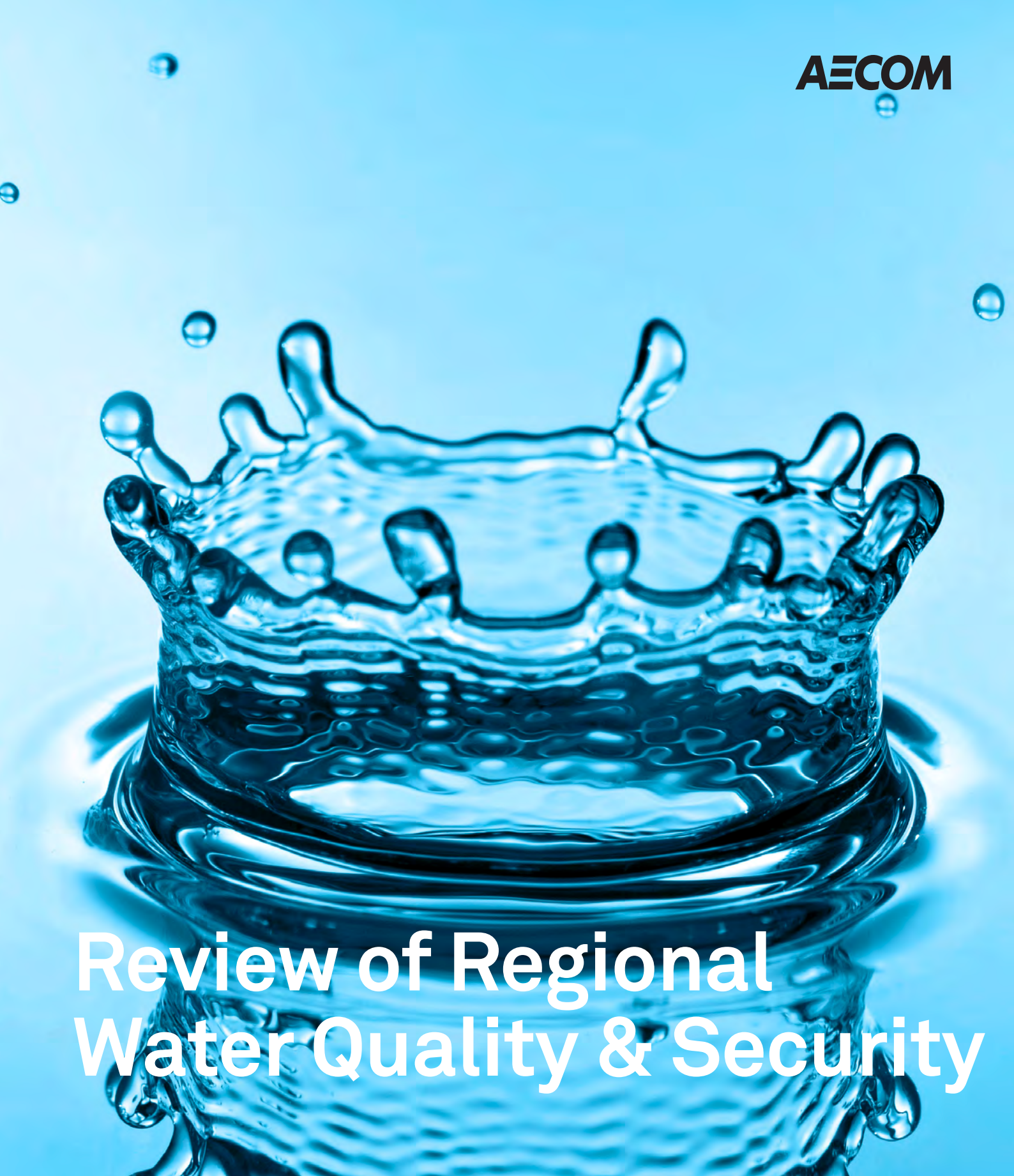




Review of Regional Water Quality & Security

Appendices

Volume 2

Prepared for Infrastructure Australia

**Enhancing and sustaining
the world's built, natural
and social environments.**

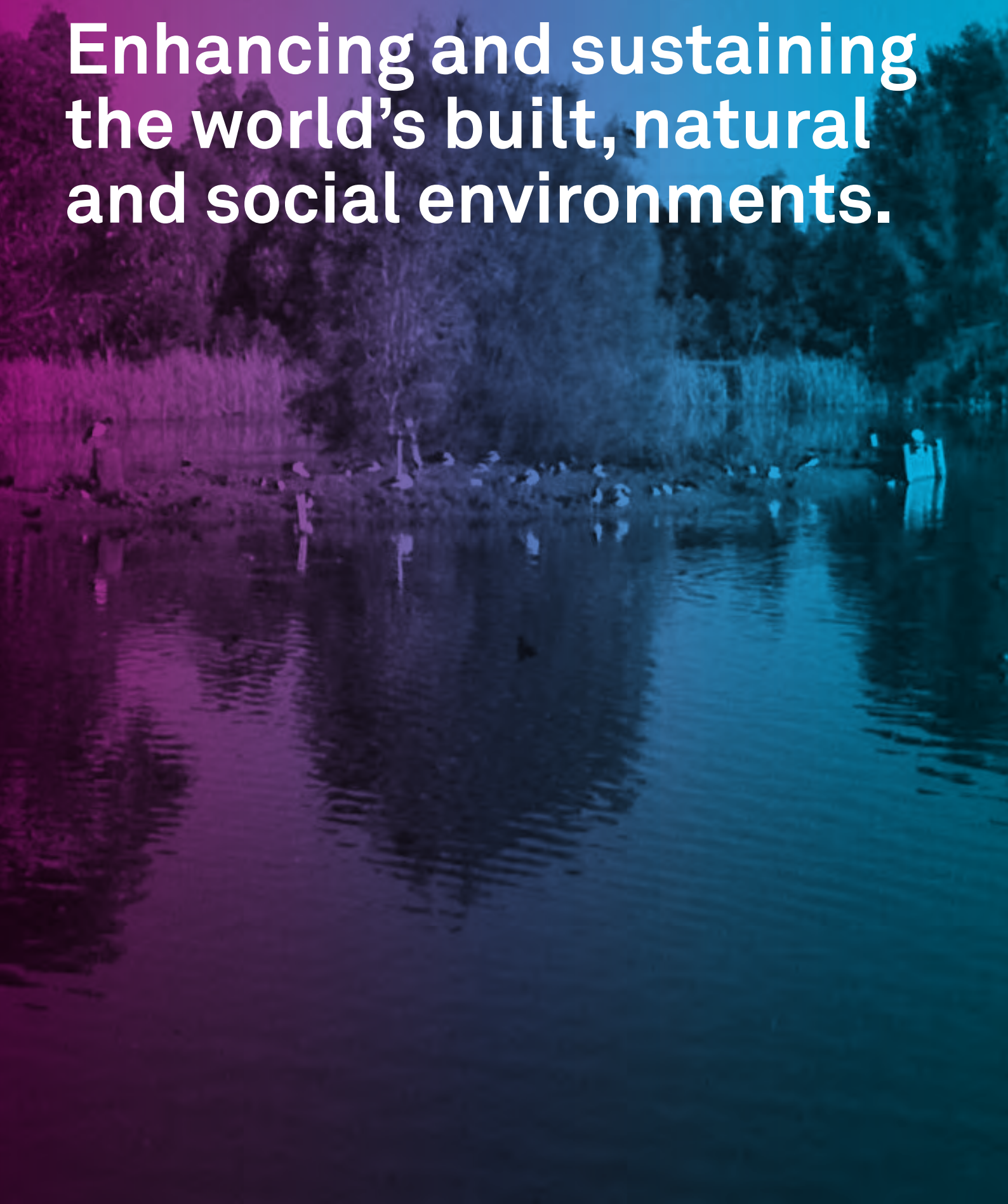


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Water Framework in Australia



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Appendix A Water Framework in Australia

The water industry is complex, with different governance structures and regulatory requirements existing in each state. Understanding the institutional arrangements and regulatory frameworks provides a baseline for the recommendations provided in this report.

The Commonwealth Government also has a strong, but generally a non-regulatory role in the water industry. The criticality of sustainable water supplies for domestic, environmental, industrial and recreational use has meant that the Commonwealth Government has taken a leading role in driving reform across the country. However, the Commonwealth Government does not have enforcement power in water and as such actual reform is generally implemented by the states.

Federal

In Australia, water belongs to the Crown, which means the relevant minister in each state or territory. The management of water in Australia is complex with many laws and agencies. In fact, there are up to as many as 800 agencies that are responsible for the administration and management of water, at the federal, state, regional and local level.

In addition to the regulatory bodies, there are a number of other government and non-government organisations with an interest in water. The organisations provide advice to regulatory authorities, work in research, develop new systems, assist regulators during implementation of new initiatives and campaign government for change.

The major responsibilities for water at a Commonwealth level sit with the Department of Water, Environment, Heritage and the Arts (DEWHA), the Council of Australian Governments (COAG), the National Water Commission (NWC) and the Australian Competition and Consumer Commission (ACCC).

While the states and territories own and manage water resources, the Commonwealth Government provides national leadership and strategic direction on water matters. COAG provides a forum for the states and territories to negotiate with the Commonwealth Government over matters of common concern, including water management.

In 1994, COAG separated the land and water title rights. In 2004 the Intergovernmental Agreement on a National Water Initiative (NWI) was created and as of 2006 all states had signed it. The aim of the NWI is to improve the economic efficiency of Australia's water management, while also protecting our resources and the environment. The NWC was formed to review the progress of the NWI and completes a biennial report on progress. The eight principal reform agendas in the NWI were and as of 2010, still are:

- Water access entitlements and planning framework
- Water markets and trading
- Best practice water pricing and institutional arrangements
- Integrated Management of Environmental Water
- Water Resource Accounting
- Urban Water Reform
- Community Partnerships and Adjustment
- Knowledge and Capacity Building

There are also arrangements in place for a number of catchments traversing state boundaries. These arrangements are in place to improve governance of cross-boundary water supplies. Most of these arrangements are legislated, though some are by agreement only. The catchments are the Murray Darling Basin, Lake Eyre Basin, Snowy River, Great Artesian Basin, Vic-SA Border Groundwater Area and NSW-Qld Border Rivers.

The Water Act 2007 commenced in March 2008. The Water Act established Commonwealth environmental water responsibilities, as well as the new Murray-Darling Basin Authority (MDBA) and required the MDBA to prepare a strategic Basin Plan. The Act also gave the ACCC powers to enforce water charge and market rules

The National Competition Council (NCC) administers the National Competition Policy, in which water is included. The Policy endeavours to address both the economic viability and ecological sustainability of the nation's water supply. Of particular reference to this project is the NCC's pricing reform, which is 'based on principles of consumption-based pricing, full-cost recovery, and removal of cross-subsidies'.

In April 2008, the Commonwealth Government established the Water for the Future program in response to the challenge of securing a sustainable water future for Australia. The program's key priorities are:

- Taking action on climate change
- Using water wisely
- Securing water supplies
- Supporting healthy rivers

The Commonwealth Government is also involved in addressing the water skills shortage and improving the knowledge of water industry members across Australia. Government Skills Australia (GSA) has been contracted by the federal Department of Education, Employment and Workplace Relations (DEEWR) to provide training packages and resources. GSA's Water Industry Advisory Committee (WIAC) is responsible for developing and promoting these programs, which extend beyond operations and into cross-discipline problem solving, such as water resources management.

Other key drinking water related requirements or best practice that are driven by the Commonwealth Government include the Australian Drinking Water Guidelines (ADWG). A 2010 draft revision of the ADWG was publicly available for comment in 2010, with the new ADWG to be issued for release in 2011.

Additionally, the NWC, in association with Water Services Association of Australia (WSAA), publishes the annual National Annual Performance Report. This report provides information on approximately 33 of the 150+ criteria collated on water utilities with greater than or equal to 10,000 connections. The NWC also provides a biennial assessment on the implementation of the NWI, the most recent of which was completed in 2009.

In addition to the above, there are a range of other programs that have been established to improve the management and delivery of water supplies in Australia. These programs are summarised on the DEWHA website¹.

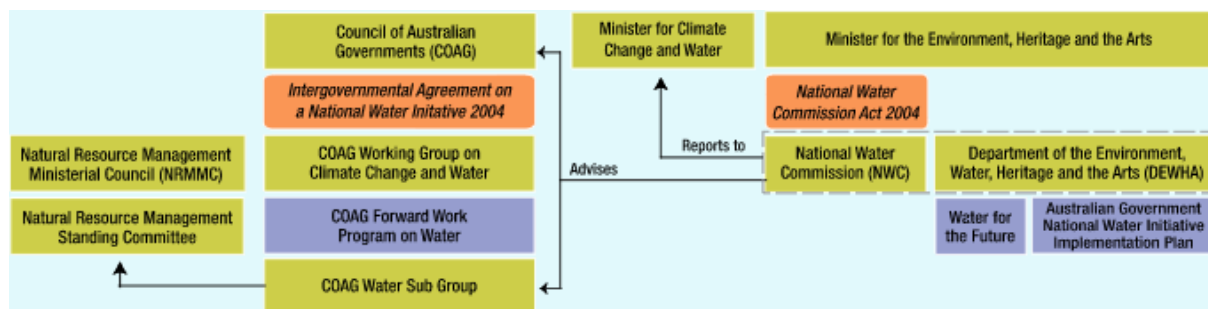


Figure 1: National arrangements for water governance²

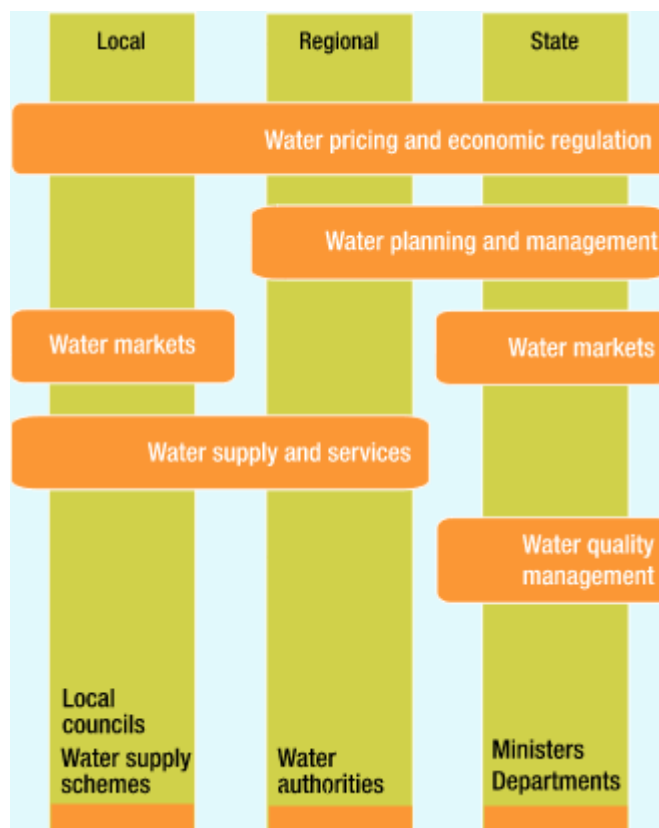
¹ <http://www.environment.gov.au/water/policy-programs/index.html>

² <http://www.nwc.gov.au/www/html/2354-national-arrangements.asp>

Figure 2: Cross-boundary arrangements ³

Queensland

In Queensland, water management responsibilities rest with various state organisations. Queensland's water framework has undergone significant change in recent years, including changes to regulatory and institutional arrangements, including the amalgamation of bulk and reticulated water suppliers. The figure and table below describe the various responsibilities in water in Queensland as it related to supply of water to regional towns.

Figure 3: Queensland arrangements for water management ⁴

³ <http://www.nwc.gov.au/www/html/1540-cross-boundary-arrangements.asp>

⁴ <http://www.nwc.gov.au/www/html/1787-queensland---introduction.asp>

Table 1 Summary of water in Queensland

Governance Area	Responsible Party	Responsibilities
Water Pricing	Queensland Competition Authority (QCA) & Water utilities	QCA provide pricing recommendations, review pricing policies & monitor pricing. Local government councils set their own urban bulk and retail prices. SunWater, Seqwater & rural water boards set their own prices.
Rural & Regional Water Planning & Mgmt	Department of Environment & Resource Management (DERM)	Prepare & implement Water Resource Plans, Resource Operations Plans & Regional Water Supply Strategies; administer water licences, water allocations, resource & distribution operations licences, prepare industry guidelines & approve water service provider plans. The key legislation is the Water Act 2000.
Metropolitan Water Planning & Mgmt	Queensland Water Commission (QWC)	Strategy is to keep water supply & demand in balance for the next 50 years in SE Qld. Have prepared & are implementing the SE Qld Regional Water Supply Strategy, SE Qld Water Security Program & SE Qld Regional Water System Operating Plan. They also administer water licences, water allocations, resource & distribution licences.
Water Markets	The Chief Executive & DERM (Resource Mgmt)	The Chief Executive may prepare resource operations plan, which includes trading rules. DERM administer water licences, water allocations & resources & distribution operations licences. They also manage and approve permanent water trades. Key legislation includes the Water Act 2000 and the Water Regulations 2002.
Water Supply & Services	Local government, SunWater, Seqwater, Brisbane City Council, & a number of other water boards.	Local government supplies urban retail water; SunWater, Seqwater & nine rural water boards supply rural retail; Local Government provide for stormwater & drainage, while rural & urban bulk water is supplied by the organisations listed to the left.
Drinking Water Mgmt	DERM (Office of the Water Supply Regulator) & the Department of Health	DERM regulate water supply activities under the Water Supply (Safety and Reliability) Act 2008. This includes the provision of drinking water quality by drinking water service providers. They administer monitoring and reporting requirement notices & Drinking Water Management Plans. Health encourages water supplied to meet the ADWG & samples & tests for compliance with these Guidelines.
Recycled Water Mgmt	DERM (Office of the Water Supply Regulator)	Oversees and implements the Water Supply (Safety and Reliability) Act 2008. Regulates urban & rural water supply functions carried out by water authorities. They have also prepared the Water Quality Guidelines for Recycled Water Schemes.
Environmental Health Mgmt	DERM (Environment)	Administer the Environmental Protection Act 1994, Environmental Protection Regulation 1998, Environmental Protection (Water) Policy 1997 and the Queensland Water Quality Guidelines 2006.

Drinking water has been regulated in Queensland since the introduction of the Water Supply (Safety and Reliability) Act 2008. Under the Act drinking water providers are required to submit draft water management plans to the Office of the Water Supply Regulator.

The submission of draft water management plans are now a legislated requirement for all water providers in Queensland. Previously the water quality requirements were guidelines only and drinking water providers were not mandated by law to provide a level of service to the Australian Drinking Water Guidelines. The guidelines have now been mandated in the Water Supply (Safety and Reliability) Act 2008; however the reporting requirements are to be phased in over the next 4 years as follows:

- Large supply schemes by July 2011
- Medium supply schemes by July 2012
- Small supply schemes by July 2013

Regional Queensland towns will fall under the medium and small supply schemes.

New South Wales

In New South Wales, water management responsibilities rest with various state, regional and local organisations. The figure and table below describe the various responsibilities in water in NSW as it related to supply of water to regional towns.

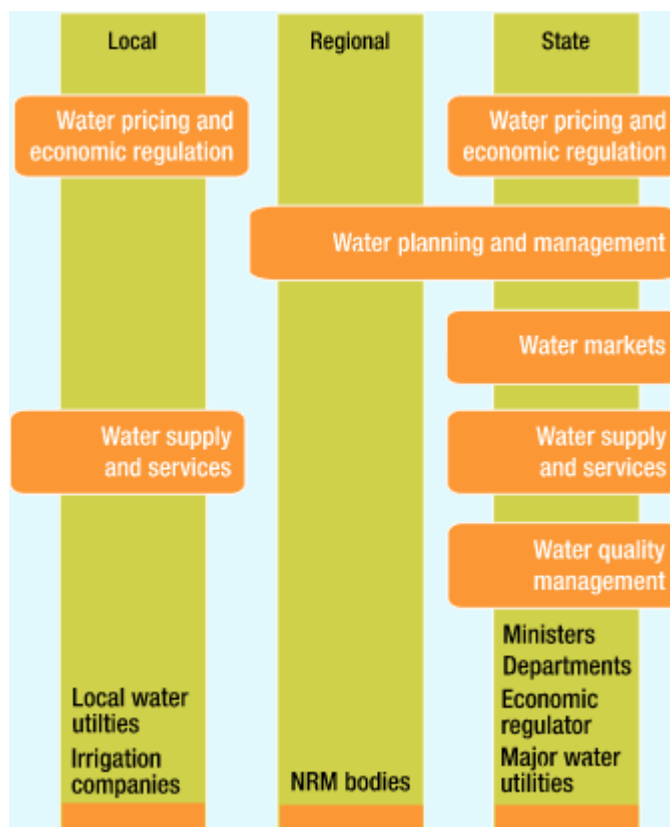


Figure 4: New South Wales arrangements for water management ⁵

Table 2 Summary of water in NSW

Governance Area	Responsible Party	Responsibilities
Water Pricing	Independent Pricing and Regulatory Tribunal (IPART) & Local Water utilities (LWUs)	While IPART set prices for metro bulk and retail water and rural bulk water, local utilities set pricing in non-metro retail and irrigation companies set rural retail prices.
Rural & Regional Water Planning & Mgmt	Department of Climate Change & Water (DECCW)	Administer the Water Management Act 2000 & the Water Act 1912. Lead preparation of sharing plans.
Metropolitan Water Planning & Mgmt	DECCW	Provide advice and guidance to local water utilities in rural & regional areas.
Water Markets	DECCW	Administer the Water Management Act 2000 & the Water Act 1912. Assess all water dealing applications in accordance with the Access Licence Dealings Principles Order.
Water Supply & Services	LWUs, StateWater, Private Irrigation Companies & Schemes & Local	LWUs – urban retail, stormwater & drainage State Water – urban & rural bulk & rural retail Private Irrigators & Schemes – rural retail Local Government – stormwater & drainage

⁵ <http://www.nwc.gov.au/www/html/1204-new-south-wales.asp>

Governance Area	Responsible Party	Responsibilities
Drinking Water Mgmt	Governments NSW Health	Develops standards for water quality and drinking water quality mgmt programs. Monitors all water supply schemes against the ADWG.
Recycled Water Mgmt	DECCW & Local Councils	DECCW administer the Protection of the Environment Operations Act 1997 (POEO), including licensing of Sewage Treatment Plants. They issue approvals under the Local Government Act 1993 to local utilities reusing or supplying reused water. Local councils issues approvals under the LGA to installers and operators of systems of sewage mgmt.
Environmental Health Mgmt	DECCW	Administers the POEO Act. Issues environment protection licences (EPLs) under the POEO Act that set operating and discharge limits for all scheduled activities.

