the higher levels of salinity in the above tables should only be considered on particularly suitable soil types with the adoption of specific management practices. If the bore water is mixed with fresh water, for further information see Australian and New Zealand guidelines for fresh and marine water quality.

MEAN ANNUAL RAINFALL

0 - 3500 mm

LOCATION DIAGRAM

NORTHWEST, NORTHEAST, SOUTHWEST, SOUTHEAST

The data for this map were derived from the Tasmanian Geological Atlas 1:250,000 digital series and Mineral Resources Tasmania Groundwater data base (BORIS) and are based upon the potential for groundwater within broad rock groups. Plotted borehole data as at 05-OCT-2006. Other groundwater and hydrogeology maps and reports are available from Mineral Resources Tasmania. Borehole data is available from the Mineral Resources Tasmania website - www.mrt.tas.gov.au. This unit has low prospectivity and is therefore groundwater potential and salinity areas are indicative only. This map does not remove the need for site specific investigations. Groundwater potential data compiled by: W.L. Mathews B.Sc. and M.L. Lattin B.Sc.(Hons) May First published July 2006. Base data from the LIST - State of Tasmania. While every care has been taken in the preparation of this map, the authors accept no responsibility for any omissions or errors or for any consequences arising from the use of the information provided. The Crown in Right of the State of Tasmania. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or by any information storage and retrieval system, without the prior written permission of the State of Tasmania. Copyright reserved.