The NSW Office of Water (NOW) administers the two key pieces of legislation for the management of water in NSW. These are the Water Management Act 2000 and the Water Act 1912. In January 2009, new compliance powers were amended into the Water Management Act 2000, providing the government with greater enforcement and penalty capabilities. NOW is also the lead agency for preparation of Water Sharing Plans. Provision of water and wastewater services by local Councils is administered under the Local Government Act 1993.

NOW also administers the NSW Guidelines for Best Practice Management for Water Supply and Sewage (2007). This guideline provides recommendations for the management and operation of water and sewage supplies to promote reasoned planning and cost recovery. For regional NSW, NOW provides managerial, technical and financial support under the Country Towns Water Supply and Sewerage Program. It also administers the Water for Life Education Program.

NSW Health are responsible for the monitoring the performance of water utilities with respect to their drinking water quality. They provide a free of charge drinking water testing service to water supply authorities for indicator bacteria and health-related inorganic chemicals. NSW Health also maintains a Drinking Water Database of water quality information for each utility. NSW health has published two documents to assist water suppliers, namely NSW Health Drinking Water Monitoring Program (2005) and the Guide for Submitting Water Samples to DAL for Analysis (2003). NSW Health support and endorse the Australian Drinking Water Guidelines

While IPART sets and regulates water pricing for metropolitan suppliers, they do not perform this role for non-metropolitan suppliers.

State Water operates the major dams across regional NSW. Supply of drinking water for domestic purposes is the responsibility of local water utilities (usually local Councils) across most of NSW and State-owned Corporations in the major metropolitan centres.

The NSW Government established thirteen Catchment Management Authorities (CMAs) across the State as part of broad natural resource management reforms. The Authorities were established under the Catchment Management Authorities Act 2003. CMAs are statutory authorities, with responsible and accountable Boards that report directly to the Minister for Natural Resources. Each Catchment Management Authority must develop a Catchment Action Plan to ensure effective implementation of natural resource management measures, in compliance with the NSW Natural Resource Management Standard and Targets.

The NSW Water Directorate provides technical information to its members, which comprise of 94 councils and county councils providing water supply and/or sewerage services to local government areas in NSW. They are available as an independent advisor to councils, promote efficiency in operation, provide technical direction and promote sharing of knowledge.

The recent Independent Inquiry into Secure and Sustainable Urban Water Supply and Sewerage Services for Non-Metropolitan NSW proposed a range of amalgamation models to improve the reliable delivery of water and sewage services in NSW. The result of this inquiry will be announced later this year. However, the present framework model in NSW is shown in Figure 4.

Announcement of the result of the Independent Inquiry into Secure and Sustainable Urban Water Supply and Sewerage Services for Non-Metropolitan NSW, which may result in amalgamation of water and wastewater supply authorities in NSW.

The Office of Water is also positioned to improve their compliance enforcement powers through the introduction of compulsory best practice procedures. This will encourage all water suppliers to maintain a consistent level of service and will also improve accountability.

Australian Capital Territory

Due to its localised geography, management of water in the ACT is relatively simple compared to most states, with all water management powers sitting with the ACT government. The figure and table below describe the various responsibilities in water in the ACT as it related to supply of water to regional towns.

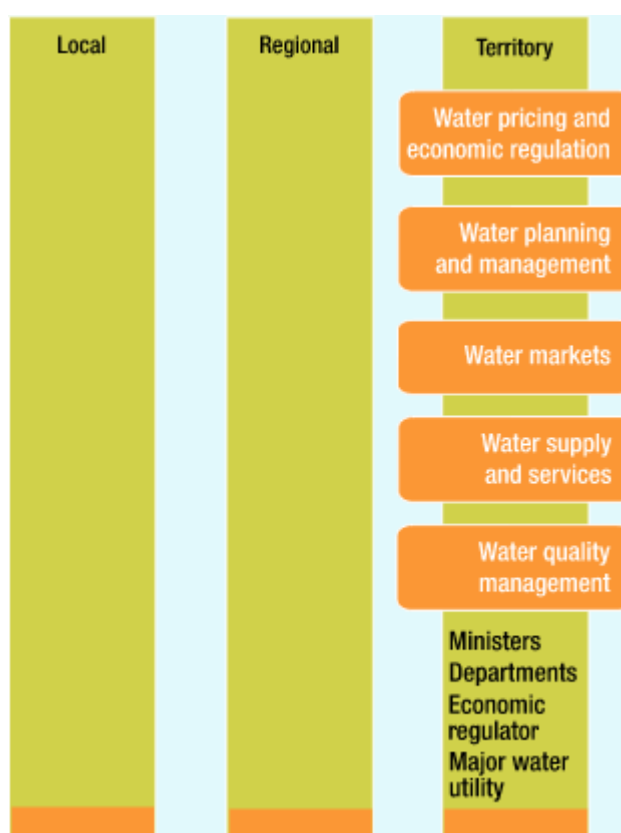


Figure 5: ACT arrangements for water management ⁶

Table 3 Summary of water in the ACT

Governance Area	Responsible Party	Responsibilities
Water Pricing	Independent Competition & Regulatory Commission (ICRC)	Sets prices & investigates competitiveness complaints; regulate urban retail water, bulk water, wastewater & water reuse.
Rural & Regional Water Planning & Mgmt	Department of Environment, Climate Change, Energy & Water (DECCEW)	Responsible for water resource mgmt under the Water Resources Act 2007; implement Think water, act water; administer the Water Sharing Plan & Environmental Flow Guidelines 2006.
Metropolitan Water Planning &	DECCEW & ACTEW	DECCEW develop policies related to future demand for water, including integration of stormwater, water supply & wastewater,

⁶ <http://www.nwc.gov.au/www/html/1118-australian-capital-territory.asp>

Governance Area	Responsible Party	Responsibilities
Mgmt	DECCEW	with a target of 20% recycling by 2013. ACTEW examine & recommend future water supply options to government under the Future Water Options Strategy.
Water Markets		Approve water trade within & external to the ACT under the Water Resources Act 2007.
Water Supply & Services	ACTEW & Roads ACT	ACTEW supply urban & rural bulk water and urban retail. There is no rural retail water business in the ACT. Roads are responsible for stormwater & drainage.
Drinking Water Mgmt	ACT Health (Chief Health Officer)	Administer the Public Health Act 1997 & issue drinking water utility licences. Drinking water standards are outlined in the Drinking Water Quality Code of Practice 2000, which refers to the ADWG.
Recycled Water Mgmt	ACT Health (Chief Health Officer)	Provide advice on system design & health implications of water reuse; implement Think water, act water, which includes a target of 20% recycling by 2013; administer the Greywater Use: Guidelines for Residential Properties in Canberra 2007
Environmental Health Mgmt	DECCEW	Develop & enforce Environmental Authorisations & Environmental Protection Agreements; administer the Environment Protection Act 1997, Environmental Protection Regulations 1997 & Environmental Protection Agreements.

DECCEW has a number of water management responsibilities in the ACT. It is responsible for a range of water efficiency program, manages the water policy, regulates water resources and monitors and reports on water quality in the ACT.

In the ACT all reticulated water is supplied by ACTEW Corporation.

Victoria

In Victoria, water management responsibilities rest with various state and regional organisations. The figure and table below describe the various responsibilities in water in Victoria as it related to supply of water to regional towns.

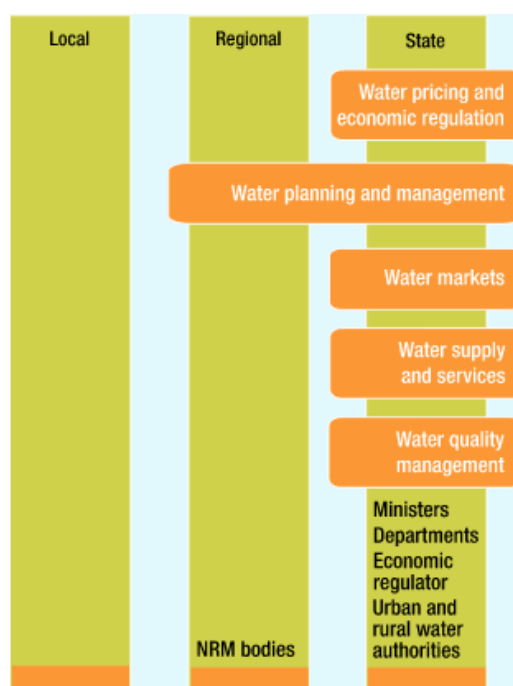


Figure 6: Victorian arrangements for water management ⁷

⁷ <http://www.nwc.gov.au/www/html/1808-victoria---introduction.asp>

Table 4 Summary of water in Victoria

Governance Area	Responsible Party	Responsibilities
Water Pricing	Essential Services Commission (ESC).	Price determination & service standards monitoring; regulation of urban bulk water & retail water, sewerage services, metropolitan drainage services, recycled water services, rural bulk water, retail water & irrigation drainage services.
Rural & Regional Water Planning & Mgmt	Department of Sustainability and Environment (DSE)	State-wide water resources policy & strategic planning; prepare regional sustainable water strategies; allocate water rights. Administer key legislation, including Water Act 1989, Our Water Our Future, Bulk Entitlements, groundwater management plans and streamflow management plans
Metropolitan Water Planning & Mgmt	DSE & Metropolitan water authorities (MWAs)	DSE - State-wide water resources policy & strategic planning; prepare the Central Regional Sustainable Water Strategy, which balances the water needs of urban & rural users & the environment; allocate the Melbourne Bulk Entitlement. MWAs - Implement bulk entitlement conditions & the Water Supply-Demand Strategy for Melbourne.
Water Markets	DSE & Rural water authorities	DSE - State-wide water resources policy & strategic planning & allocation of Bulk Entitlements under the Water Act 1989. Rural water authorities - within an irrigation district, trade is subject to the rules & the approval of the relevant Irrigation Authority.
Water Supply & Services	Metro, regional & rural urban retail water businesses & local government	The three metro water businesses supply urban and rural bulk water; urban retail water is supplied by the three metro water businesses and 13 regional businesses; rural retail is supplied by five rural water businesses; stormwater & drainage are managed by Melbourne Water & Local Government.
Drinking Water Mgmt	Department of Human Services (DHS) (Drinking Water Regulatory Unit)	Implement & oversee the Safe Drinking Water Act 2003 and the Safe Drinking Water Regulations 2005, which specifies drinking water quality standards & are based on the ADWG.
Recycled Water Mgmt	Environment Protection Authority (EPA)	Protect water quality & regulation of waste disposal & pollution in Victoria under the Environment Protection Act 1970; administer Our Water Our Future; the Water Recycling Action Plan (2002); Guideline for Environment Management: Use of Reclaimed Water (EPA, 2003); & Reuse options for Household Wastewater
Environmental Health Mgmt	EPA	Administer the Environment Protection Act 1970 & issue works approval to existing industry or new scheduled premises discharging waste to the environment; issue licences that set operating & waste discharge limits.

The key price of drinking water legislation in Victoria is the Safe Drinking Water Act 2003, which came into effect on 1 July 2004. Prior to this, drinking water quality was regulated through the Health Act 1958, the Health (Quality of Drinking Water) Regulations 2002, the Food Act 1984, and contractual and licence deeds between water businesses and the Department of Sustainability and Environment.

The 10 Catchment Management Authorities (CMAs) in Victoria were established under the Catchment and Land Protection Act 1994. Water in Victoria is managed by 19 state-owned businesses that report to the Victorian Government.

Other legislation in place for water management in Victoria includes the Water Industry Act 1994, the Water Industry Regulatory Order 2003 and the Financial Management Act 1994.

Victoria's Our Water, Our Future program was launched in 2004. It was developed to improve water savings by modernising irrigation systems and encouraging water saving in households and industry; to create new water supplies and improve existing ones; and to expand the existing water grid.

ESC is currently reviewing the Regulatory Accounting Code. The Victorian government is also positioned to improve training to water treatment plant operators through the introduction of a new education and training program with improved requirements for certification of operations staff.

Below is a list of some of the government and non-government organisations with an interest in water in Victoria. The list is not intended to be comprehensive and merely provides a snap-shot of the main stakeholders.

Other: Victorian Water Industry Association (VicWater)

Tasmania

In Tasmania, water management responsibilities rest with various state, regional and local organisation. Tasmania has undergone significant change in the past year, with the amalgamation of water suppliers to just three. The figure and table below describe the various responsibilities in water in Tasmania as it related to supply of water to regional towns.

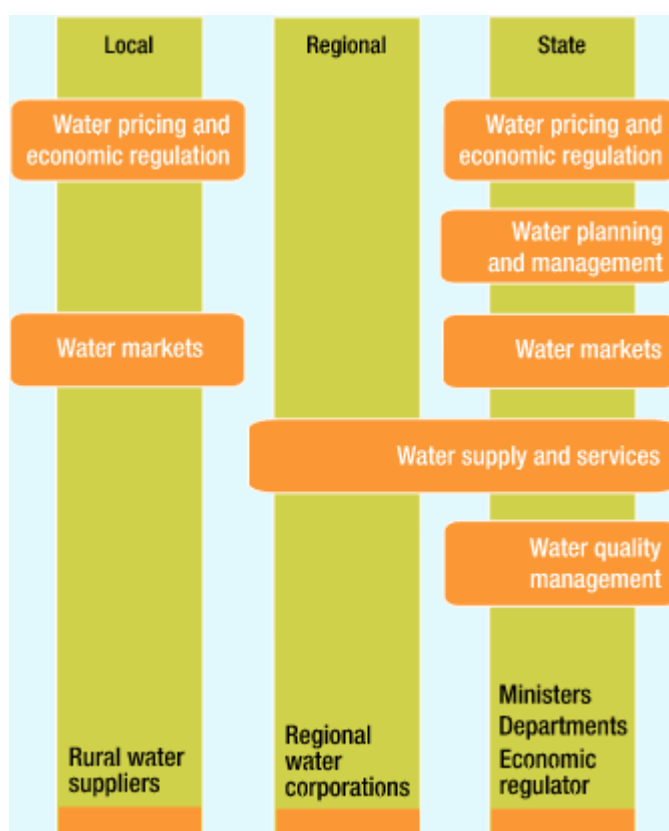


Figure 7: Tasmanian arrangements for water management ⁸

Table 5 Summary of water in Tasmania

Governance Area	Responsible Party	Responsibilities
Water Pricing	Economic Regulator of Water & Sewerage, Water Corporations & irrigation entities	Regulate water and sewerage prices and licence industry participants; monitor annual performance; regulate urban bulk water & retail water, sewerage services. The three Water Corporations set urban retail prices, while the five irrigation entities set rural retail prices.
Rural & Regional Water Planning & Mgmt	Department of Primary Industries & Water (DPIW)	Oversee mgmt of Tasmania's freshwater resources under Water Management Act 1999; prepare & implement water management plans, including environmental provisions.
Metropolitan	DPIW	Water infrastructure & development; water management planning;

⁸ <http://www.nwc.gov.au/www/html/1804-tasmania.asp>

Governance Area	Responsible Party	Responsibilities
Water Planning & Mgmt		administer the Water Management Act 1999
Water Markets	Department of Primary Industries, Parks, Water and Environment (DPIPWE),	Oversee mgmt of Tasmania's freshwater resources under Water Management Act 1999; grant water licences & allocations & approve of water transfers. Also administer Guiding Principles for Water Trading – Water Resources Policy #2003/2, Water management plans & Irrigation Clauses Act 1973
Water Supply & Services	Southern Regional Corporation, Northern Regional Corporation, North Western Regional Corporation, Rural water entities, Local Government	Urban & rural bulk water & urban retail water is operated by the three water corporations, rural retail is operated by five rural entities, while local government look after stormwater & drainage.
Drinking Water Mgmt	Department of Health and Human Services (DHHS) (Director of Public Health)	Administer Public Health Act 1997; regulate drinking water supplies through administration & enforcement of Drinking Water Quality Guidelines (2005), which are in accordance with the ADWG.
Recycled Water Mgmt	DHHS, DPIPWE, Local councils	DHHS oversee drinking water supplier responsibilities & investigates threats to public health (Public Health Act 1997, Environmental Management and Pollution Control Act 1994) DPIPWE has a key role in ensuring sustainable reuse through permits or environmental protection notices. Local Councils approve & regulate wastewater re-use schemes either through environmental protection notices, permits or user-supplier agreements.
Environmental Health Mgmt	Board of the Environment Protection Authority (EPA), Local councils	EPA enforce provisions of the Environmental Management and Pollution Control Act 1994 & State Policy on Water Quality Management 1997 Local Councils issue permits to Level 1 & 2 activities (under the Environmental Management and Pollution Control Act 1994).

South Australia

In South Australia, water management responsibilities rest with various state, regional and local organisations. The figure and table below describe the various responsibilities in water in South Australia as it related to supply of water to regional towns.

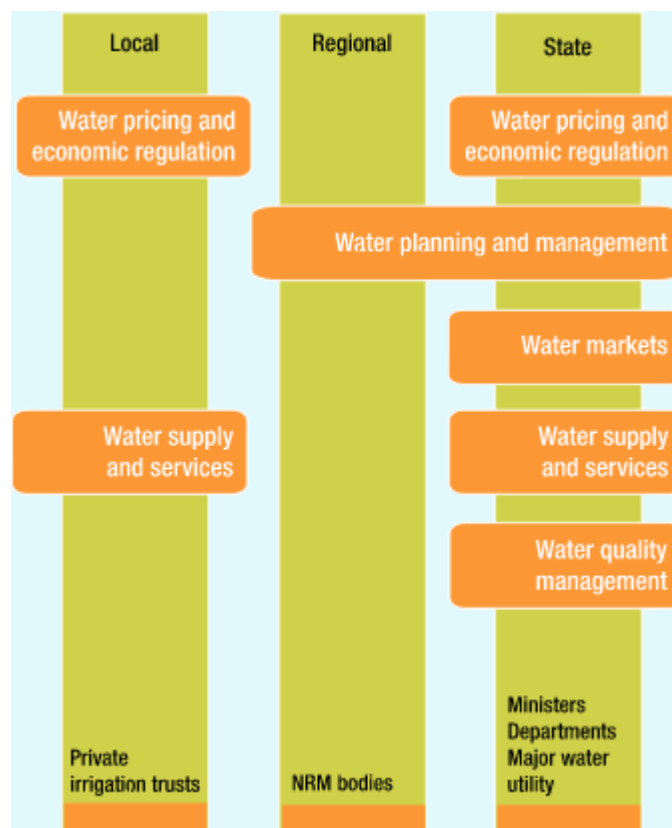
Figure 8: South Australian arrangements for water management ⁹

Table 6 Summary of water in South Australia

Governance Area	Responsible Party	Responsibilities
Water Pricing	Essential Services Commission (ESC), SA Cabinet, irrigation trusts	ESC - Review Government price-setting. SA Cabinet – set prices for urban retail water. Private irrigation trusts (27) – set rural retail water prices.
Rural & Regional Water Planning & Mgmt	Department of Land, Water and Biodiversity Conservation (DLWBC), Natural Resource Mgmt (NRM) Boards	DLWBC - Water resource management & administering the Natural Resources Management Act 2004; develop & implement regional natural resource management plans & water allocation plans. Other legislation includes the State Natural Resource Management Plan 2004; Regional Natural Resource Management Plans; Water Allocation Plans; and River Murray Act 2003
Metropolitan Water Planning & Mgmt	SA Water	Plan & develop water & wastewater assets & to secure water supply for South Australia, including the Water-Proofing Adelaide plan.
Water Markets	Department of Land, Water and Biodiversity Conservation (DLWBC)	Approve water trade; record all water licences & transfers; Water Information & Licensing Management Application. Operate Natural Resources Management Act 2004; Natural Resource Management Plans; & Water Allocation Plans.
Water Supply & Services	SA Water, irrigation trusts, Local Government, (NRM) Boards	SA Water supplies urban & rural bulk water & urban retail water. 27 private irrigation trusts supply rural water ; stormwater & drainage is managed by local government & the NRM Boards.
Drinking Water	Department of	Administer & enforce the Food Act 2001 to ensure drinking water

⁹ <http://www.nwc.gov.au/www/html/1794-south-australia.asp>

Governance Area	Responsible Party	Responsibilities
Mgmt	Health	supplies are safe; operates the Drinking Water Quality Management System. Health has adopted the Australian Drinking Water Guidelines (2004).
Recycled Water Mgmt	Department of Health	Issue approvals under Public and Environmental (Waste Control) Regulations 1995 to WTPs; with the EPA, produced the South Australian Reclaimed Water Guidelines (Treated Effluent); administers Public and Environmental Health Act 1987
Environmental Health Mgmt	Environment Protection Authority	Administer the Environment Protection Act 1993; issue environmental authorisations to activities prescribed in Environment Protection Act 1993; administers Environmental Protection (Water Quality) Policy 2003 & Codes of Practice

Western Australia

In Western Australia, water management responsibilities rest with various state and local organisations. The figure and table below describe the various responsibilities in water in Western Australia as it related to supply of water to regional towns.

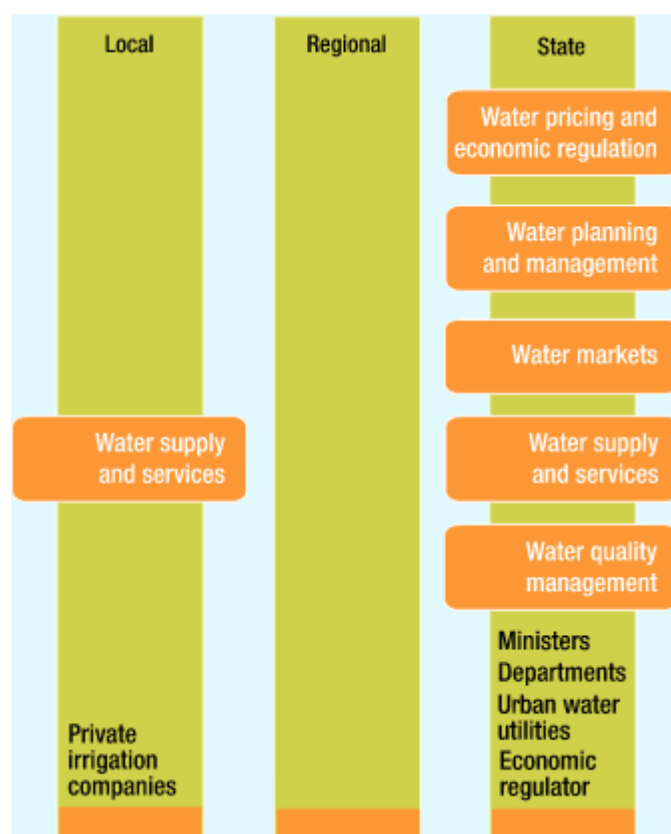


Figure 9: Western Australian arrangements for water management¹⁰

Table 7 Summary of water in Western Australia

Governance Area	Responsible Party	Responsibilities
Water Pricing	Economic Regulation Authority (ERA)	Price recommendation. Oversight for urban & rural water pricing practices. Western Australia Cabinet set urban bulk & retail prices, while Irrigation Cooperatives set rural retail prices.

¹⁰ <http://www.nwc.gov.au/www/html/1812-western-australia.asp>

Governance Area	Responsible Party	Responsibilities
Rural & Regional Water Planning & Mgmt	Department of Water (DoW)	Administer the Rights in Water and Irrigation Act 1914; water allocation planning & administration of water entitlements & water rights. Other legislation includes the State Water Plan 2007.
Metropolitan Water Planning & Mgmt	DoW, Water Corporation	DoW - water resources & water industry, planning & policy, management & regulation; supply water & wastewater services to 97% of Western Australia's population. Water Corp - develop Integrated Water Supply Scheme Source Development Plan 2005 - 2050
Water Markets	DoW	Water allocation planning & admin of water entitlements & water rights. Approve trading of water entitlements, in accordance with Rights in Water and Irrigation Act 1914 & State-wide policy No. 6.
Water Supply & Services	Water Corporation, Busselton Water, Aqwest Water, Rottnest Island Authority, Irrigation Corporations, Local Govt	Water Corporation supplies urban & rural bulk water; Water Corporation, Busselton Water, Aqwest Water & Rottnest Island Authority supply urban retail water, private irrigation companies supply rural water; stormwater & drainage are managed by Water Corporation & Local Govt.
Drinking Water Mgmt	Department of Health, ERA, DoW	Health - advise on the appropriate health standards for drinking water; regulate the Water Corporation's drinking water quality. Health has adopted the ADWG (1996). ERA - issue licences that specify drinking water quality standards. DoW - identify & protect Public Drinking Water Source Areas & prepare Drinking Water Source Protection Assessments & Drinking Water Source Protection Plans. Legislation includes Country Areas Water Supply Act 1947, Metropolitan Water Supply, Sewerage and Drainage Act 1909, Public Drinking Water Source Areas (PDWSA) Policy, Statement of Planning Policy 2.7 Public Drinking Water Source Policy, Water Services Licensing Act 2005
Recycled Water Mgmt	Department of Health; Environmental Protection Authority (EPA), DoW, ERA	Health administer & enforce the Health Act 1911; and set min design & installation standards in the Code of Practice for the Reuse of Greywater in Western Australia. EPA provides environmental advice to the Minister; prepare environmental protection policies under the Environmental Protection Act 1986. DoW supports the Minister by developing sewerage service policy. ERA issues licences to sewerage service providers, for the provision of water services, including the supply of recycled water.
Environmental Health Mgmt	Department of Environment & Conservation (DEC), Environmental Protection Authority (EPA), Swan River Trust	DEC administers Environmental Protection Act 1986; oversee mgmt of natural resources; license & register water & wastewater related activities; & perform water quality management & monitoring. EPA advises the govt on policy & prepares environmental protection policies. Swan River Trust manage & protect the river system, advises the Minister on development proposals within the Trust's Management Area & controls and prevents pollution of the rivers. Other instruments include Environmental Protection Regulations 1987; Environmental Protection Policies; Environmental Quality Objectives; Swan and Canning Rivers Management Act 2006; and Swan and Canning Rivers Management Regulations 2007.

Northern Territory

In the Northern Territory, water management responsibilities rest with various territory organisations. The figure and table below describe the various responsibilities in water in the Northern Territory as it related to supply of water to regional towns.

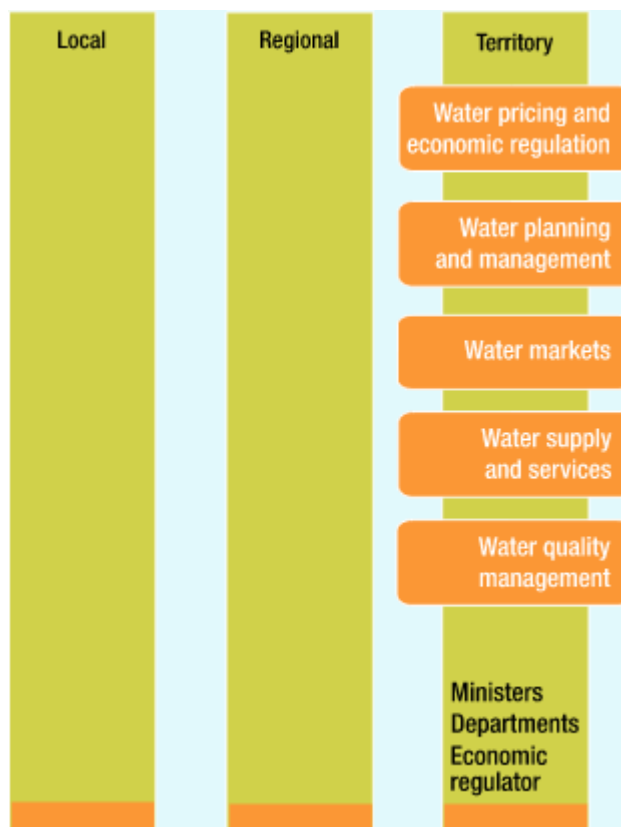


Figure 10: Northern Territory arrangements for water management ¹¹

Table 8 Summary of water in the Northern Territory

Governance Area	Responsible Party	Responsibilities
Water Pricing	Utilities Commission	Monitor & enforce compliance with pricing determinations; regulates urban water supply & sewerage services. The Treasurer (Regulatory Minister) sets water prices.
Rural & Regional Water Planning & Mgmt	Dept of Natural Resources, Environment, The Arts and Sport (NRETAS) (Controller of Water Resources)	Water resource planning & management under the Water Act 1992; prepare Water Allocation Plans.
Metropolitan Water Planning & Mgmt	NRETAS, Power & Water Corporation	Ensure the achievement of water resource management outcomes; investigate & develop water related infrastructure.
Water Markets	NRETAS	Issue, transfer & amend water licences under the Water Act 1992 & Water Regulations 1992; maintain a register of water licences.
Water Supply & Services	Power and Water Corporation, Local Govt, Dept of Planning &	Power and Water Corporation supply urban & rural bulk water, urban retail water; and rural retail water. Local Govt & DPI manage stormwater & drainage.

¹¹ <http://www.nwc.gov.au/www/html/1735-northern-territory.asp>

Governance Area	Responsible Party	Responsibilities
	Infrastructure (DPI)	
Drinking Water Mgmt	Dept of Health and Community Services (DHCS), Utilities Commission	DHCS set standards for drinking water quality under Water Services and Sewerage Supply Act 2001 & monitors compliance with those objectives. The minimum drinking water standards are in accordance with the ADWG (2004). The Utilities Commission regulate water supply services, which include issuing & auditing compliance against Operating Licences that specify drinking water quality standards.
Recycled Water Mgmt	DHCS (Chief Health Officer), Utilities Commission, Power & Water Corporation	DHCS provide direction & safeguards for wastewater quality for reclaimed water schemes; set the standards for the quality of recycled water licensed under the Water Services and Sewerage Supply Act 2001. The Utilities Commission regulate water supply services, which include issuing & auditing compliance against Operating Licences that specify recycled water standards. Power and Water Corp also have a Reclaimed Water Policy
Environmental Health Mgmt	NRETAS	Administer the Water Act 1992 & Water Regulations 2001 including issuing of water discharge licences & intervening in cases of pollution.

Responsibility for Water Delivery

It is unsurprising that water management in Australia is complex with many laws and agencies involved in the process. In fact, there are up to as many as 800 agencies that are responsible for the administration and management of water, at the federal, state, regional and local levels.

Water management and supply by utilities is also highly variable across the country, with some states and territories supplied by one very large utility, while others are served by a large number of smaller, mostly local government based, utilities. Table 9 describes potable water distribution in Australia. In some states a utility might only serve one town, though in most cases, utilities serve a number of towns.

Table 9: Drinking water supply utilities in Australia

State or Territory	Number of Water Utilities ¹²	Supplier Description
Queensland	72	Local Councils and Regional water utilities
New South Wales	109	106 Local Councils + 3 Metro
Australian Capital Territory	1	Single State-wide water utility
Victoria	16	Regional water utilities (3 Metro + 13 Regional)
Tasmania	3	Regional water utilities
South Australia	1	Single State-wide water utility
Northern Territory	1	Single State-wide water utility
Western Australia	5	Single State-wide water utility + 4 small Local utilities

¹² As of May 2010

Project Methodology

B



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Project Methodology

Overview of Methodology

A flow chart describing the overall process is provided below in Figure 11.

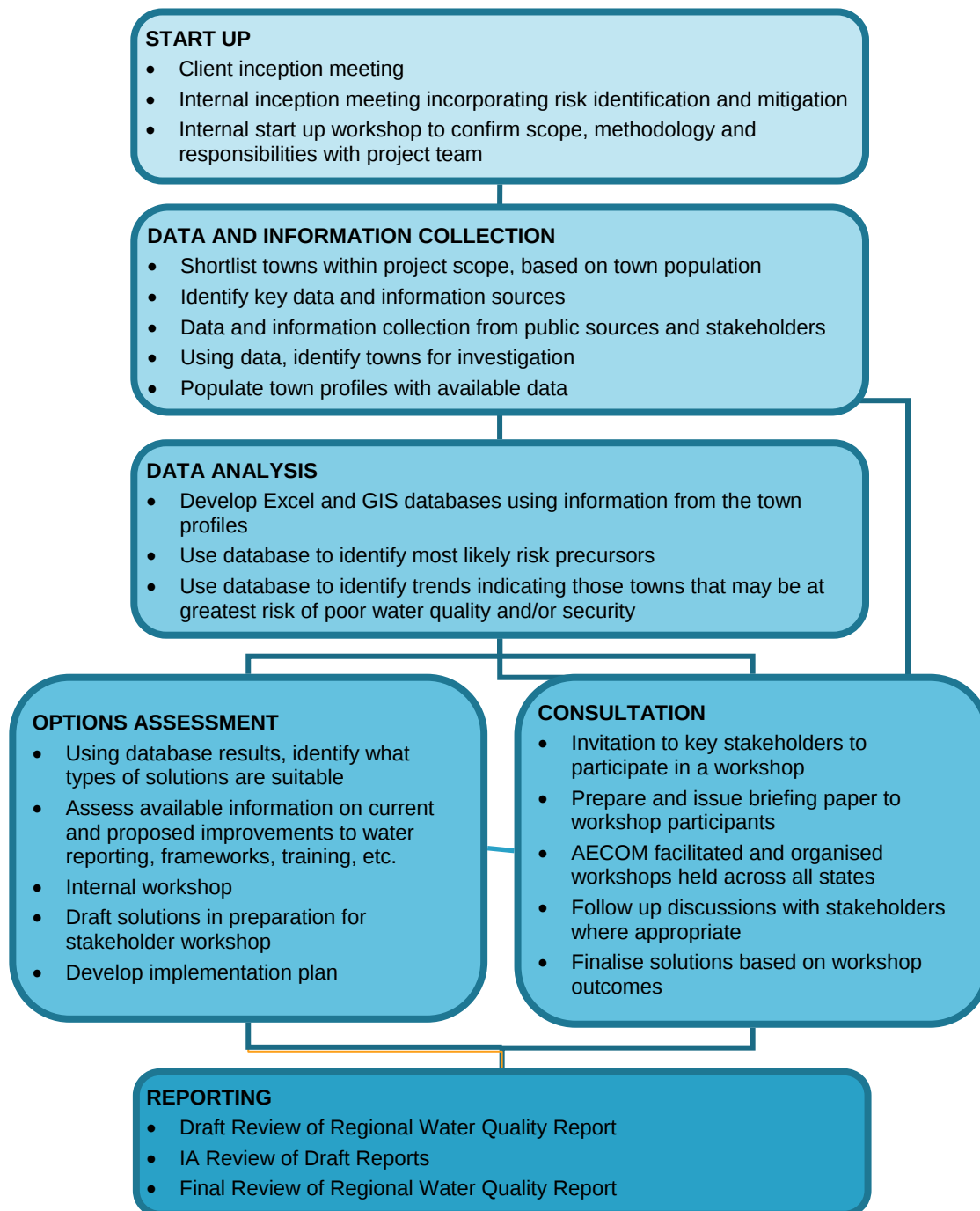


Figure 11: Overall Project Methodology

Identification of Towns for Investigation

Identification of towns to be included in the investigation was a four-step process. This process is described below in Figure 12.

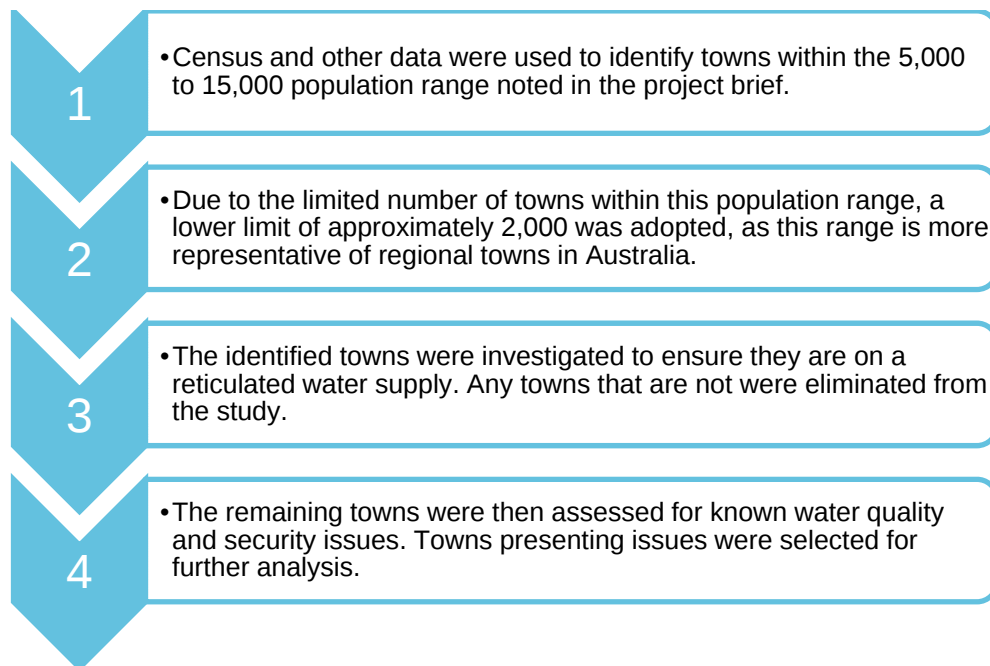


Figure 12: Town Identification Process

It is important to note that it was not the intent of this investigation to study every town in each state and territory that falls within the town scope outlined above. Due to the allocated program and budget for the project, the approach is more strategic and our aim was to investigate a sample of towns in each state or territory.

As there are no towns in the ACT that satisfy the requirements of the scope of this project, no towns in the ACT were selected for further investigation.

Town Profiles

The risks listed in Figure 13 provide a snapshot of some of the physical and organisational risks to water quality and security. Risks such as these were used to identify towns to be included in the study.

AECOM prepared an excel template to capture the major water quality and security risks faced by each town sampled in the investigation. The template used to prepare the town profiles is provided in Appendix C.

Data and Information Collection

Data and information on the selected towns was sourced via public websites, reports and with assistance from federal, state and local stakeholders. This information was used to populate the town profiles. It should be noted that Western Australia were excluded from this part of the investigation Water Corporation were unable to provide the necessary information, and there was very little publically available information on water quality and security in Western Australia.

Further information on water legislation, frameworks, best practice guidelines, reporting, training, reform and institutional arrangements was also compiled. This information is particularly relevant in establishing appropriate solutions. However, it should be understood that given the timeframe and abundance of information potentially available, that there may be gaps in this review, even following stakeholder liaison during the data and information collection phase.

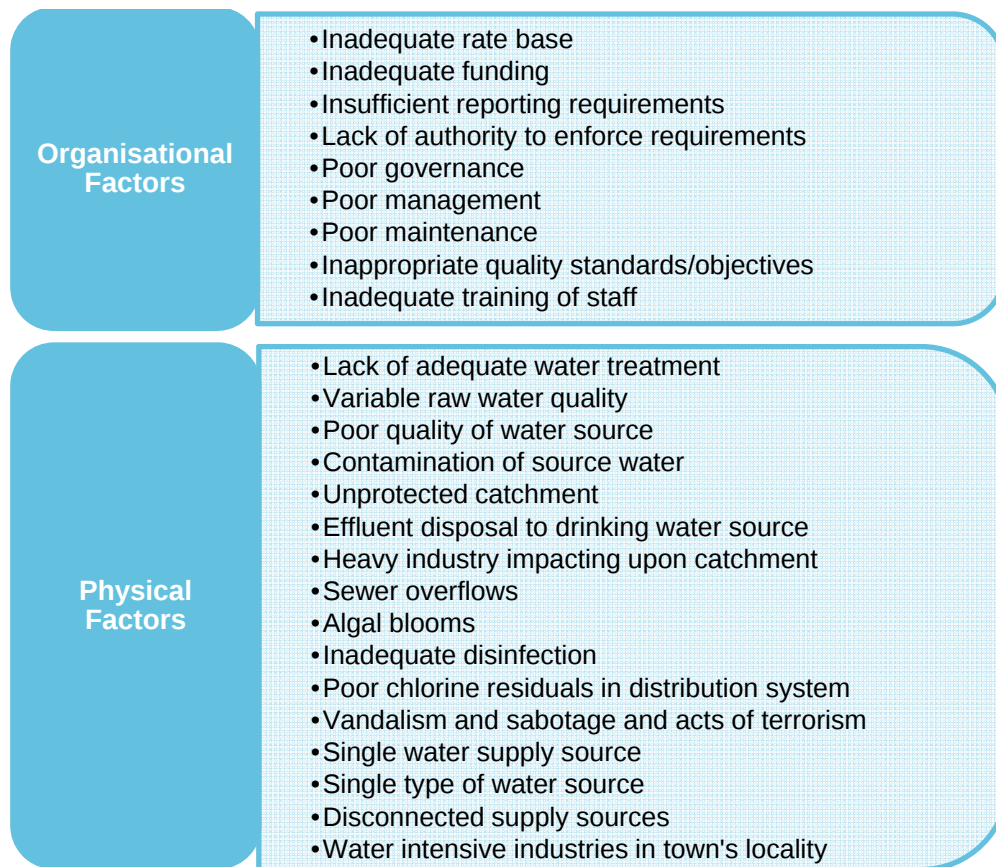


Figure 13: Physical and Organisational Risk Factors that may lead to poor water quality and security

Options Development

The development of solution options occurred in three phases:

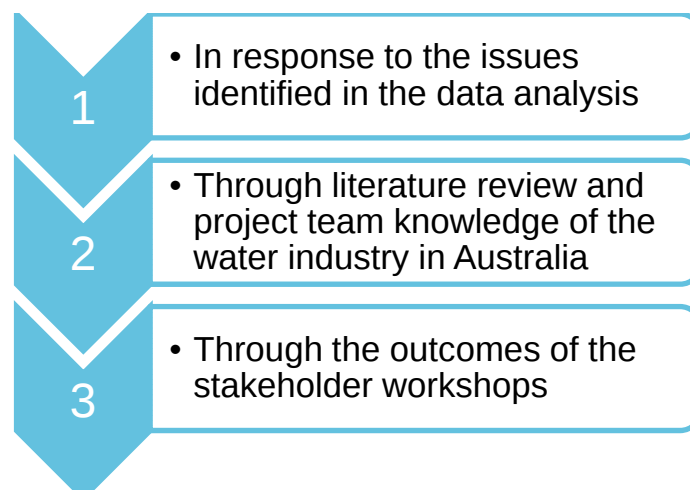


Figure 14: Solution Identification Methodology

Following completion of the town profiles, a nationwide database was established to capture the issues in each town used in the study. This database enabled the project team to determine what the major issues are across the country and within each state. The project team also used the information to attempt to draw cause and effect style conclusions. This allowed us to identify potential trends that may indicate susceptibility to water quality and security risk.

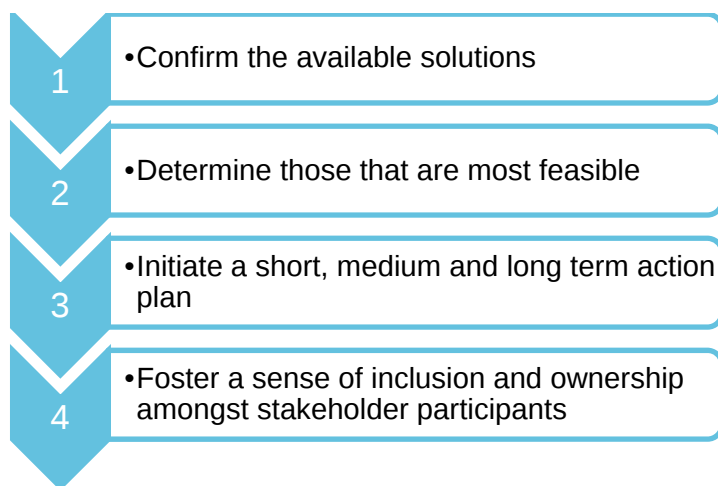
To supplement this process and to close potential information gaps, a literature review was performed to encapsulate other potential issues and solutions confronting the water industry in regional towns. In addition, the knowledge and experience the individual project team members have of the barriers to healthy water quality and reliable water supplies was utilised.

Completion of the two above steps enabled the project team to approach the stakeholder workshops with a broad range of solutions for consideration and discussion. The stakeholders provided information on initiatives and systems currently in place in each state. Additionally, proposed changes and other initiatives under development were also identified and investigated. Stakeholders were asked for alternate and additional solutions to those identified, for their professional opinion on which solutions would be more appropriate, and for their contribution on which solutions would be relatively simple or difficult to implement.

Stakeholder Workshops

Stakeholder workshops formed part of the options development and assessment, ensuring that realistic solutions were identified and recommended. The workshops also assisted in determining barriers to implementation of proposed solutions.

The objectives of the workshops were to:



The workshops considered what solutions may be implemented from a Commonwealth, state and utility level. While the objective of the project was to provide recommendations for improvement, workshop participants were also asked to focus on what is done well at a Commonwealth, state and utility level.

Workshops were held for each state and territory to ensure local issues and solutions were identified and incorporated. A national stakeholder workshop was also held to capture broader issues, as well as those solutions that may be implemented at a Commonwealth level.

A workshop was not held in Western Australia following a decision by Water Corporation not to participate. Water Corporation also requested that the other stakeholders, the Department of Health and the Department of Water, not participate in the workshop.

The discussion points addressed during the workshop were:

- Introduction to the workshop and project
- Introductions by Stakeholder participants
- The current situation in water
- Overview of towns included in the study and how they were chosen
- Some Results from the investigation so far
- Other issues that may not be conclusive via the data analysis
- Solutions already identified and what other solutions might be available
- “Wish list”, i.e. if all options were feasible, what we would do to fix water quality and security
- Barriers to implementation of available options
- Options that may be implemented in the short, medium and long term

- Who should be responsible for implementing these options
- General response to Commonwealth Government's interest in water quality and security in regional Australia

The workshops ran for approximately three hours each. During the workshop, open conversation and debate was encouraged, however, "barrow pushing" was not accepted. An AECOM team member was responsible for recording minutes during the sessions. A workshop summary was circulated to workshop participants for feedback. Submission of additional information was also invited during the week following the workshops.

Invitations to the workshops were issued to a number of key stakeholders. Stakeholders were chosen for their broad knowledge and responsibilities within their study areas. The stakeholders who agreed to participate in the workshops are shown in Table 10.

Table 10: Workshop Participants

Study Area	Organisation	Name	Role
National	Department of Environment, Water, Heritage and the Arts (DEWHA)	Steve Costello	Assistant Secretary, Urban Water Security
		Craig Bradley	Director, Cities and Towns - Urban Water Security
National	Water Services Association Australia (WSAA)	Adam Lovell	Manager, Science and Sustainability
National	Water Industry Operators Association (WIOA)	George Wall	Executive Officer
National	National Health and Medical Research Council Water Quality Advisory Committee (NHMRC WQAC)	Peter Mosse	Member
NSW	Department of Health	Paul Byleveld	Manager, Water Unit
		Sandy Leask	Water Unit
NSW	NSW Office of Water (Department of Environment Climate Change and Water, or DECCW)	Sam Samra	Manager Water Utility Performance
		Bill Ho	Manager of Water and Sewerage
NSW	Water Directorate	Gary Mitchell	Executive Officer
		Stewart McLeod	Chair
VIC	Department of Human Services (DHS)	David Sheehan	Program Manager, Drinking Water Regulation
VIC	Goulburn Valley Water (and also representing VicWater)	Bruce Hammond	General Manager - Technical Services
VIC	Essential Services Commission	Stuart Christie	-
TAS	Department of Health and Human Services (DHHS)	Scott Burton	Senior Environmental Health Officer
		Raquel Esteban	State Water Officer, Public & Environmental Health
TAS	OnStream	Cam Crawford	Executive Manager, Development and Strategy
QLD	Department of Environment and Resource Management (DERM)	Richard Priman	Director of Regional Water Supplies
QLD	Office of Water Supply Regulator (DERM)	Dr. Anne Gardiner	Principal Scientist, Office of the Water Supply Regulator
QLD	Queensland Water Directorate	Dr Rob Fearon	Executive Manager
SA	SA Water	Dennis Steffensen	Principal Scientific Advisor
		Amber Lang	Water Quality Performance Manager
		Paul Doherty	Manager Systems Planning
SA	Department of Health	Nerissa Walton	Senior Scientific Officer – Water Quality

Study Area	Organisation	Name	Role
SA/National	Water Quality Research Australia (WQRA)	Jodieanne Dawe	CEO
		Michelle Akeroyd	Program Manager – Drinking Water
NT	Power and Water	Noel McCarthy	Senior Quality Systems Officer

It should also be noted that the National Water Commission, Australian Water Association, NSW State Water, the Victorian Essential Services Commission, the Victorian Department for Sustainability and the Environment were also invited to the workshops but were unable to attend due to prior commitments.

Assessment of Solutions

Those issues that the project team and stakeholders determined to pose the most risk and greatest uncertainty were identified. Following this, the project team identified the best policy related solutions for the prominent issues. Policy based solutions, rather than specific engineering based solutions, were utilised to ensure the Commonwealth Government would be able to drive implementation of the proposed reform agenda.

Implementation Plan

An implementation plan was prepared for each of the ten recommended solutions. The implementation plan provides a staged approach or alternative options, where applicable. The implementation plan also nominated an indicative timeframe by which the recommendations should be implemented.

Town Profile Template



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Appendix C Town Profile Template

TOWN	State/Territory			
	Town Name			
	Town Population			
WATER UTILITY	Name of Water Utility			
	Rate (\$/kL)			
	Per Capita Water Consumption (L/day)			
	Number of Connections			
CATCHMENT AND WATER SUPPLY	Catchment			
	Sub-Catchment			
	Catchment Protection Status			
	Potable Water Source(s)			
	Supply Capacity			
WATER QUALITY	Treatment Plant(s)			
	Level of Treatment			
	Drinking Water Guidelines			
	Results			
WATER SECURITY	Current Water Restrictions			
	Proportion of Potable Water Supplied to Households (%)			
	Distance from the Coast (km)			
	Climate			
	Average Annual Rainfall			
FACTOR			YES/NO	NOTES/EXPLANATION
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought		
		Single drinking water source		
		Poor quality water source		
		Sewage overflow or disposal into water source		
		Flooding		
		Fauna defecating in supply		
		Fauna destroying water intake structures		
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)		
		Un-lined landfills		
		Extensive agriculture		
		Low vegetation cover (dust, sediment runoff)		
		Poor access to supply		
		Unsustainable water extraction		

		Aquifer turning saline due to high extraction		
		Hard water		
		Aging or inadequate pipe work and associated infrastructure		
		Significant water losses due to leaking pipes		
	Governance	High per capita water consumption		
		Inappropriate water quality standards / objectives		
		Lack of infrastructure maintenance		
		Poor management or governance		
		Vandalism / sabotage / terrorism		
		Insufficient trained personnel		
		Inadequate funding for maintenance or upgrades		
	Industries	Mining / minerals		
		Irrigation		
		Chemicals / process		
	Population	Seasonal population loadings		
		Rapid population growth		
WATER QUALITY OR SECURITY RISK (EFFECT)		Pathogenic contamination		
		Algal blooms		
		Heavy metal contamination		
		Poor chlorine residuals		
		Pesticide contamination		
		Boil water notices		
		Deaths or illness due to water quality		
		Water restrictions (current and historic)		
		Taste and odour issues		
		Other contamination that would affect health		
	Notes			

Town Profiles – QLD

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Town #	1			
TOWN	State/Territory	Qld-North		
	Town Name	Napranum Aboriginal Shire Council		
	Town Population	830 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility	Napranum Aboriginal Shire Council		
	Rate (\$/kL)	No rates charged to users - Aboriginal community		
	Per Capita Water Consumption (L/day)	In September 2009, it was approximately 2,000L/person/day.		
	Number of Connections	218		
CATCHMENT AND WATER SUPPLY	Catchment	Groundwater		
	Sub-Catchment	N/A		
	Catchment Protection Status	nil		
	Potable Water Source(s)	Bore water supply 10 to 30m depth.		
	Supply Capacity	100% of supply - allowable extraction unknown.		
WATER QUALITY	Treatment Plant(s)	N/A refer above		
	Level of Treatment	Nil. Bores pump to the reservoir, water is then pumped from the reservoir to the old high level tank.		
	Drinking Water Guidelines	None. Water quality testing is not undertaken.		
	Results	No water quality testing is completed.		
WATER SECURITY	Current Water Restrictions	Yes, due to the high lift pumps failing - the bores were diverted to the high level tank and operated		
	Proportion of Potable Water Supplied to Households (%)	100% - there is a farm, however it is owned by Council and has its separate bore.		
	Distance from the Coast (km)	<100m		
	Climate	Tropical. High rainfall Dec to March, April to November low rainfall periods.		
	Average Annual Rainfall	"over 2 metres" (No information available from BOM, however based on knowledge of area)		
FACTOR		YES / NO	NOTES / EXPLANATION	
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	No	Council is concerned they will run out of water. Water demand management is required to address this issue. Napranum is not listed as being drought declared as at 30 September 2009 on www.longpaddock.qld.gov.au
		Single drinking water source	Yes	
		Poor quality water source	No	
		Sewage overflow or disposal into water source	No	Treated sewage overflows to the ground; may soak into the ground water. Pump station overflows occur perhaps once/year.
		Flooding	No	The area floods, but this doesn't affect the bores - water table rises.
		Fauna defecating in supply	No	
		Fauna destroying water intake structures	No	People do – vandalism.
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	No	Suspected high levels of dissolved CO2 in ground water causing damage to the brass, copper fittings in house plumbing, hydrants, meters etc.
		Un-lined landfills	Yes	Lots of unofficial dump sites - the community dumps dead dogs regularly.
		Extensive agriculture	No	Lots of mining activity in the area - Bauxite, adjacent to Weipa.
		Low vegetation cover (dust, sediment runoff)	Yes	Lots of dust in the dry season.
		Poor access to supply	No	Only ground water, alternate source not available apart from desalinated supply (no current provision).
		Unsustainable water extraction	Possibly	Not sure what the licence is. The mines use a lot of ground water.
		Aquifer turning saline due to high extraction	No	Not that is known.
		Hard water	No	Not that is known.
	Governance	Aging or inadequate pipe work and associated infrastructure	Yes	Council is regularly locating and repairing leaks.
		Significant water losses due to leaking pipes	Yes	High water usage.
		High per capita water consumption	Yes	Approximately 2000L/person/day in the dry season, mixture of high usage and excessive leaks.
		Inappropriate water quality standards / objectives	N/A	No testing is done.
		Lack of infrastructure maintenance	Yes	Common across all aboriginal communities.
		Poor management or governance	Yes	The current manager is good, however, his staff have a low skill and knowledge base. If current manager was to leave then level of service would drop. Poor management of water and sewerage systems is common across all aboriginal communities.
	Industries	Vandalism / sabotage / terrorism	Yes	Napranum is not too bad, however, it is common across all aboriginal communities.
		Insufficient trained personnel	Yes	Common across all aboriginal communities.
		Inadequate funding for maintenance or upgrades	Yes	Common across all aboriginal communities.
	Population	Mining / minerals	Yes	Lots of mining activity in the area - Bauxite.
		Irrigation	No	The Council farm has its own bore.
		Chemicals / process	No	
WATER QUALITY OR SECURITY RISK (EFFECT)	Population	Seasonal population loadings	Yes	Population increased during the "Wet Season" but not much when compared with other aboriginal communities.
		Rapid population growth	Yes	Growth is greater than State Average based on Census data, however Council records indicate otherwise.
	Pathogenic contamination	No	None known, due to lack of sampling.	
	Algal blooms	No	None known.	
	Heavy metal contamination	No	None known.	
	Poor chlorine residuals	Yes	No chlorination.	
	Pesticide contamination	No	None known.	
	Boil water notices	No	None known.	
	Deaths or illness due to water quality	No	None known.	
	Water restrictions (current and historic)	Yes	Only when something fails i.e. pump/switchboard etc.	
Taste and odour issues	No	None known.		
Other contamination that would affect health	Unknown	Suspected high levels of dissolved CO2 in ground water.		
Notes		Napranum is an indigenous community located on the edge of Weipa - North Queensland.		

Town # 2

TOWN	State/Territory	Qld-North			
	Town Name	Emerald			
	Town Population	10,990 (Census 2006, Urban Centre/Locality)			
WATER UTILITY	Name of Water Utility	Emerald Shire Council			
	Rate (\$/kL)	Unknown			
	Per Capita Water Consumption (L/day)	Unknown			
CATCHMENT AND WATER SUPPLY	Number of Connections	Unknown			
	Catchment	Lake Maraboon			
	Sub-Catchment	Unknown			
	Catchment Management Authority (CMA)	Emerald Shire Council			
	CMA Web-Link	www.emerald.qld.gov.au			
	Catchment Protection Status	Unknown			
	Potable Water Source(s)	Lake Maraboon			
	Supply Capacity	Unknown			
WATER QUALITY	Treatment Plant(s)	None			
	Level of Treatment	None			
	Drinking Water Guidelines	ADWG 2008			
	Results	Typical Results	Lake Maraboon	ADWG 2004	
		Fluoride (mg/L)	Unknown	1.5 mg/L	
		pH	Unknown	6.5-8.5	
		Chlorine residual (mg/L)	Unknown	5 mg/L	
		Alkalinity (mg/L)	Unknown	??	
		Hardness (mg/L)	Unknown	200 mg/L as CaCO3	
Turbidity (NTU)		Unknown	5 NTU		
WATER SECURITY	Current Water Restrictions	Sprinkler Ban: Monday - 12 am - 12 pm Tuesday-Sunday - 9am - 7 pm Refer to: www.emerald.qld.gov.au/Community/Your_Neighbourhood/Water.htm			
	Proportion of Potable Water Supplied to Households (%)	Unknown			
	Distance from the Coast (km)	300km			
	Climate	Dry			
	Average Annual Rainfall	525mm			
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	FACTOR		YES / NO	NOTES / EXPLANATION
		Drought	No	Emerald is not listed as being drought declared as at 30 September 2009 on www.longpaddock.qld.gov.au. It is noted that some areas of Central Highlands Regional Council is drought declared.	
		Single drinking water source	Unknown		
		Poor quality water source	Unknown		
		Sewage overflow or disposal into water source	Unknown		
		Flooding	Yes		
		Fauna defecating in supply	Yes		
		Fauna destroying water intake structures	Yes		
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)			
		Un-lined landfills			
		Extensive agriculture	Yes		
		Low vegetation cover (dust, sediment runoff)	Yes		
		Poor access to supply			
		Unsustainable water extraction			
		Aquifer turning saline due to high extraction			
		Hard water			
		Aging or inadequate pipe work and associated infrastructure			
	Significant water losses due to leaking pipes				
	Governance	High per capita water consumption			
		Inappropriate water quality standards / objectives			
		Lack of infrastructure maintenance			
		Poor management or governance			
		Vandalism / sabotage / terrorism			
	Industries	Insufficient trained personnel			
		Inadequate funding for maintenance or upgrades			
		Mining / minerals			
	Population	Irrigation			
		Chemicals / process			
		Seasonal population loadings			
WATER QUALITY OR SECURITY RISK (EFFECT)	Rapid population growth	YES	Growth is greater than State Average based on Census data		
	Pathogenic contamination				
	Algal blooms				
	Heavy metal contamination				
	Poor chlorine residuals				
	Pesticide contamination				
	Boil water notices				
	Deaths or illness due to water quality				
	Water restrictions (current and historic)				
	Taste and odour issues				
	Other contamination that would affect health				
Notes					

Town #		3			
TOWN		State/Territory	Qld-North		
		Town Name	Longreach		
		Town Population	2,976 (Census 2006, Urban Centre/Locality)		
WATER UTILITY		Name of Water Utility	Longreach Regional Council		
		Rate (\$/kL)	\$0.7/kL		
		Per Capita Water Consumption (L/day)	Unknown. Volume produced by water treatment plant = 5ML/day		
CATCHMENT AND WATER SUPPLY		Number of Connections	1,500		
		Catchment	Thompson River		
		Sub-Catchment	-		
		Catchment Management Authority (CMA)	Longreach Regional Council		
		CMA Web-Link	www.longreach.qld.gov.au		
		Catchment Protection Status	Nil		
WATER QUALITY		Potable Water Source(s)	Thompson River Bore Water		
		Supply Capacity	5ML/day and peak day demand at 9ML/day		
		Treatment Plant(s)	Longreach Water Treatment Plant		
		Level of Treatment	Coagulation, clarification, DAF, granular media filtration, disinfection		
		Drinking Water Guidelines	ADWG 2008		
		Results (% compliance for 2008 reporting period)	Typical Results	Longreach Water Treatment Plant	ADWG 2008
	Fluoride (mg/L)		Unknown	1.5 mg/L	
	pH		Unknown	6.5-8.5	
	Chlorine residual (mg/L)		Unknown	5 mg/L	
	Alkalinity (mg/L)		Unknown	??	
Hardness (mg/L)	Unknown		200 mg/L as CaCO3		
	Turbidity (NTU)	Unknown	5 NTU		
WATER SECURITY		Current Water Restrictions	Residential Monday to Sunday 6am to 8am 5pm to 8pm		
	Commercial Monday, Wednesday, Friday 6am to 9am 4pm to 7pm				
	Refer to www.longreach.qld.gov.au				
		Proportion of Potable Water Supplied to Households (%)	100%		
		Distance from the Coast (km)	~850km		
		Climate	Dry		
		Average Annual Rainfall	450mm (sourced from www.bom.gov.au)		
		FACTOR	YES / NO	NOTES / EXPLANATION	
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	Yes	Longreach Regional Council is listed as being partially drought declared as at 30 September 2009 on www.longpaddock.qld.gov.au	
		Single drinking water source	No		
		Poor quality water source			
		Sewage overflow or disposal into water source	No		
		Flooding	Yes		
		Fauna defecating in supply	Yes		
		Fauna destroying water intake structures	Yes		
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)			
		Un-lined landfills			
		Extensive agriculture	Yes		
		Low vegetation cover (dust, sediment runoff)	Yes		
		Poor access to supply	No		
		Unsustainable water extraction			
		Aquifer turning saline due to high extraction			
		Hard water			
	Aging or inadequate pipe work and associated infrastructure				
	Significant water losses due to leaking pipes				
	Governance	High per capita water consumption			
		Inappropriate water quality standards / objectives	No		
		Lack of infrastructure maintenance			
Poor management or governance					
Vandalism / sabotage / terrorism					
Industries	Insufficient trained personnel				
	Inadequate funding for maintenance or upgrades				
	Mining / minerals	Yes			
Population	Irrigation	Yes			
	Chemicals / process	No			
	Seasonal population loadings	No			
	Rapid population growth	No	Population decline experienced between 2001 and 2006 Census		
WATER QUALITY OR SECURITY RISK (EFFECT)	Pathogenic contamination				
	Algal blooms				
	Heavy metal contamination				
	Poor chlorine residuals				
	Pesticide contamination				
	Boil water notices				
	Deaths or illness due to water quality				
	Water restrictions (current and historic)	Yes			
	Taste and odour issues				
	Other contamination that would affect health				
Notes					

Town #		4			
TOWN	State/Territory	Qld-North			
	Town Name	Cloncurry			
	Town Population	2,384 (Census 2006, Urban Centre/Locality)			
WATER UTILITY	Name of Water Utility	Cloncurry Shire Council			
	Rate (\$/kL)	Unknown			
	Per Capita Water Consumption	Unknown. Water Treatment Plant produces 4 ML/day.			
CATCHMENT AND WATER SUPPLY	Number of Connections	approx. 1,200			
	Catchment	Chinaman Creek and Cloncurry River Catchment			
	Sub-Catchment	Unknown			
	Catchment Management Authority (CMA)	Cloncurry Shire Council			
	CMA Web-Link	www.cloncurry.qld.gov.au			
	Catchment Protection Status	Unknown			
	Potable Water Source(s)	Cloncurry River Chinamen Creek Dam			
	Supply Capacity	4 ML/day			
WATER QUALITY	Treatment Plant(s)	Cloncurry Water Treatment Plant			
	Level of Treatment	Coagulation, clarification, media filtration and disinfection with chlorination (chlorine gas).			
	Drinking Water Guidelines	ADWG 2008			
	Results	Typical Results	Cloncurry WTP	ADWG 2004	
		Fluoride (mg/L)	0.30	1.5 mg/L	
		pH	7.80	6.5-8.5	
		Chlorine residual (mg/L)	1.20	5 mg/L	
		Alkalinity (mg/L)	194.00	??	
		Hardness (mg/L)	199.00	200 mg/L as CaCO3	
		Turbidity (NTU)	<1	5 NTU	
WATER SECURITY	Current Water Restrictions	Currently on Level 1 Restrictions: Sprinkling only between 6:00am to 9:00am and 6:00pm to 9:00pm "odds & evens" Refer to www.cloncurry.qld.gov.au/community/community_waterrestrictions.shtml .			
	Proportion of Potable Water Supplied to Households (%)	100%			
	Distance from the Coast (km)	~ 400km to the gulf			
	Climate	Arid, long hot Summers			
	Average Annual Rainfall	472mm			
WATER QUALITY OR SECURITY RISK (CAUSE)		FACTOR	YES / NO	NOTES / EXPLANATION	
		Drought	No	Cloncurry is not listed as being drought declared as at 30 September 2009 on www.longpaddock.qld.gov.au . Cloncurry has faced severe water shortages over the last 15 years when the wet season does not replenish the dam supply. Supplemented by flood harvesting from the Cloncurry river into the dam storage, river wells extracting water stored in the river bed and bores brought on loine around town when the dam supply runs dry.	
		Single drinking water source	No	Cloncurry River and Chinamen Creek Dam. Qld State Government is currently constructing pipeline from North West Pipeline to supplement Chinaman Creek Dam.	
		Poor quality water source	No		
		Sewage overflow or disposal into water source	No		
		Flooding	Yes	Floods in Cloncurry River caused damage to the Chinaman Creek dam fuse plug in 1997, causing a loss of storage. Flooding in Cloncurry River has caused damage to river well system.	
		Fauna defecating in supply	Yes	Cattle in dam storage area.	
		Fauna destroying water intake structures	Unknown		
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	Yes	River water has high levels of iron and manganese in periods of high runoff during wet season. This overloads the WTP for short periods resulting in very dirty water.	
		Un-lined landfills	No		
		Extensive agriculture	Yes	Beef cattle in Chinaman Creek and Cloncurry River upstream catchment.	
		Low vegetation cover (dust, sediment runoff)	Yes		
		Poor access to supply	No		
		Unsustainable water extraction			
		Aquifer turning saline due to high extraction			
		Hard water			
		Aging or inadequate pipe work and associated infrastructure	Yes	Water reticulation network consists of asbestos cement (AC) mains in places. Regular leaks require patching. Low pressure in outer areas of town.	
		Significant water losses due to leaking pipes	Yes	Believed to be but not proven.	
		High per capita water consumption	Yes	> 500 L/capita/day	
		Inappropriate water quality standards / objectives	No		
		Lack of infrastructure maintenance	Yes	Raw water storage inadequate for usage, water treatment plant at capacity. Council is pursuing opportunity to source supplementary supply from Julius Dam pipeline.	
		Poor management or governance	Unknown		
		Vandalism / sabotage / terrorism	No		
		Insufficient trained personnel	Unknown		
		Inadequate funding for maintenance or upgrades	Yes		
		Industries	Mining / minerals	Yes	Smaller mines upstream. Dewatering activities for Ernest Mine anecdotally lowers groundwater over a large enough area to affect Cloncurry township bore supplies.
			Irrigation	No	
			Chemicals / process	No	
Seasonal population loadings	No				
Population					
	Rapid population growth	No	Population decline experienced between 2001 and 2006 Census New mining activity can result in rapid population growth. Current water limitations allegedly impacting on town's ability to attract new mining operations.		
SECURITY	Pathogenic contamination	No			
	Algal blooms	No			
	Heavy metal contamination	No			
	Poor chlorine residuals	No			

WATER QUALITY OR S RISK (EFFECT)	Pesticide contamination	No	
	Boil water notices	Yes	When required under the Act.
	Deaths or illness due to water quality	Unknown	
	Water restrictions (current and historic)	Yes	
	Taste and odour issues	Yes	Associated with fresh runs in river or when dam levels are getting low.
	Other contamination that would affect health		
Notes			

Town #		5			
TOWN	State/Territory		Qld-North		
	Town Name		Charters Towers		
	Town Population		7,979 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility		Charters Towers Regional Council		
	Rate (\$/kL)		Unknown		
	Per Capita Water Consumption (L/day)		Unknown. Water Treatment Plant produces 14ML/day.		
	Number of Connections		>2,500		
CATCHMENT AND WATER SUPPLY	Catchment		Burdekin River		
	Sub-Catchment		-		
	Catchment Management Authority (CMA)		Charters Towers Regional Council		
	CMA Web-Link		www.charterstowers.qld.gov.au		
	Catchment Protection Status		Restricted access to public.		
	Potable Water Source(s)		Burdekin River Weir		
	Supply Capacity		Burdekin River 14ML/day		
WATER QUALITY	Treatment Plant(s)		F E J Butcher Treatment Plant		
	Level of Treatment		Coagulation, clarification, media filtration and disinfection with chlorine (chlorine gas).		
	Drinking Water Guidelines		ADWG 2004		
	Results	Typical Results		F E J Butcher Treatment Plant	ADWG 2004
		Fluoride (mg/L)		0.12	1.5 mg/L
		pH		7.30	6.5-8.5
		Chlorine residual (mg/L)		2.80	5 mg/L
		Alkalinity (mg/L)		120.00	??
		Hardness (mg/L)		100.00	200 mg/L as CaCO3
Turbidity (NTU)		0.22	5 NTU		
WATER SECURITY	Current Water Restrictions		Unknown		
	Proportion of Potable Water Supplied to Households (%)		Unknown		
	Distance from the Coast (km)		130km		
	Climate		Dry		
	Average Annual Rainfall		620mm		
WATER QUALITY OR SECURITY RISK (CAUSE)			FACTOR	YES / NO	NOTES / EXPLANATION
	Catchment and Water Supply	Drought	No	Charters Towers is not listed as drought declared as at 30th September 2009 on www.lonpaddock.qld.gov.au	
		Single drinking water source	Yes		
		Poor quality water source	No		
		Sewage overflow or disposal into water source	No		
		Flooding	Yes		
		Fauna defecating in supply	Yes		
		Fauna destroying water intake structures	No		
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	Unknown		
		Un-lined landfills	No	N/A as water supply source is located some 20 km from town.	
		Extensive agriculture	Yes		
		Low vegetation cover (dust, sediment runoff)	Yes		
		Poor access to supply	No		
		Unsustainable water extraction	Unknown		
		Aquifer turning saline due to high extraction	N/A		
		Hard water	Unknown		
	Aging or inadequate pipe work and associated infrastructure	No	Assets are generally in good condition.		
	Significant water losses due to leaking pipes	No	Council has received funding from Qld government to install pressure reducing valves across network. Council is diligent on water consumption and possible water leaks.		
	Governance	High per capita water consumption	Yes		
		Inappropriate water quality standards / objectives	No		
		Lack of infrastructure maintenance	No		
		Poor management or governance	No		
		Vandalism / sabotage / terrorism	No		
		Insufficient trained personnel	No		
		Inadequate funding for maintenance or upgrades	No		
	Industries	Mining / minerals	No		
		Irrigation	No		
		Chemicals / process	No		
	Population	Seasonal population loadings	Yes	Generally around large events i.e. Goldfield ashes cricket carnival and Country music festival	
Rapid population growth		No	Population decline experienced between 2001 and 2006 Census		
WATER QUALITY OR SECURITY RISK (EFFECT)	Pathogenic contamination	Unknown			
	Algal blooms	Yes	Previous outbreak of geosmin blooms		
	Heavy metal contamination	Unknown			
	Poor chlorine residuals	Unknown			
	Pesticide contamination	Unknown			
	Boil water notices	Unknown			
	Deaths or illness due to water quality	Unknown			
	Water restrictions (current and historic)	Yes	Odds and evens watering bans but exact details are unknown.		
	Taste and odour issues	Yes	On rare occasions residents complain of water unsuitable for drinking.		
	Other contamination that would affect health				
Notes					

Town # 6

TOWN	State/Territory	Qld-North		
	Town Name	Innisfail		
	Town Population	8,262 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility	Cassowary Coast Regional Council		
	Rate (\$/kL)	Refer to www.isc.qld.gov.au/council/Corporate%20Services/Financial%20Management/Financial%20Management.shtml		
	Per Capita Water Consumption (L/day)	Unknown. Volume produced by water treatment plant - 12ML/day.		
CATCHMENT AND WATER SUPPLY	Number of Connections	4,885		
	Catchment	Johnson River Basin, Liverpool Creek		
	Sub-Catchment	-		
	Catchment Management Authority (CMA)	Cassowary Coast Regional Council		
	CMA Web-Link	www.isc.qld.gov.au		
	Catchment Protection Status	Wet Tropics World Heritage listed		
	Potable Water Source(s)	Surface water		
WATER QUALITY	Supply Capacity	7ML/d and peak day demand at 12ML/d		
	Treatment Plant(s)	Innisfail Water Treatment Plant		
	Level of Treatment	Coagulation, clarification, granular media filtration, disinfection (sodium hypochlorite).		
	Drinking Water Guidelines	ADWG 2008		
	Results	Typical Results	Innisfail WTP	ADWG 2004
		Fluoride (mg/L)	-	1.5 mg/L
		pH	7.20	6.5-8.5
		Chlorine residual (mg/L)	1.75	5 mg/L
		Alkalinity (mg/L)	20.00	??
		Hardness (mg/L)	20.00	200 mg/L as CaCO3
Turbidity (NTU)	0.15	5 NTU		
WATER SECURITY	Current Water Restrictions	Level 1 Restrictions: - No watering on Mondays - Odds and evens split - Watering only allowed between 5-7 am and 7-9 pm Refer to http://www.cassowarycoast.qld.gov.au/2009/09/water-restrictions/		
	Proportion of Potable Water Supplied to Households (%)	Unknown		
	Distance from the Coast (km)	10km		
	Climate	Wet Tropics		
	Average Annual Rainfall	3560mm (sourced from www.bom.gov.au)		
FACTOR		YES / NO	NOTES / EXPLANATION	
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	No	Innisfail is not listed as being drought
		Single drinking water source	No	
		Poor quality water source	Unknown	
		Sewage overflow or disposal into water source	No	
		Flooding	Yes	
		Fauna defecating in supply	Yes	
		Fauna destroying water intake structures	Yes	
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	Unknown	
		Un-lined landfills	Unknown	
		Extensive agriculture	Yes	
		Low vegetation cover (dust, sediment runoff)	Medium	
		Poor access to supply	Unknown	
		Unsustainable water extraction	Unknown	
		Aquifer turning saline due to high extraction	Unknown	
		Hard water	Unknown	
		Aging or inadequate pipe work and associated infrastructure	Unknown	
		Significant water losses due to leaking pipes	Unknown	
	Governance	High per capita water consumption	Unknown	
		Inappropriate water quality standards / objectives	Unknown	
		Lack of infrastructure maintenance	Unknown	
		Poor management or governance	Unknown	
		Vandalism / sabotage / terrorism	Unknown	
		Insufficient trained personnel	Unknown	
	Industries	Inadequate funding for maintenance or upgrades	Unknown	
		Mining / minerals	Unknown	
		Irrigation	Unknown	
	Population	Chemicals / process	Unknown	
		Seasonal population loadings	Unknown	
	Population	Rapid population growth	No	Population decline experienced between 2001 and 2006 Census.
WATER QUALITY OR SECURITY RISK (EFFECT)	Pathogenic contamination	Unknown		
	Algal blooms	Unknown		
	Heavy metal contamination	Unknown		
	Poor chlorine residuals	Unknown		
	Pesticide contamination	Unknown		
	Boil water notices	Unknown		
	Deaths or illness due to water quality	Unknown		
	Water restrictions (current and historic)	Yes		
	Taste and odour issues	Unknown		
	Other contamination that would affect health	Unknown		
Notes				

Town #		7			
TOWN	State/Territory		Qld-North		
	Town Name		Mareeba		
	Town Population		6806 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility		Tablelands Regional Council		
	Rate (\$/kL)		Unknown		
	Per Capita Water Consumption (L/day)		Unknown		
CATCHMENT AND WATER SUPPLY	Number of Connections		Unknown		
	Catchment		Barron River Catchment		
	Sub-Catchment		-		
	Catchment Management Authority (CMA)		Tablelands Regional Council		
	CMA Web-Link		www.trc.qld.gov.au/contact-us		
	Catchment Protection Status		Nil		
	Potable Water Source(s)		Barron River SunWater irrigation network & bores		
WATER QUALITY	Supply Capacity		Unknown		
	Treatment Plant(s)		Mareeba Water Treatment Plant		
	Level of Treatment		Coagulation, sedimentation, media filtration and liquid chlorine.		
	Drinking Water Guidelines		ADWG 2008		
	Results (% compliance for 2008 reporting period)	Typical Results		Mareeba Water Treatment Plant	ADWG 2004
		Fluoride (mg/L)		Unknown	1.5 mg/L
		pH		Unknown	6.5-8.5
		Chlorine residual (mg/L)		Unknown	5 mg/L
		Alkalinity (mg/L)		Unknown	??
		Hardness (mg/L)		Unknown	200 mg/L as CaCO3
Turbidity (NTU)		Unknown	5 NTU		
WATER SECURITY	Current Water Restrictions		None		
	Proportion of Potable Water Supplied to Households (%)		Unknown		
	Distance from the Coast (km)		100km		
	Climate		Semi dry		
	Average Annual Rainfall		850mm (sourced from www.bom.gov.au)		
FACTOR			YES / NO	NOTES / EXPLANATION	
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	No	Mareeba is not listed as being drought declared as at 30th September 2009 on www.longpaddock.qld.gov.au .	
		Single drinking water source	No	Sunwater Irrigation canal and bore water also available.	
		Poor quality water source			
		Sewage overflow or disposal into water source	No		
		Flooding	Yes		
		Fauna defecating in supply	Yes		
		Fauna destroying water intake structures	Yes		
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)			
		Un-lined landfills	No		
		Extensive agriculture	Yes		
		Low vegetation cover (dust, sediment runoff)	Yes		
		Poor access to supply			
		Unsustainable water extraction			
		Aquifer turning saline due to high extraction			
		Hard water			
	Governance	Aging or inadequate pipe work and associated infrastructure			
		Significant water losses due to leaking pipes			
		High per capita water consumption			
		Inappropriate water quality standards / objectives	No		
		Lack of infrastructure maintenance			
		Poor management or governance			
	Industrial	Vandalism / sabotage / terrorism			
		Insufficient trained personnel			
		Inadequate funding for maintenance or upgrades			
		Mining / minerals	No		
	Population	Irrigation	Yes		
		Chemicals / process	No		
Seasonal population loadings		Yes	Events such as local rodeo raise population.		
WATER QUALITY OR SECURITY RISK (EFFECT)	Rapid population growth	No	Population decline experienced between 2001 and 2006 Census		
	Pathogenic contamination				
	Algal blooms				
	Heavy metal contamination				
	Poor chlorine residuals				
	Pesticide contamination				
	Boil water notices				
	Deaths or illness due to water quality				
	Water restrictions (current and historic)	Yes			
	Taste and odour issues				
	Other contamination that would affect health				
	Notes				

Town # 8

TOWN	State/Territory		Qld-North			
	Town Name		Atherton			
	Town Population		6247 (Census 2006, Urban Centre/Locality)			
WATER UTILITY	Name of Water Utility		Tablelands Regional Council			
	Rate (\$/kL)		Unknown			
	Per Capita Water Consumption (L/day)		Unknown			
CATCHMENT AND WATER SUPPLY	Number of Connections		Unknown			
	Catchment		Barron River Catchment			
	Sub-Catchment		-			
	Catchment Management Authority (CMA)		Tablelands Regional Council			
	CMA Web-Link		www.trc.qld.gov.au/contact-us			
	Catchment Protection Status		No			
	Potable Water Source(s)		Johnstone & Upper Barron River Scrubby Creek Lake Tinaroo & Bores			
	Supply Capacity		Unknown			
WATER QUALITY	Treatment Plant(s)		Atherton water Treatment Plant			
	Level of Treatment		-			
	Drinking Water Guidelines		ADWG 2008			
	Results (% compliance for 2008 reporting period)	Typical Results		Atherton Water Treatment Plant		ADWG 2004
		Fluoride (mg/L)		Unknown		1.5 mg/L
		pH		Unknown		6.5-8.5
		Chlorine residual (mg/L)		Unknown		5 mg/L
		Alkalinity (mg/L)		Unknown		??
Hardness (mg/L)		Unknown		200 mg/L as CaCO3		
Turbidity (NTU)		Unknown		5 NTU		
WATER SECURITY	Current Water Restrictions		Level 1 water restrictions. - Odd property numbers (on odd days of month) and even property numbers (even days of month) watering. - watering using only allowed between 7-9 am Refer to www.trc.qld.gov.au/infrastructure/water .			
	Proportion of Potable Water Supplied to Households (%)		Unknown			
	Distance from the Coast (km)		100km			
	Climate		Tropical			
	Average Annual Rainfall		1420mm (sourced from www.bom.gov.au)			
WATER QUALITY OR SECURITY RISK (CAUSE)						
	Catchment and Water Supply	Drought	No	Atherton is not listed as being drought declared as at 30th September 2009 on www.longpaddock.qld.gov.au .		
		Single drinking water source	No			
		Poor quality water source				
		Sewage overflow or disposal into water source	No			
		Flooding	Yes			
		Fauna defecating in supply	Yes			
		Fauna destroying water intake structures	Yes			
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)				
		Un-lined landfills				
		Extensive agriculture	Yes			
		Low vegetation cover (dust, sediment runoff)	Yes			
		Poor access to supply				
		Unsustainable water extraction				
		Aquifer turning saline due to high extraction				
		Hard water				
	Governance	Aging or inadequate pipe work and associated infrastructure				
		Significant water losses due to leaking pipes				
		High per capita water consumption				
		Inappropriate water quality standards / objectives	No			
		Lack of infrastructure maintenance				
		Poor management or governance				
		Vandalism / sabotage / terrorism				
	Industries	Insufficient trained personnel				
		Inadequate funding for maintenance or upgrades				
		Mining / minerals	No			
	Population	Irrigation	Yes			
		Chemicals / process	No			
		Seasonal population loadings	No			
	WATER QUALITY OR SECURITY RISK (EFFECT)	Rapid population growth	No	Atherton is growing slower than the Queensland state average based on 2001 and 2006 Census data.		
Pathogenic contamination						
Algal blooms						
Heavy metal contamination						
Poor chlorine residuals						
Pesticide contamination						
Boil water notices						
Deaths or illness due to water quality						
Water restrictions (current and historic)		Yes				
Taste and odour issues						
Other contamination that would affect health						
Notes						

Town # 9

TOWN	State/Territory		Qld-North		
	Town Name		Sarina		
	Town Population		3285 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility		Mackay Regional Council		
	Rate (\$/kL)		Unknown		
	Per Capita Water Consumption (L/day)		Unknown. Average volume produced by the water supply scheme is 1.1ML/d and the peak is 1.4ML/d.		
CATCHMENT AND WATER SUPPLY	Number of Connections		> 500		
	Catchment		None. Bore water, ground water.		
	Sub-Catchment		-		
	Catchment Management Authority (CMA)		Mackay Regional Council		
	CMA Web-Link		www.mackay.qld.gov.au		
	Catchment Protection Status		Unknown		
	Potable Water Source(s)		Bore Water		
WATER QUALITY	Supply Capacity		Treatment plant design capacity - 2.8ML/d.		
	Treatment Plant(s)		Northern Beaches Water Supply Scheme		
	Level of Treatment		Coagulation, clarification, media filtration, pH correction and disinfection with chlorination (sodium hypochlorite).		
	Drinking Water Guidelines		ADWG 2008		
	Results (% compliance for 2008 reporting period)	Typical Results		Northern Beaches Water Supply Scheme	ADWG 2004
		Fluoride (mg/L)		0.4	1.5 mg/L
		pH		7.8	6.5-8.5
		Chlorine residual (mg/L)		0.5	5 mg/L
		Alkalinity (mg/L)		140	??
		Hardness (mg/L)		146	200 mg/L as CaCO3
Turbidity (NTU)		0.60	5 NTU		
WATER SECURITY	Current Water Restrictions		Sarina is currently on Level 3 restrictions. - Total sprinkler ban - Hand held hoses only between 6-7 am and 6-7 pm Refer to www.mackay.qld.gov.au/services/water_and_waste/water_restrictions		
	Proportion of Potable Water Supplied to Households (%)		Unknown		
	Distance from the Coast (km)		10		
	Climate		Tropical		
	Average Annual Rainfall		1730mm (indicative only no information available from www.bom.gov.au)		
FACTOR			YES / NO	NOTES / EXPLANATION	
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	No	Sarina is not listed as being drought declared as at 30th September 2009 on www.longpaddock.qld.gov.au .	
		Single drinking water source	Yes		
		Poor quality water source	Unknown		
		Sewage overflow or disposal into water source	No		
		Flooding	Yes		
		Fauna defecating in supply	No	Bore water.	
		Fauna destroying water intake structures	No	Bore water.	
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	Unknown		
		Un-lined landfills	Unknown		
		Extensive agriculture	Yes		
		Low vegetation cover (dust, sediment runoff)	Yes		
		Poor access to supply			
		Unsustainable water extraction	Unknown		
		Aquifer turning saline due to high extraction	Unknown		
		Hard water	Unknown		
		Aging or inadequate pipe work and associated infrastructure	Unknown		
		Significant water losses due to leaking pipes	Unknown		
	Governance	High per capita water consumption	Unknown		
		Inappropriate water quality standards / objectives			
		Lack of infrastructure maintenance	Unknown		
		Poor management or governance	Unknown		
		Vandalism / sabotage / terrorism			
		Insufficient trained personnel			
	Industries	Inadequate funding for maintenance or upgrades	Unknown		
		Mining / minerals	No		
		Irrigation	Yes		
	Population	Chemicals / process	No		
		Seasonal population loadings	No		
		Rapid population growth	Yes	Growth greater than Queensland State Average based on 2001 and 2006 Census data.	
WATER QUALITY OR SECURITY RISK (EFFECT)	Pathogenic contamination		Unknown		
	Algal blooms		Unknown		
	Heavy metal contamination		Unknown		
	Poor chlorine residuals		Unknown		
	Pesticide contamination		Unknown		
	Boil water notices		Unknown		
	Deaths or illness due to water quality		Unknown		
	Water restrictions (current and historic)		Yes		
	Taste and odour issues		Unknown		
	Other contamination that would affect health		Unknown		
Notes					

Town # 10

TOWN	State/Territory		Qld-North					
	Town Name		Ayr					
	Town Population		8093 (Census 2006, Urban Centre/Locality)					
WATER UTILITY	Name of Water Utility		Burdekin Shire Council					
	Rate (\$/kL)		refer to www.burdekin.qld.gov.au/services/water/billing/					
	Per Capita Water Consumption (L/day)		Unknown					
	Number of Connections		Council Chambers WTP - 500 Nelsons Lagoon WTP - 500 South Ayr WTP - 500					
CATCHMENT AND WATER SUPPLY	Catchment		Part of the Burdekin River Catchment					
	Sub-Catchment		-					
	Catchment Management Authority (CMA)		Burdekin Shire Council					
	CMA Web-Link		www.burdekin.qld.gov.au					
	Catchment Protection Status		Unknown					
	Potable Water Source(s)		Council Chambers WTP - Bore water Nelsons lagoon WTP - Bore water South Ayr WTP - Bore Water					
	Supply Capacity		Council Chambers WTP - 3ML/d Nelsons lagoon WTP - 10ML/d South Ayr WTP - 11ML/d					
	WATER QUALITY	Treatment Plant(s)		Nelsons lagoon, Council Chambers, South Ayr water Treatment Plants				
Level of Treatment		Council Chambers WTT - semi automated - disinfection with chlorination (sodium hypochlorite). Nelsons lagoon WTP - semi automated - disinfection with chlorination (sodium hypochlorite). South Ayr WTP - semi automated - disinfection with chlorination (sodium hypochlorite).						
Drinking Water Guidelines		ADWG 2008						
Results		Typical Results	Council Chambers	Nelsons Lagoon	South Ayr	ADWG 2004		
		Fluoride (mg/L)	0.10	0.10	0.20	1.5 mg/L		
		pH	7.30	8.50	8.60	6.5-8.5		
		Chlorine residual (mg/L)	0.30	0.30	0.30	5 mg/L		
		Alkalinity (mg/L)	69.00	91.00	108.00	??		
		Hardness (mg/L)	71.00	58.00	54.00	200 mg/L as CaCO3		
Turbidity (NTU)	<1	1.40	0.90	5 NTU				
WATER SECURITY	Current Water Restrictions		Nil					
	Proportion of Potable Water Supplied to Households (%)		Unknown					
	Distance from the Coast (km)		10km					
	Climate		Tropical					
	Average Annual Rainfall		944mm (sourced from www.bom.gov.au)					
FACTOR			YES / NO		NOTES / EXPLANATION			
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	No	Ayr is not listed as being drought declared as at 30th September 2009 on www.longpaddock.qld.gov.au .				
		Single drinking water source	No	There are multiple sources for bore water.				
		Poor quality water source	No					
		Sewage overflow or disposal into water source	No					
		Flooding	Yes					
		Fauna defecating in supply	No	Bore water.				
		Fauna destroying water intake structures	No					
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	Unknown					
		Un-lined landfills	No					
		Extensive agriculture	Yes					
		Low vegetation cover (dust, sediment runoff)	Yes	Does not pose a problem for bore water.				
		Poor access to supply	No					
		Unsustainable water extraction	Unknown					
		Aquifer turning saline due to high extraction	Unknown					
		Hard water	Unknown					
		Aging or inadequate pipe work and associated infrastructure	No					
		Significant water losses due to leaking pipes	Unknown					
	Governance	High per capita water consumption	Unknown					
		Inappropriate water quality standards / objectives	No					
		Lack of infrastructure maintenance	Unknown					
		Poor management or governance	No					
		Vandalism / sabotage / terrorism	No					
		Insufficient trained personnel	No					
	Industries	Inadequate funding for maintenance or upgrades	Unknown					
		Mining / minerals	No					
		Irrigation	No	Surrounding farmlands have their own supply sources.				
	Population	Chemicals / process	No					
		Seasonal population loadings	No					
		Rapid population growth	No	Population decline experienced between 2001 and 2006 Census				
WATER QUALITY OR SECURITY RISK (EFFECT)	Pathogenic contamination	Unknown						
	Algal blooms	No						
	Heavy metal contamination	Unknown						
	Poor chlorine residuals	Unknown						
	Pesticide contamination	Unknown						
	Boil water notices	Unknown						
	Deaths or illness due to water quality	Unknown						
	Water restrictions (current and historic)	Yes						
	Taste and odour issues	No						
	Other contamination that would affect health	No						
Notes								

Town # 11

TOWN	State/Territory	Qld-North			
	Town Name	Bowen			
	Town Population	7484 (Census 2006, Urban Centre/Locality)			
	Name of Water Utility	Whitsundays Regional Council			
WATER UTILITY	Rate (\$/kL)	Unknown			
	Per Capita Water Consumption (L/day)	Unknown			
	Number of Connections	> 5,000			
	Catchment	Proserpine River Catchment			
CATCHMENT AND WATER SUPPLY	Sub-Catchment	-			
	Catchment Management Authority (CMA)	Whitsunday Regional Council			
	CMA Web-Link	www.whitsunday.qld.gov.au			
	Catchment Protection Status	None			
WATER QUALITY	Potable Water Source(s)	Bore water			
	Supply Capacity	Bowen Bores Water Treatment Plant - 13.12ML/day; Bowen Proserpine River Water Supply System -			
	Treatment Plant(s)	Bowen Bores Water Treatment Plant and Bowen Proserpine River Water Supply System			
	Level of Treatment	Disinfection with chlorination (sodium hypochlorite).			
WATER SECURITY	Drinking Water Guidelines	ADWG 2008			
	Results (% compliance for 2008 reporting period)	Typical Results	Bowen Bores Water	Bowen Proserpine River Water	ADWG 2004
		Fluoride (mg/L)	0.1	0.6	1.5 mg/L
		pH	7.5	7.8	6.5-8.5
		Chlorine residual (mg/L)	0.6	1.2	5 mg/L
		Alkalinity (mg/L)	161	51	??
		Hardness (mg/L)	284	48	200 mg/L as CaCO3
		Turbidity (NTU)	<1	5.00	5 NTU
	Current Water Restrictions	Level 1 restrictions: - Watering only between 5-9 am and 5-9 pm on alternative days Refer to www.bowen.qld.gov.au/ServicesFees/whitsundayServices/WaterConservation/tabid/155/Default.aspx			
	Proportion of Potable Water Supplied to Households (%)	Unknown			
	Distance from the Coast (km)	0			
WATER QUALITY OR SECURITY RISK (CAUSE)	FACTOR		YES / NO		NOTES / EXPLANATION
	Catchment and Water Supply	Drought	No		Bowen is not listed as being drought declared as at 30th September 2009 on www.longpaddock.qld.gov.au .
		Single drinking water source	No		
		Poor quality water source	Unknown		
		Sewage overflow or disposal into water source	No		
		Flooding	Yes		
		Fauna defecating in supply	Yes		Possible in Proserpine River water source.
		Fauna destroying water intake structures	Yes		Possible in Proserpine River water source.
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	Unknown		
		Un-lined landfills	Unknown		
		Extensive agriculture	Moderate		
		Low vegetation cover (dust, sediment runoff)	Yes		
		Poor access to supply			
		Unsustainable water extraction	Unknown		
		Aquifer turning saline due to high extraction	Unknown		
		Hard water	Unknown		
		Aging or inadequate pipe work and associated infrastructure	Unknown		
		Significant water losses due to leaking pipes	Unknown		
	Governance	High per capita water consumption	Unknown		
		Inappropriate water quality standards / objectives	No		
		Lack of infrastructure maintenance	Unknown		
		Poor management or governance	Unknown		
		Vandalism / sabotage / terrorism			
		Insufficient trained personnel			
	Industries	Inadequate funding for maintenance or upgrades	Unknown		
		Mining / minerals	No		
		Irrigation	Yes		
	Population	Chemicals / process	No		
		Seasonal population loadings	No		
	WATER QUALITY OR SECURITY RISK (EFFECT)	Rapid population growth	No		Population decline experienced between 2001 and 2006 Census
		Pathogenic contamination	Unknown		
		Algal blooms	Unknown		
		Heavy metal contamination	Unknown		
		Poor chlorine residuals	Unknown		
		Pesticide contamination	Unknown		
		Boil water notices	Unknown		
		Deaths or illness due to water quality	Unknown		
		Water restrictions (current and historic)	Yes		
		Taste and odour issues	Unknown		
		Other contamination that would affect health	Unknown		
	Notes				

Town # 12

TOWN	State/Territory		Qld-South	
	Town Name		Moranbah	
	Town Population		7113 (Census 2006, Urban Centre/Locality)	
WATER UTILITY	Name of Water Utility		Isaac Regional Council	
	Rate (\$/kL)		Unknown	
	Per Capita Water Consumption (L/day)		Unknown	
	Number of Connections		Unknown	
CATCHMENT AND WATER SUPPLY	Catchment		Fitzroy	
	Sub-Catchment		Isaac-Connors	
	Catchment Management Authority (CMA)		Fitzroy Basin Association	
	CMA Web-Link		http://www.fba.org.au/ourregion/ourregion.html	
	Catchment Protection Status		Unknown	
	Potable Water Source(s)		Burdekin to Moranbah Pipeline	
WATER QUALITY	Supply Capacity		Burdekin to Moranbah Pipeline 17000ML/Annum	
	Treatment Plant(s)		-	
	Level of Treatment		Sedimentation and Filtration	
	Drinking Water Guidelines		ADWG 2004	
	Results		Unknown	
WATER SECURITY	Current Water Restrictions		Yes - external water use, no watering Monday, tues - sun 5am-8am and 5pm-8pm, sprinklers not on Monday, twice weekly 5pm-8pm.	
	Proportion of Potable Water Supplied to Households (%)		Unknown	
	Distance from the Coast (km)		156km	
	Climate		Sub-tropical	
	Average Annual Rainfall		589.9mm	
FACTOR			YES / NO	NOTES / EXPLANATION
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	Yes	Water restrictions have been enforced. Not Currently drought declared, however has been previously (Primary Industries and Fisheries)
		Single drinking water source	Yes	Sunwater Pipeline, however this is a fairly reliable source of water.
		Poor quality water source	No	Sunwater supply.
		Sewage overflow or disposal into water	No	
		Flooding		
		Fauna defecating in supply		
		Fauna destroying water intake structures		
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)		
		Un-lined landfills		
		Extensive agriculture		
		Low vegetation cover (dust, sediment)		
		Poor access to supply		
		Unsustainable water extraction		
		Aquifer turning saline due to high extraction	No	
		Hard water	No	
	Governance	Aging or inadequate pipe work and associated infrastructure	No	Rated as operating well, only requires maintenance.
		Significant water losses due to leaking pipes		
		High per capita water consumption		
		Inappropriate water quality standards / objectives		
		Lack of infrastructure maintenance		
		Poor management or governance		
		Vandalism / sabotage / terrorism		
	Industries	Insufficient trained personnel		
		Inadequate funding for maintenance or upgrades		
		Mining / minerals	Yes	Mines around Moranbah, however no evidence to suggest this has effected water supply.
	Population	Irrigation	No	
		Chemicals / process	Yes	Mineral process industry in surrounding area.
		Seasonal population loadings	No	
	WATER QUALITY OR SECURITY RISK (EFFECT)	Rapid population growth	Yes	3.3% growth/annum 2001-2005. During mining boom.
Pathogenic contamination				
Algal blooms				
Heavy metal contamination				
Poor chlorine residuals				
Pesticide contamination				
Boil water notices				
Deaths or illness due to water quality				
Water restrictions (current and historic)				
Taste and odour issues				
Other contamination that would affect				
Notes			Water supply to the water provider is the responsibility of Sunwater.	

Town # 13

TOWN	State/Territory	Qld-South		
	Town Name	Dysart		
	Town Population	3137 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility	Isaac Regional Council		
	Rate (\$/kL)	Unknown		
	Per Capita Water Consumption (L/day)	826 L/day		
	Number of Connections	Unknown		
CATCHMENT AND WATER SUPPLY	Catchment	Fitzroy		
	Sub-Catchment	Isaac-Connors		
	Catchment Management Authority (CMA)	Fitzroy Basin Association		
	CMA Web-Link	http://www.fba.org.au/ourregion/ourregion.html		
	Catchment Protection Status			
	Potable Water Source(s)	Ground Water		
WATER QUALITY	Supply Capacity	Unknown		
	Treatment Plant(s)			
	Level of Treatment	Sedimentation and Filtration		
	Drinking Water Guidelines	ADWG 2004		
WATER SECURITY	Results	Unknown		
	Current Water Restrictions	Yes - external water use 3 times per week, 3 hours each day, between 5pm-8pm.		
	Proportion of Potable Water Supplied to Households (%)	Unknown		
	Distance from the Coast (km)	133km		
	Climate	Sub-tropical		
	Average Annual Rainfall	589.9mm (Moranbah is closest recording station).		
FACTOR		YES / NO	NOTES / EXPLANATION	
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	Yes	Water restrictions. Not Currently drought declared, however has been previously (Primary Industries and Fisheries)
		Single drinking water source		
		Poor quality water source		
		Sewage overflow or disposal into water source		
		Flooding		
		Fauna defecating in supply		
		Fauna destroying water intake structures		
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)		
		Un-lined landfills		
		Extensive agriculture		
		Low vegetation cover (dust, sediment runoff)		
		Poor access to supply		
		Unsustainable water extraction		
		Aquifer turning saline due to high extraction		
		Hard water		
	Governance	Aging or inadequate pipe work and associated infrastructure	No	Infrastructure rated as operating well, only requires maintenance in PB report.
		Significant water losses due to leaking pipes		
		High per capita water consumption		
		Inappropriate water quality standards / objectives		
		Lack of infrastructure maintenance		
		Poor management or governance		
	Industries	Vandalism / sabotage / terrorism		
		Insufficient trained personnel		
		Inadequate funding for maintenance or upgrades		
		Mining / minerals	Yes	Mines around Dysart, however no evidence to suggest this has effected water supply.
Pop ulation	Irrigation	No		
	Chemicals / process	Yes	Mineral process industry in surrounding area.	
	Seasonal population loadings	No		
	Rapid population growth	Yes	During mining boom. 5.4% growth/annum 2001-2005.	
WATER QUALITY OR SECURITY RISK (EFFECT)	Pathogenic contamination			
	Algal blooms			
	Heavy metal contamination			
	Poor chlorine residuals			
	Pesticide contamination			
	Boil water notices			
	Deaths or illness due to water quality			
	Water restrictions (current and historic)			
	Taste and odour issues			
	Other contamination that would affect health			
	Notes			

Town # 14

TOWN	State/Territory		Qld-South	
	Town Name		Chinchilla	
	Town Population		3681 (Census 2006, Urban Centre/Locality)	
WATER UTILITY	Name of Water Utility		Western Downs Regional Council	
	Rate (\$/kL)		\$251.55/Annum, Six monthly charges \$0.99/kL up to 100kL, \$1.35/kL from 101 to 400kL, \$2.26/kL above 400kL..	
	Per Capita Water Consumption (L/day)		Unknown. 0.4ML/Connection and 0.3ML/Residential Connection in 05/06 financial year.	
	Number of Connections		2004	
CATCHMENT AND WATER SUPPLY	Catchment		Condamine	
	Sub-Catchment		-	
	Catchment Management Authority (CMA)		Condamine Alliance Incorporated	
	CMA Web-Link		http://www.condaminealliance.com.au/	
	Catchment Protection Status		Unknown	
	Potable Water Source(s)		Chinchilla Weir on the Condamine River Charley's Creek Weir	
	Supply Capacity		Water storage facilities in the town Chinchilla Weir - 9780ML	
WATER QUALITY	Treatment Plant(s)		Chinchilla Water Treatment Plant, Chinchilla.	
	Level of Treatment		Flocculation, sedimentation, filtration, pH correction and disinfection.	
	Drinking Water Guidelines		ADWG 2004	
	Results		Unknown	
WATER SECURITY	Current Water Restrictions		Level 3 - 300L/day/person - hoses and dripper systems 3 days/week from 5pm to 8pm, no watering with sprinklers, buckets anytime excluding Monday.	
	Proportion of Potable Water Supplied to Households (%)		Unknown	
	Distance from the Coast (km)		250km	
	Climate		Temperate	
	Average Annual Rainfall		649.4mm	
FACTOR			YES / NO	NOTES / EXPLANATION
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	Yes	Water restrictions currently in place. Currently drought declared (Primary Industries and Fisheries)
		Single drinking water source	Yes	
		Poor quality water source		
		Sewage overflow or disposal into water source		
		Flooding	Yes	
		Fauna defecating in supply	Yes	Open water supply.
		Fauna destroying water intake structures		
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)		
		Un-lined landfills		
		Extensive agriculture	Yes	Agriculture is the primary land use around the township.
		Low vegetation cover (dust, sediment runoff)	Yes	Clearing for farm use.
		Poor access to supply		
		Unsustainable water extraction		
		Aquifer turning saline due to high extraction	No	
		Hard water	No	
	Aging or inadequate pipe work and associated infrastructure	Yes	Main breaks/100km of mains: 12.8 in 05/06, 7.6 in 04/05, 14.8 in 03/04, 19.7 in 02/03 and 16.5 in 01/02.	
	Significant water losses due to leaking pipes			
	Governance	High per capita water consumption		
		Inappropriate water quality standards / objectives		
		Lack of infrastructure maintenance		
		Poor management or governance		
		Vandalism / sabotage / terrorism		
		Insufficient trained personnel		
		Inadequate funding for maintenance or upgrades		Total Operations Maintenance and Administration Costs/Connection: 316 05/06, 234 04/05, 212 03/04, 168 02/03, 202 01/02; /100km of water main: 1040000 05/06, 713636 04/05, 668852 03/04, 536589 02/03, 541183 01/02; /ML supplied: 790 05/06
	Industries	Mining / minerals		
		Irrigation	Yes	Surrounding farms.
		Chemicals / process	Yes	Surrounding farms.
	Population	Seasonal population loadings		
		Rapid population growth		1.87% growth/annum 2001-2005.
WATER QUALITY OR SECURITY RISK (EFFECT)	Pathogenic contamination		Meeting utility's standards/guidelines for E.coli 05/06: 100%	
	Algal blooms			
	Heavy metal contamination			
	Poor chlorine residuals			
	Pesticide contamination			
	Boil water notices			
	Deaths or illness due to water quality			
	Water restrictions (current and historic)			
	Taste and odour issues			
	Other contamination that would affect health		Meeting utility's standards/guidelines for Physical Chemical compliance 05/06: 100%, 04/05: 100%, 03/04: 71.43%, 02/03: 88.89%.	
Notes		Key natural resource management issues in the region include: - preventing further increase in land affected by salinity - maintaining water quality - controlling exotic weeds and pests - improving soil health and reduce soil erosion - maintaining healthy waterways - maintaining biodiversity including flora, fauna and ecosystems - water reform - protecting and maintaining biodiversity and other NRM assets		

Town # 15

TOWN	State/Territory	Qld-South		
	Town Name	Dalby		
	Town Population	9778 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility	Western Downs Regional Council		
	Rate (\$/kL)	\$223.6/annum, six monthly charges \$1.24/kL up to 125kL, \$2.47/kL from 125kL to 15,000kL, \$3.71/kL above 15,000kL.		
	Per Capita Water Consumption (L/day)	Unknown. 0.4ML/connection in 05/06 financial year.		
	Number of Connections	Dalby Town Council 2007: 4,033 Residential, 432 Commercial/Industrial, 0 Rural, 0 Other, 4,465 Total.		
CATCHMENT AND WATER SUPPLY	Catchment	Condamine		
	Sub-Catchment	-		
	Catchment Management Authority (CMA)	Condamine Alliance Incorporated		
	CMA Web-Link	http://www.condaminealliance.com.au/		
	Catchment Protection Status	Unknown		
	Potable Water Source(s)	10 Underground Bores Loudoun Weir Desalination Plant		
	Supply Capacity	Loudoun Weir - 588 ML Ground water bore - unknown Desalination Plant - 20L/s		
WATER QUALITY	Treatment Plant(s)	Dalby Water Treatment Plant, Dalby Water Supply Desalination Plant, Dalby.		
	Level of Treatment	Water from Loudoun Weir goes through sedimentation and filtration process, underground bore water is chlorinated only, medium to poor quality irrigation (from bores 10 to 12) water through reverse osmosis plant.		
	Drinking Water Guidelines	ADWG 2004		
	Results	Unknown		
WATER SECURITY	Current Water Restrictions	Level 4 -target 240L/person/day. 3 days watering with hoses or dripper systems from 5.30pm to 6.30pm and buckets anytime excluding Mondays.		
	Proportion of Potable Water Supplied to Households (%)	Unknown		
	Distance from the Coast (km)	180km		
	Climate	Temperate		
	Average Annual Rainfall	606.8mm		
FACTOR		YES / NO	NOTES / EXPLANATION	
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	Yes	Water restrictions. Currently drought declared (Primary Industries and Fisheries)
		Single drinking water source	No	Surface and ground water.
		Poor quality water source	Yes	Desalination plant has been built.
		Sewage overflow or disposal into water source		
		Flooding	Yes	Of the surface water catchments.
		Fauna defecating in supply	Yes	Surface water storages.
		Fauna destroying water intake structures		
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)		
		Un-lined landfills		
		Extensive agriculture	Yes	Agriculture is the main land use around the township.
		Low vegetation cover (dust, sediment runoff)	Yes	Clearing for farming use.
		Poor access to supply		
		Unsustainable water extraction		
		Aquifer turning saline due to high extraction		
		Hard water		
	Governance	Aging or inadequate pipe work and associated infrastructure	Yes	Main breaks/100km of mains: 19.4 in 05/06, 9.2 in 04/05, 11.9 in 03/04.
		Significant water losses due to leaking pipes		
		High per capita water consumption		
		Inappropriate water quality standards / objectives		
		Lack of infrastructure maintenance		
	Industries	Poor management or governance		
		Vandalism / sabotage / terrorism		
		Insufficient trained personnel		
		Inadequate funding for maintenance or upgrades		Total Operations Maintenance and Administration Costs/Connection: 227 05/06, 247, 04/05, 234 03/04; /100km of water main: 752592 05/06, 740132 04/05, 696689 03/04; /ML supplied: 639 05/06.
		Mining / minerals		
Population	Irrigation	Yes	Irrigation of farm land.	
	Chemicals / process	Yes	Spraying of farming land.	
	Seasonal population loadings	No		
	Rapid population growth	No		
WATER QUALITY OR SECURITY RISK (EFFECT)	Pathogenic contamination		Meeting Utility's standards/guidelines for E.coli 05/06: 100%.	
	Algal blooms			
	Heavy metal contamination			
	Poor chlorine residuals			
	Pesticide contamination			
	Boil water notices			
	Deaths or illness due to water quality			
	Water restrictions (current and historic)			
	Taste and odour issues			
	Other contamination that would affect health		Meeting Utility's standards/guidelines for Physical Chemical compliance 05/06: 100%, 02/03:100%.	
Notes		There is discussion of the possibility of water supply from Coal Seam Gas, this however may require expensive treatment etc.		

Town # 16

TOWN	State/Territory	Qld-South		
	Town Name	Goondiwindi		
	Town Population	5,629 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility	Goondiwindi Regional Council		
	Rate (\$/kL)	\$138/annum, \$0.71/1000L		
	Per Capita Water Consumption (L/day)	Unknown. 0.8ML/connection in 05/06 financial year.		
CATCHMENT AND WATER SUPPLY	Number of Connections	Goondiwindi Town Council 2007: 1,960 Residential, 310 Commercial/Industrial, 9 Rural, 30 Other, 2,309 Total.		
	Catchment	Border Rivers		
	Sub-Catchment	-		
	Catchment Management Authority (CMA)	Queensland Murray Darling Committee		
	CMA Web-Link	http://www.qmdc.org.au/		
	Catchment Protection Status	Unknown		
WATER QUALITY	Potable Water Source(s)	Macintyre River		
	Supply Capacity	Unknown		
	Treatment Plant(s)	Unknown		
	Level of Treatment	Unknown		
	Drinking Water Guidelines	ADW G 2004		
WATER SECURITY	Results	Unknown		
	Current Water Restrictions	No		
	Proportion of Potable Water Supplied to Households (%)	Unknown		
	Distance from the Coast (km)	320km		
	Climate	Temperate		
	Average Annual Rainfall	594.1mm		
FACTOR		YES / NO	NOTES / EXPLANATION	
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	Yes	Dry inland area. Currently drought declared (Primary Industries and Fisheries)
		Single drinking water source	Yes	Water sourced from Macintyre River.
		Poor quality water source		
		Sewage overflow or disposal into water source		
		Flooding	Yes	
		Fauna defecating in supply	Yes	Open water supply.
		Fauna destroying water intake structures		
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)		
		Un-lined landfills		
		Extensive agriculture	Yes	Agricultural area outside of township.
		Low vegetation cover (dust, sediment runoff)	Yes	Clearing for farmland.
		Poor access to supply		
		Unsustainable water extraction	No	
		Aquifer turning saline due to high extraction	No	
		Hard water		
	Governance	Aging or inadequate pipe work and associated infrastructure	Yes	Main breaks/100km of mains: 144.3 in 05/06, 112.8 in 04/05, 168.7 in 03/04 and 126.0 in 01/02.
		Significant water losses due to leaking pipes		
		High per capita water consumption		
		Inappropriate water quality standards / objectives		
		Lack of infrastructure maintenance		
	Industries	Poor management or governance		
		Vandalism / sabotage / terrorism		
		Insufficient trained personnel		
	Population	Inadequate funding for maintenance or upgrades		Total Operations Maintenance and Administration Costs/Connection: 330 05/06, 294, 04/05, 258 03/04, 253 02/03, 247 01/02; /100km of water main: 1247098 05/06, 1102819 04/05, 1145296 03/04, 1118596 02/03, 1087874 01/02; /ML supplied: 420 05/06.
		Mining / minerals	No	
Irrigation		Yes	Irrigation of crops.	
Chemicals / process		Yes	Spraying of crops.	
Seasonal population loadings		No		
WATER QUALITY OR SECURITY RISK (EFFECT)	Rapid population growth	No		
	Pathogenic contamination		Meeting utility's standards/guidelines for E.coli 05/06: 100%.	
	Algal blooms			
	Heavy metal contamination			
	Poor chlorine residuals			
	Pesticide contamination			
	Boil water notices			
	Deaths or illness due to water quality			
	Water restrictions (current and historic)			
	Taste and odour issues			
	Other contamination that would affect health		Meeting Utility's standards/guidelines for Physical Chemical compliance 05/06: 100%, 04/05:100%, 03/04:100%, 02/03:100%.	
	Notes			

Town # 17

TOWN		State/Territory	Qld-South		
		Town Name	Roma		
		Town Population	5,983 (Census 2006, Urban Centre/Locality)		
WATER UTILITY		Name of Water Utility	Maranoa Regional Council		
		Rate (\$/kL)	\$11/kL		
		Per Capita Water Consumption (L/day)	1,660L/day		
		Number of Connections	Roma Town Council 2007: 2,280 Residential, 170 Commercial/Industrial, 242 Rural, 0 Other, 2,692 Total.		
CATCHMENT AND WATER SUPPLY		Catchment	Murray Darling		
		Sub-Catchment	-		
		Catchment Management Authority (CMA)	Queensland Murray Darling Committee		
		CMA Web-Link	http://www.qmdc.org.au/		
		Catchment Protection Status	Unknown		
		Potable Water Source(s)	Groundwater		
		Supply Capacity	Unknown		
WATER QUALITY		Treatment Plant(s)	None		
		Level of Treatment	None		
		Drinking Water Guidelines	ADWG 2004		
		Results	Unknown		
WATER SECURITY		Current Water Restrictions	Watering 3 days per week		
		Proportion of Potable Water Supplied to Households (%)	Unknown		
		Distance from the Coast (km)	426km		
		Climate	Sub-tropical		
		Average Annual Rainfall	559.9mm		
FACTOR			YES / NO	NOTES / EXPLANATION	
WATER QUALITY OR SECURITY RISK (CAUSE)		Catchment and Water Supply	Drought	Yes	Current water restrictions. Currently drought declared (Primary Industries and Fisheries)
			Single drinking water source	Yes	Groundwater.
			Poor quality water source	No	Does not require treatment.
			Sewage overflow or disposal into water source	No	
			Flooding	No	
			Fauna defecating in supply	No	
			Fauna destroying water intake structures	No	
			Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	No	
			Un-lined landfills		
			Extensive agriculture	No	In surrounding area, however uses groundwater so not affected.
			Low vegetation cover (dust, sediment runoff)	No	In surrounding area, however uses groundwater so not affected.
			Poor access to supply	No	
			Unsustainable water extraction		
			Aquifer turning saline due to high extraction		
		Hard water			
		Governance	Aging or inadequate pipe work and associated infrastructure	No	Rated as operating well, only requires maintenance (PB report); Main breaks/100km of mains: 109.3 in 05/06, 142.7 in 04/05, 116.4 in 03/04, 124.6 in 02/03 and 85.3 in 01/02.
			Significant water losses due to leaking pipes		
			High per capita water consumption		
			Inappropriate water quality standards / objectives		
			Lack of infrastructure maintenance		
		Industries	Poor management or governance		
			Vandalism / sabotage / terrorism		
			Insufficient trained personnel		
		Population	Inadequate funding for maintenance or upgrades		Total Operations Maintenance and Administration Costs/Connection: 310 05/06, 272, 04/05, 290 03/04, 237 02/03, 215 01/02; /100km of water main: 638760 05/06, 579032 04/05, 619672 03/04, 502459 02/03, 455590 01/02; /ML supplied: 294 05/06.
			Mining / minerals	No	
Irrigation	No				
Chemicals / process	No				
Seasonal population loadings	No				
WATER QUALITY OR SECURITY RISK (EFFECT)		Rapid population growth	No		
		Pathogenic contamination		Meeting utility's standards/guidelines for E.coli 05/06: 100%.	
		Algal blooms			
		Heavy metal contamination			
		Poor chlorine residuals			
		Pesticide contamination			
		Boil water notices			
		Deaths or illness due to water quality			
		Water restrictions (current and historic)			
		Taste and odour issues			
Notes		Other contamination that would affect health		Meeting Utility's standards/guidelines for Physical Chemical compliance 04/05:100%, 03/04:25%, 02/03:66.67%.	

Town # 18

TOWN	State/Territory	Qld-South			
	Town Name	Stanthorpe			
	Town Population	4,271 (Census 2006, Urban Centre/Locality)			
WATER UTILITY	Name of Water Utility	Stanthorpe Water Supply Scheme			
	Rate (\$/kL)	\$258.7/annum, \$0.87/kL			
	Per Capita Water Consumption (L/day)	Unknown. 0.3ML/Connection and 0.2ML/Rural Connection in 05/06 financial year.			
CATCHMENT AND WATER SUPPLY	Number of Connections	2,353			
	Catchment	Border Rivers			
	Sub-Catchment	-			
	Catchment Management Authority (CMA)	Queensland Murray Darling Committee			
	CMA Web-Link	http://www.qmdc.org.au/			
	Catchment Protection Status	Unknown			
	Potable Water Source(s)	Storm King Dam Emu Swamp Dam (future)			
	Supply Capacity	Storm King Dam - 2,180 ML 4 Clear water storages - 5.05 ML TMP Emu Swamp Dam (future) - 8,000 to 18,000ML			
WATER QUALITY	Treatment Plant(s)	Mt Marlay Water Treatment Plant - 5ML/day max treatment.			
	Level of Treatment	Unknown			
	Drinking Water Guidelines	ADWG 2004			
WATER SECURITY	Results	Unknown			
	Current Water Restrictions	No			
	Proportion of Potable Water Supplied to Households (%)	Unknown			
	Distance from the Coast (km)	165km			
	Climate	Temperate			
	Average Annual Rainfall	765.2mm			
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	FACTOR	YES / NO	NOTES / EXPLANATION	
		Drought	Yes	Town has had some form of water restrictions for 46% of 1975-2007 period. Not currently drought declared (Primary Industries and Fisheries)	
		Single drinking water source	Yes	Currently water sourced from Storm King Dam, however planned construction of Emu Swamp Dam.	
		Poor quality water source			
		Sewage overflow or disposal into water source			
		Flooding	Yes		
		Fauna defecating in supply	Yes	Open water supply.	
		Fauna destroying water intake structures			
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)			
		Un-lined landfills			
		Extensive agriculture	Yes	Agricultural area.	
		Low vegetation cover (dust, sediment runoff)	Yes	Clearing for agriculture.	
		Poor access to supply			
		Unsustainable water extraction			
		Aquifer turning saline due to high extraction	No		
		Hard water	No		
		Governance	Aging or inadequate pipe work and associated infrastructure		Main breaks per 100km of main: 2.8 in 05/06, 11.3 on 04/05, 11.5 in 03/04, 27.8 in 02/03 and 8.4 in 01/02.
			Significant water losses due to leaking pipes		
	High per capita water consumption				
	Inappropriate water quality standards / objectives				
	Lack of infrastructure maintenance				
	Industries	Poor management or governance			
		Vandalism / sabotage / terrorism			
		Insufficient trained personnel			
	Population	Inadequate funding for maintenance or upgrades		Total Operations Maintenance and Administration Costs/Connection: 256 05/06, 222 04/05, 190 03/04, 287 02/03, 207 01/02; /100km of water main: 595370 05/06, 519811 04/05, 488008 03/04, 1287494 02/03, 528993 01/02; /ML supplied: 807 05/06.	
		Mining / minerals	No		
		Irrigation	Yes		
		Chemicals / process	Yes	Industrial & wine production area.	
Seasonal population loadings		No			
WATER QUALITY OR SECURITY RISK (EFFECT)	Rapid population growth	Yes	Rapidly growing industrial area.		
	Pathogenic contamination		Meeting Utility's standards/guidelines for E.coli 05/06: 100%.		
	Algal blooms				
	Heavy metal contamination				
	Poor chlorine residuals				
	Pesticide contamination				
	Boil water notices				
	Deaths or illness due to water quality				
	Water restrictions (current and historic)				
	Taste and odour issues				
	Other contamination that would affect health		Meeting utility's standards/guidelines for Physical Chemical compliance 05/06:100%, 04/05:100%, 03/04:100%, 02/03:100%.		
	Notes				

Town # 19

TOWN	State/Territory	Qld-South		
	Town Name	Warwick		
	Town Population	12,562 (Census 2006)		
WATER UTILITY	Name of Water Utility	Southern Downs Regional Council		
	Rate (\$/kL)	\$390.6/annum, \$1.14/kL, restricted flow access charge \$269.08/annum.		
	Per Capita Water Consumption (L/day)	Unknown. 0.3ML/Connection in 05/06 financial year.		
	Number of Connections	Warwick Shire Council 2006: 7,693 Residential, 7,693 Total.		
CATCHMENT AND WATER SUPPLY	Catchment	Condamine		
	Sub-Catchment	-		
	Catchment Management Authority (CMA)	Condamine Alliance Incorporated		
	CMA Web-Link	http://www.condaminealliance.com.au/		
	Catchment Protection Status	Unknown		
	Potable Water Source(s)	Leslie Dam - Sunwater operated Connolly Dam		
	Supply Capacity	Leslie Dam - storage volume = 108,000ML, allocation = 2,707ML		
		Connolly Dam - storage volume = 2,592ML		
Total allocation = 5,073ML from both sources				
WATER QUALITY	Treatment Plant(s)	Warwick Water Supply Treatment Plant.		
	Level of Treatment	Unknown		
	Drinking Water Guidelines	Unknown		
	Results	Unknown		
WATER SECURITY	Current Water Restrictions	Level 1 - Permitted: Hand-held hosing of gardens at any time, drip irrigation systems, automatic top-up of pools & spas. Not Permitted: Sprinklers or unattended water devices/hoses.		
	Proportion of Potable Water Supplied to Households (%)	Unknown		
	Distance from the Coast (km)	151km		
	Climate	Temperate		
	Average Annual Rainfall	689.9mm		
	FACTOR	YES / NO	NOTES / EXPLANATION	
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	Yes	Current water restrictions. Not currently drought declared however has previously (Primary Industries and Fisheries)
		Single drinking water source	No	Two water supply dams.
		Poor quality water source		
		Sewage overflow or disposal into water source		
		Flooding	Yes	
		Fauna defecating in supply	Yes	Open water supply.
		Fauna destroying water intake structures		
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)		
		Un-lined landfills		
		Extensive agriculture	Yes	Agricultural area.
		Low vegetation cover (dust, sediment runoff)	Yes	Clearing for farming.
		Poor access to supply		
		Unsustainable water extraction		
		Aquifer turning saline due to high extraction	No	
		Hard water	No	
	Governance	Aging or inadequate pipe work and associated infrastructure	Yes	Main breaks/100km of main: 9.0 in 05/06, 3.2 in 04/05, 10.8 in 03/04, 14.5 in 02/03 and 21.5 in 01/02.
		Significant water losses due to leaking pipes		
		High per capita water consumption		
		Inappropriate water quality standards / objectives		
		Lack of infrastructure maintenance		
		Poor management or governance		
	Industries	Vandalism / sabotage / terrorism		
		Insufficient trained personnel		
		Inadequate funding for maintenance or upgrades		Total Operations Maintenance and Administration Costs/Connection: 272 05/06, 269 04/05, 253 03/04, 239 02/03, 251 01/02; /100km of water main: 652255 05/06, 642581 04/05, 615541 03/04, 571242 02/03, 568289 01/02; /ML supplied: 940 05/06.
	Population	Mining / minerals	No	
		Irrigation	Yes	Irrigation of farming land.
		Chemicals / process	Yes	Industrial and wine making area.
	WATER QUALITY OR SECURITY RISK (EFFECT)	Seasonal population loadings	No	
		Rapid population growth	Yes	Rapidly growing industrial area.
		Pathogenic contamination		Meeting utility's standards/guidelines for E.coli 05/06: 100%.
Algal blooms				
Heavy metal contamination				
Poor chlorine residuals				
Pesticide contamination				
Boil water notices				
Deaths or illness due to water quality				
Water restrictions (current and historic)				
Taste and odour issues				
Other contamination that would affect health			Meeting utility's standards/guidelines for Physical Chemical compliance 02/03: 100%.	
Notes				

Town # 20

TOWN	State/Territory	Old-South	
	Town Name	Highfields	
	Town Population	5910 (Census 2006, Urban Centre/Locality)	
WATER UTILITY	Name of Water Utility	Toowoomba Regional Council	
	Rate (\$/kL)	Unknown	
	Per Capita Water Consumption (L/day)	Unknown	
	Number of Connections	Unknown	
CATCHMENT AND WATER SUPPLY	Catchment	Moreton	
	Sub-Catchment	Upper Brisbane	
	Catchment Management Authority (CMA)	South East Queensland Catchments	
	CMA Web-Link	http://www.seqcatchments.com.au/	
	Catchment Protection Status	Unknown	
	Potable Water Source(s)	Cressbrook Dam Perseverance Dam Council Bores - 20 service Toowoomba and surrounding area	
	Supply Capacity	Cressbrook Dam - 78,847ML Perseverance Dam - 26,668ML Bores 30-35% of the City's needs	
WATER QUALITY	Treatment Plant(s)	Highfields Water Treatment Plant	
	Level of Treatment	Rapid Sand Filtration Plant	
	Drinking Water Guidelines	ADWG 2004	
	Results	Unknown	
WATER SECURITY	Current Water Restrictions	Level 5 - No outside watering, topping up pools or washing vehicles using the town supply.	
	Proportion of Potable Water Supplied to Households (%)	Unknown	
	Distance from the Coast (km)	125km	
	Climate	Temperate	
	Average Annual Rainfall	944mm (Toowoomba)	
FACTOR		YES / NO	NOTES / EXPLANATION
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply		
		Yes	Cressbrook Dam currently at 8.4%, Perseverance Dam at 12.3%, however a pipeline is currently under construction to supply water to the Cressbrook Dam from Wivenhoe Dam. Currently drought declared (Primary Industries and Fisheries)
		No	Multiple dams.
		Yes	
		Yes	Open water supply.
		No	
		No	
		Yes	Dams have nearly run out of water.
	Governance		
	Industries	No	
		No	
		No	
	Population	No	
		Yes	Growing area.
WATER QUALITY OR SECURITY RISK (EFFECT)			
Notes		Cressbrook Dam will be connected to Wivenhoe Dam within the next year.	

Town # 21

TOWN	State/Territory		Qld-South	
	Town Name		Tin Can Bay - Cooloola Cove	
	Town Population		3857 (Census 2006, Urban Centre/Locality & State Suburb)	
WATER UTILITY	Name of Water Utility		Gympie Regional Council	
	Rate (\$/kL)		Unknown	
	Per Capita Water Consumption (L/day)		Unknown. 0.3ML/connection in 05/06 financial year.	
	Number of Connections		Cooloola Shire Council 2007: 9,900 Residential, 750 Commercial/Industrial, 270 Rural, 94 Other, 11,014 Total.	
CATCHMENT AND WATER SUPPLY	Catchment		Mary Basin	
	Sub-Catchment		Noosa River and coastal streams north of the Noosa River	
	Catchment Management Authority (CMA)		Burnett Mary Regional Group	
	CMA Web-Link		http://www.bmrq.org.au/	
	Catchment Protection Status		Unknown	
	Potable Water Source(s)		Unknown	
	Supply Capacity		Unknown	
WATER QUALITY	Treatment Plant(s)		Unknown	
	Level of Treatment		Unknown	
	Drinking Water Guidelines		ADWG 2004	
	Results		Unknown	
WATER SECURITY	Current Water Restrictions		Yes - Watering 4-8pm, Non-Residential (Over 10ML/Year users) watering 4-8pm, vehicle washing and Cleaning Paving and Driveways only is water saving devices fitted.	
	Proportion of Potable Water Supplied to Households (%)		Unknown	
	Distance from the Coast (km)		9km	
	Climate		Sub-Tropical	
	Average Annual Rainfall		1410.6mm (Rainbow Beach), 1292.2mm (Toolara Forestry)	
FACTOR			YES / NO	NOTES / EXPLANATION
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	Yes	Water restrictions however high rainfall area. Not currently drought declared (Primary Industries and Fisheries)
		Single drinking water source		
		Poor quality water source		
		Sewage overflow or disposal into water source		
		Flooding		
		Fauna defecating in supply		
		Fauna destroying water intake structures		
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)		
		Un-lined landfills		
		Extensive agriculture		
		Low vegetation cover (dust, sediment runoff)		
		Poor access to supply		
		Unsustainable water extraction		
		Aquifer turning saline due to high extraction		
	Hard water			
	Aging or inadequate pipe work and associated infrastructure	Yes	Main breaks/100km of mains: 13.8 in 05/06, 4.9 in 04/05, 6.1 in 03/04, 5.2 in 02/03 and 5.0 in 01/02.	
	Significant water losses due to leaking pipes			
	Governance	High per capita water consumption		
		Inappropriate water quality standards / objectives		
		Lack of infrastructure maintenance		
		Poor management or governance		
		Vandalism / sabotage / terrorism		
		Insufficient trained personnel		
	Inadequate funding for maintenance or upgrades		Total Operations Maintenance and Administration Costs/Connection: 261 05/06, 253, 04/05, 208 03/04, 195 02/03, 213 01/02; /100km of water main: 865204 05/06, 754286 04/05, 677994 03/04, 611869 02/03, 667039 01/02; /ML supplied: 770 05/06.	
	Industries	Mining / minerals		
		Irrigation		
		Chemicals / process		
	Population	Seasonal population loadings		
		Rapid population growth		
	WATER QUALITY OR SECURITY RISK (EFFECT)	Pathogenic contamination		Meeting utility's standards/guidelines for E.coli 05/06: 100%.
Algal blooms				
Heavy metal contamination				
Poor chlorine residuals				
Pesticide contamination				
Boil water notices				
Deaths or illness due to water quality				
Water restrictions (current and historic)				
Taste and odour issues				
Other contamination that would affect health		Meeting utility's standards/guidelines for Physical Chemical compliance 05/06:100%, 04/05:100%, 03/04:100%, 02/03:100%.		
Notes				

Town # 22

TOWN	State/Territory	Qld-South		
	Town Name	Kingaroy & Kumbia		
	Town Population	7,811 (Census 2006, Urban Centre/Locality & State Suburb)		
WATER UTILITY	Name of Water Utility	South Burnett Regional Council		
	Rate (\$/kL)	Unknown		
	Per Capita Water Consumption (ML/day)	0.3ML/Connection, 0.2ML/Residential Connection in 05/06 financial year.		
CATCHMENT AND WATER SUPPLY	Number of Connections	Kingaroy Shire Council: 3,820 Residential, 335 Commercial/Industrial, 60 Rural, 95 other, 4,310 Total.		
	Catchment	Burnett		
	Sub-Catchment	-		
	Catchment Management Authority (CMA)	Burnett Mary Regional Group		
	CMA Web-Link	http://www.bmrg.org.au/		
	Catchment Protection Status	Unknown		
WATER QUALITY	Potable Water Source(s)	Gordonbrook Dam		
	Supply Capacity	Gordonbrook Dam - 6600ML		
	Treatment Plant(s)	Gordonbrook Water Treatment Plant		
	Level of Treatment	Unknown		
	Drinking Water Guidelines	ADWG 2004		
	Results	Unknown		
WATER SECURITY	Current Water Restrictions	Kingaroy Level 4 - 2 hours watering 3 days per week, total ban on all sprinklers. Kumbia Level 7 - No outside watering		
	Proportion of Potable Water Supplied to Households (%)	Unknown		
	Distance from the Coast (km)	125km		
	Climate	Subtropical		
	Average Annual Rainfall	776.2mm		
FACTOR		YES / NO	NOTES / EXPLANATION	
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	Yes	Water restrictions, nearly ran out of water in 2007.
		Single drinking water source	Yes	Water from one source.
		Poor quality water source	Yes	Algal blooms.
		Sewage overflow or disposal into water		
		Flooding		
		Fauna defecating in supply	Yes	Open water supply.
		Fauna destroying water intake structures		
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)		
		Un-lined landfills		
		Extensive agriculture	Yes	Agricultural area.
		Low vegetation cover (dust, sediment)	Yes	Clearing for farmland.
		Poor access to supply		
		Unsustainable water extraction	Yes	Nearly ran out of water during 2007.
		Aquifer turning saline due to high	No	
		Hard water	No	
		Aging or inadequate pipe work and associated infrastructure	Yes	Main breaks/100km of mains: 23.9 in 05/06, 13 in 04/05, 18.1 in 03/04, 27.5 in 02/03 and 26.4 in 01/02.
		Significant water losses due to leaking		
	Governance	High per capita water consumption		
		Inappropriate water quality standards / objectives		
		Lack of infrastructure maintenance		
		Poor management or governance		
		Vandalism / sabotage / terrorism		
	Industries	Inadequate funding for maintenance or upgrades		Total Operations Maintenance and Administration Costs/Connection: 301 05/06, 264 04/05, 245 03/04, 380 02/03, 237 01/02; /100km of water main: 709783 05/06, 575543 04/05, 508791 03/04, 844402 02/03, 766258 01/02; /ML supplied: 965 05/06.
		Mining / minerals	No	
		Irrigation	Yes	Irrigation of crops.
	Population	Chemicals / process	Yes	Spraying of crops.
		Seasonal population loadings	No	
		Rapid population growth	No	
	WATER QUALITY OR SECURITY RISK (EFFECT)	Pathogenic contamination		Meeting Utility's standards/guidelines for E.coli 05/06: 93.06%.
Algal blooms		Yes	2.8m average depth in dam, algal blooms have occurred in the past.	
Heavy metal contamination				
Poor chlorine residuals				
Pesticide contamination				
Boil water notices				
Deaths or illness due to water quality				
Water restrictions (current and historic)				
Taste and odour issues				
Other contamination that would affect health			Meeting utility's standards/guidelines for Physical Chemical compliance 05/06:0%, 04/05:0%, 03/04:33.33%, 02/03:100%.	
Notes				

Town Profiles – NSW

E



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Appendices
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Town # 23

TOWN	State/Territory	NSW
	Town Name	Lithgow
	Town Population	14,000 (NSW Health, 2009); 11,298 (Census 2006, Urban Centre/Locality)
WATER UTILITY	Name of Water Utility	Lithgow City Council
	Council Web-Link	http://www.council.lithgow.com/
	Rate (\$/kL)	Unknown. Water rates = \$403/property for the 2001-2002 reporting period.
WATER UTILITY	Per Capita Water Consumption (L/day)	Not reported. Estimate = 221 L/day (using NSW Health 2009 population statistics, and domestic water consumption reported in the 2007/2008 Lithgow SoE Report).
	Number of Connections	7,820 (NSW DWE 07-08 Performance Monitoring Database)
CATCHMENT AND WATER SUPPLY	Catchment	Hawkesbury Nepean
	Sub-Catchment	Northern Valleys
	Catchment Management Authority (CMA)	Hawkesbury Nepean
CATCHMENT AND WATER SUPPLY	CMA Web-Link	http://www.hn.cma.nsw.gov.au
	Catchment Protection Status	None. Not a wild river catchment or protected.
	Potable Water Source(s)	Fish River Water Supply Scheme (State Water): Oberon Dam and Duckmaloi Weir Lithgow City Council System: Farmers Creek Dam and Clarence Colliery Transfer System
CATCHMENT AND WATER SUPPLY	Supply Capacity	Oberon Dam Storage = 45,400ML Duckmaloi Weir Storage = 20ML Farmers Creek Dam Storage = 450ML Clarence Colliery Transfer System = up to 5 to 6 ML/day
	Treatment Plant(s)	Oakey Water Treatment Plant
WATER QUALITY	Level of Treatment	Gravity fed; raw water from Farmers Creek Dam; current design capacity = 15 ML/d; operating capacity is reduced to 12ML/day; treatment includes chemical addition of soda ash, alum and polyelectrolyte, flocculation, clarification, filtration and post dosing of chlorine and soda ash; average daily output during winter = 4ML/d to 8ML per day in the summer months.
	Drinking Water Guidelines	ADWGW 2004
	NSW Health Monitoring Location: LG01-Lithgow	
WATER QUALITY	% compliance for water quality parameters achieving < 100%, 2003-2004	Aluminium 86 E. coli 99 Nickel 86 pH 79 Total Coliforms 66
	Parameter(s) tested and number of samples () 2003-2004	Aluminium (14), Antimony (14), Arsenic (14), Barium (14), Boron (14), Cadmium (14), Calcium (14), Chloride (14), Chromium (14), Copper (14), Cyanide (14), E.Coli (76), Fluoride (14), Iron (14), Lead (14), Magnesium (14), Manganese (14), Molybdenum (14), Nickel (14), Nitrate (14), Nitrite (14), pH (14), Selenium (14), Silver (14), Sulfate (14), Total Coliforms (76), Total Dissolved Solids (TDS) (14), Total Hardness as CaCO3 (14), True Colour (6), Turbidity (14), Zinc (14)
	% compliance for water quality parameters achieving < 100%, 2004-2005	Manganese 97 Nickel 55 pH 48 Total Coliforms 77 Turbidity 97
WATER QUALITY	Parameter(s) tested and number of samples () 2004-2005	Aluminium (31), Antimony (31), Arsenic (31), Barium (31), Boron (31), Cadmium (31), Calcium (31), Chloride (31), Chromium (31), Copper (31), Cyanide (13), E.Coli (73), Fluoride (31), Iron (31), Lead (31), Magnesium (31), Manganese (31), Molybdenum (31), Nickel (31), Nitrate (31), Nitrite (31), pH (31), Selenium (31), Silver (31), Sulfate (31), Total Coliforms (73), Total Dissolved Solids (TDS) (31), Total Hardness as CaCO3 (31), True Colour (31), Turbidity (31), Zinc (31)
	% compliance for water quality parameters achieving < 100%, 2005-2006	Aluminium 92 Iron 92 Nickel 69 pH 71 Total Coliforms 90 Turbidity 92
	Parameter(s) tested and number of samples () 2005-2006	Aluminium (13), Antimony (13), Arsenic (13), Barium (13), Boron (13), Cadmium (13), Calcium (13), Chloride (13), Chromium (13), Copper (13), Cyanide (13), E.Coli (67), Fluoride (13), Free Chlorine (1), Iodine (13), Iron (13), Lead (13), Magnesium (13), Manganese (13), Molybdenum (13), Nickel (13), Nitrate (13), Nitrite (13), pH (14), Selenium (13), Silver (13), Sodium (13), Sulfate (13), Total Coliforms (67), Total Dissolved Solids (TDS) (13), Total Hardness as CaCO3 (13), True Colour (13), Turbidity (13), Zinc (13)
WATER QUALITY	% compliance for water quality parameters achieving < 100%, 2006-2007	Iron 92 Nickel 92 Total Coliforms 79
	Parameter(s) tested and number of samples () 2006-2007	Aluminium (12), Antimony (12), Arsenic (12), Barium (12), Boron (12), Cadmium (12), Calcium (12), Chloride (12), Chromium (12), Copper (12), E.Coli (71), Fluoride (12), Iodine (12), Iron (12), Lead (12), Magnesium (12), Manganese (12), Molybdenum (12), Nickel (12), Nitrate (12), Nitrite (12), pH (12), Selenium (12), Silver (12), Sodium (12), Sulfate (12), Total Coliforms (71), Total Dissolved Solids (TDS) (12), Total Hardness as CaCO3 (12), True Colour (12), Turbidity (12), Zinc (12)
	% compliance for water quality parameters achieving < 100%, 2007-2008	Aluminium 70 pH 81 Total Coliforms 73
WATER QUALITY	Parameter(s) tested and number of samples () 2007-2008	Aluminium (23), Antimony (23), Arsenic (23), Barium (23), Boron (23), Cadmium (23), Calcium (23), Chloride (23), Chromium (23), Copper (23), E.Coli (152), Fluoride (23), Fluoride (field result WSA) (1), Free Chlorine (17), Iodine (23), Iron (23), Lead (23), Magnesium (23), Manganese (23), Molybdenum (23), Nickel (23), Nitrate (23), Nitrite (23), pH (26), Selenium (23), Silver (23), Sodium (23), Sulfate (23), Total Chlorine (1), Total Coliforms (152), Total Dissolved Solids (TDS) (23), Total Hardness as CaCO3 (23), True Colour (23), Turbidity (23), Zinc (23)

WATER SECURITY		Current Water Restrictions		Yes. Level 4 restrictions: Summer Months - sprinklers, hand held hoses and micro systems, hours = 4 hrs a day between 6am -8am & 5pm - 7pm on an odds and even system, Sprinklers, Winter Months - hand held hoses and micro systems, hours = 4 hrs a day between 6am -8am & 5pm - 7pm on an odds and even system.	
		Proportion of Potable Water Supplied to Households (%)		71% Domestic, 29% Commercial (07-08 Lithgow SoE Report)	
		Distance from the Coast (km)		~ 120km	
		Climate		Temperate (BoM, 2005)	
		Average Annual Rainfall		715 mm (Source: BoM gauge number 63164, period 2004-2008)	
FACTOR				YES / NO	NOTES / EXPLANATION
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	No	Experienced drought for 4 months of the period 07/08 (Lithgow SoE report 07/08). Classified as 'Marginal or Satisfactory' according to NSW DPI Drought Map October 2009.	
		Single drinking water source	No		
		Poor quality water source	No	No indication that source water is poor quality.	
		Sewage overflow or disposal into water source	Yes	Two sewer overflow incidents at pump stations. Reported in the 07-08 Lithgow City Council Annual Report.	
		Flooding	No		
		Fauna defecating in supply	No	No reports of this being a cause of contamination.	
		Fauna destroying water intake structures	No		
		Natural mineral pollutants (e.g. uranium, nitrates, iron, flouride)	Yes	Coal mining operations cause leeching of natural minerals through exposure of rock to air and moisture, and creation of cracks in river beds. Unsure of what minerals.	
		Un-lined landfills	No	No indication of leaking landfills.	
		Extensive agriculture	No	Farming exists nearby, but the area is not based on extensive and intensive agriculture. Large portions of land nearby are forested.	
		Low vegetation cover (dust, sediment runoff)	No	Surrounds are grassed or tree covered areas.	
		Poor access to supply	No		
		Unsustainable water extraction	Yes	Residents have historically been on water restrictions. Currently on Level 4 restrictions.	
		Aquifer turning saline due to high extraction	No		
		Hard water	No	No reports that the source water is 'hard' water.	
	Governance	Aging or inadequate pipework and associated infrastructure	Yes	Oakey Water Treatment Plant requires upgrade. Works are currently in progress. Age of infrastructure not reported to DECCW (07-08 Water Treatment Performance Report).	
		Significant water losses due to leaking pipes	No	Unknown. No reports of water losses in the system.	
		High per capita water consumption	No	Per capita water consumption is below the national average reported by the National Water Commission, 04-05 reporting period.	
		Inappropriate water quality standards / objectives	No	Council report to NSW Health, who use the ADWG.	
		Lack of infrastructure maintenance	Yes	Oakey Water Treatment Plant required maintenance and upgrade. Council prosecuted in the Land and Environment Court for not undertaking pollution prevention works at the plant in the timeframe specified by DECCW (previously DECC).	
		Poor management or governance	Yes	Water treatment plant not maintained adequately. Council prosecuted in Land and Environment Court. Many concerned community members regarding adequacy and quality of supply.	
		Vandalism / sabotage / terrorism	No		
	Industries	Insufficient trained personnel	No	No indication of training issues.	
		Inadequate funding for maintenance or upgrades	No		
		Mining / minerals	Yes		
		Irrigation	No	No extensive irrigation industry nearby.	
Population	Chemicals / process	No			
	Seasonal population loadings	No			
	Rapid population growth	No	Average Annual Population growth = 0.5% (from 2001 to 2006 Census), which is less than the NSW average (1.6%) reported by ABS, March 2009.		
WATER QUALITY OR SECURITY RISK (EFFECT)	Bacteriological and / or viral contamination	Yes	Only 73% compliance for Faecal Coliforms in 07-08 reporting period (NSW Health, 2009).		
	Algal blooms				
	Heavy metal contamination	Yes			
	Poor chlorine residuals	No	Free Chlorine met ADWG guidelines for 07-08 reporting period (NSW Health, 2009).		
	Pesticide contamination	No			
	High suspended solids	No			
	Boil water notices	No	No reports of boil water notices according to NSW Health summary spreadsheet.		
	Deaths or illness due to water quality	No			
	Water restrictions (current and historic)	Yes			
	Taste and odour issues	No			
	Other contamination that would affect health	Yes	Levels of aluminium compliant with ADWG only 70% of the time for the 07-08 reporting period (NSW Health, 2009).		
	Notes				

Town # 24

TOWN	State/Territory	NSW		
	Town Name	Bourke		
	Town Population	3,780 (NSW Health, 2009); 2,145 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility	Bourke Shire Council		
	Council Web-Link	http://www.bourke.local-e.nsw.gov.au/		
	Rate (\$/kL)	Unknown. \$627/property for the 2001-2002 reporting period.		
	Per Capita Water Consumption (L/day)	Unknown. 285 kL/household per year (according to graph presented in the Central West Regional SoE Report, 07-08)		
CATCHMENT AND WATER SUPPLY	Number of Connections	1180		
	Catchment	Western		
	Sub-Catchment	-		
	Catchment Management Authority (CMA)	Western		
	CMA Web-Link	http://www.western.cma.nsw.gov.au/		
	Catchment Protection Status	None.		
	Potable Water Source(s)	Darling River (Watercourse)		
WATER QUALITY	Supply Capacity	Unknown. Source is a controlled river with reduced flow (DECCW, 2009).		
	Treatment Plant(s)	Yes		
	Level of Treatment	Filtration, Flocculation, Sedimentation, Chlorination (NSW Health, 2009)		
	Drinking Water Guidelines	ADWG 2004 (NSW Health)		
	NSW Health Monitoring Location: BK01-Bourke			
	% compliance for water quality parameters achieving < 100%, 2003-2004	Chloride	67	
		E. coli	98	
		Sodium	89	
		Total Coliforms	66	
		Total Dissolved Solids (TDS)	67	
	Parameter(s) tested and number of samples () 2003-2004	Total Hardness as CaCO3	44	
		Aluminium (9), Antimony (9), Arsenic (9), Barium (9), Boron (9), Cadmium (9), Calcium (9), Chloride (9), Chromium (9), Copper (9), Cyanide (9), E.Coli (44), Flouride (9), Free Chlorine (8), Iodine (9), Iron (9), Lead (9), Magnesium (9), Manganese (9), Mercury (9), Molybdenum (9), Nickel (9), Nitrate (9), Nitrite (9), pH (9), Selenium (9), Silver (9), Sodium (9), Sulfate (9), Total Coliforms (44), Total Dissolved Solids (TDS) (9), Total Hardness as CaCO3 (9), True Colour (6), Turbidity (9), Zinc (9)		
		% compliance for water quality parameters achieving < 100%, 2004-2005	Aluminium	27
			Copper	67
			E. coli	96
	Iron		73	
	Lead		53	
	Nickel		87	
	pH		73	
	Total Coliforms		75	
	Parameter(s) tested and number of samples () 2004-2005	Turbidity	47	
		Zinc	93	
		Aluminium (15), Antimony (15), Arsenic (15), Barium (15), Boron (15), Cadmium (15), Calcium (15), Chloride (15), Chromium (15), Copper (15), Cyanide (2), E.Coli (51), Flouride (15), Free Chlorine (15), Iodine (15), Iron (15), Lead (15), Magnesium (15), Manganese (15), Mercury (15), Molybdenum (15), Nickel (15), Nitrate (15), Nitrite (15), pH (15), Selenium (15), Silver (15), Sodium (15), Sulfate (15), Total Coliforms (51), Total Dissolved Solids (TDS) (15), Total Hardness as CaCO3 (15), True Colour (15), Turbidity (15), Zinc (15)		
		% compliance for water quality parameters achieving < 100%, 2005-2006	Aluminium	58
			Copper	75
	E. coli		96	
Iron	67			
Lead	83			
Nickel	92			
Total Coliforms	75			
Parameter(s) tested and number of samples () 2005-2006	Turbidity	58		
	Aluminium (12), Antimony (12), Arsenic (12), Barium (12), Boron (12), Cadmium (12), Calcium (12), Chloride (12), Chromium (12), Copper (12), E.Coli (53), Flouride (12), Iodine (12), Iron (12), Lead (12), Magnesium (12), Manganese (12), Mercury (12), Molybdenum (12), Nickel (12), Nitrate (12), Nitrite (12), pH (12), Selenium (12), Silver (12), Sodium (12), Sulfate (12), Total Coliforms (53), Total Dissolved Solids (TDS) (12), Total Hardness as CaCO3 (12), True Colour (12), Turbidity (12), Zinc (12)			
	% compliance for water quality parameters achieving < 100%, 2006-2007	Aluminium	83	
		Copper	92	
		E. coli	88	
Iron		92		
Lead		92		
Total Coliforms		75		
Parameter(s) tested and number of samples () 2006-2007	Turbidity	92		
	Aluminium (12), Antimony (12), Arsenic (12), Barium (12), Boron (12), Cadmium (12), Calcium (12), Chloride (12), Chromium (12), Copper (12), E.Coli (52), Flouride (12), Iodine (12), Iron (12), Lead (12), Magnesium (12), Manganese (12), Mercury (12), Molybdenum (12), Nickel (12), Nitrate (12), Nitrite (12), pH (12), Selenium (12), Silver (12), Sodium (12), Sulfate (12), Total Coliforms (52), Total Dissolved Solids (TDS) (12), Total Hardness as CaCO3 (12), True Colour (12), Turbidity (12), Zinc (12)			
	% compliance for water quality parameters achieving < 100%, 2007-2008	Chloride	78	
		E. coli	94	
		Total Coliforms	67	
Total Dissolved Solids (TDS)		78		
Total Hardness as CaCO3		78		
Parameter(s) tested and number of samples () 2007-2008	Aluminium (9), Antimony (9), Arsenic (9), Barium (9), Boron (9), Cadmium (9), Calcium (9), Chloride (9), Chromium (9), Copper (9), E.Coli (51), Flouride (9), Iodine (9), Iron (9), Lead (9), Magnesium (9), Manganese (9), Mercury (9), Molybdenum (9), Nickel (9), Nitrate (9), Nitrite (9), pH (9), Selenium (9), Silver (9), Sodium (9), Sulfate (9), Total Coliforms (51), Total Dissolved Solids (TDS) (9), Total Hardness as CaCO3 (9), True Colour (9), Turbidity (9), Zinc (9)			

WATER SECURITY		Current Water Restrictions	Level 1. Maximum of two sprinkler taps per household, for maximum of two hours per day between 6pm in the evening and 8am in the morning; no filling of private swimming pools; wash paved areas and roofs with pressure cleaner and/or buckets only; two hours maximum sprinklers on bowling greens, nurseries, public garden, sporting fields, ovals and War Memorial Swimming Pool grounds.	
		Proportion of Potable Water Supplied to Households (%)	Unknown	
		Reuse	None (Central West Regional SoE Report, 07-08)	
		Distance from the Coast (km)	~ 700 km	
		Climate	Grassland (BoM, 2005)	
		Average Annual Rainfall	219mm (Source: BoM station number 48245, period 2004-2008)	
FACTOR			YES / NO	NOTES / EXPLANATION
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	No	Classified as 'Marginal' according to NSW DPI Drought Map October 2009.
		Single drinking water source	Yes	According to the Bourke Shire Council Annual Report (07-08), Council is planning on drilling an artesian bore to supplement supply.
		Poor quality water source	No	
		Sewage overflow or disposal into water source	Yes	Central West Regional SoE Report states that water quality in the catchment is affected by wastewater discharges and overflows.
		Flooding	No	
		Fauna defecating in supply	Yes	
		Fauna destroying water intake structures	No	
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	No	
		Un-lined landfills	No	It is stated in the 05-06 Bourke Shire Council SoE Report that the management of illegal dumping is a priority for Council.
		Extensive agriculture	Yes	Cotton farming, sheep and cattle production (Bourke Shire Council SoE Report, 05-06)
		Low vegetation cover (dust, sediment runoff)	Yes	
		Poor access to supply	No	
		Unsustainable water extraction	Yes	Drinking water source is the Darling River, which is a controlled river with reduced flow.
		Aquifer turning saline due to high extraction	Yes	Salinity is monitored at various points along the river. Historically, salinity levels have exceeded drinking water guidelines.
		Hard water	Yes	22% of water quality results were non-compliant for water hardness for the 07-08 reporting period.
		Aging or inadequate pipework and associated infrastructure	Yes	Facility built or refurbished in 1988 (DECCW 07-08 Water Treatment Performance Report). Recent minor refurbishments to water filtration plant. New pumps and control buildings installed (Bourke Shire Council Annual Report, 07-08).
		Significant water losses due to leaking pipes	No	No report of water losses.
	Governance	High per capita water consumption	No	Water consumption is essentially the state average.
		Inappropriate water quality standards / objectives	No	Council report to NSW Health, who use the ADWG.
		Lack of infrastructure maintenance	No	
		Poor management or governance	No	
		Vandalism / sabotage / terrorism	No	
		Insufficient trained personnel	No	No indication of training issues.
	Industries	Inadequate funding for maintenance or upgrades	No	No indication of funding issues.
		Mining / minerals	Yes	Stated to be an industry in the Bourke region (mineral/mining, chemical wholesaling), in the Central West Regional SoE Report, 07-08.
		Irrigation	Yes	Agriculture such as cotton in the LGA.
	Population	Chemicals / process	No	
		Seasonal population loadings	Yes	Approximately 20,000 tourists visited the Bourke Tourist Information Centre in 05-06 (Bourke Shire Council SoE Report, 05-06); however there is no information on the number of tourists staying in the township during peak season.
		Rapid population growth	Yes	Average Annual Population growth = 3.8% (from 2001-2006 Census), which is greater than the NSW average of 1.6%.
WATER QUALITY OR SECURITY RISK (EFFECT)	Bacteriological and / or viral contamination	Yes	The levels of E.Coli and Total Coliforms were not 100% compliant for the 07-08 reporting period.	
	Algal blooms	No		
	Heavy metal contamination	Yes	Some heavy metals have been repeatedly non-compliant up to the 07-08 reporting period.	
	Poor chlorine residuals	Yes	Free chlorine is not tested.	
	Pesticide contamination	Yes	The Central West Regional SoE Report 07-08 identifies pesticide runoff as a risk factor in the region. Pesticides are not tested for in the drinking water supply according to the NSW Health database.	
	High suspended solids	Yes	Levels of Total Dissolved Solids were not 100% compliant for the 07-08 reporting period.	
	Boil water notices	No		
	Deaths or illness due to water quality	No		
	Water restrictions (current and historic)	Yes		
	Taste and odour issues	No		
	Other contamination that would affect health	No		
	Notes			

Town # 25

TOWN	State/Territory	NSW		
	Town Name	Narromine		
	Town Population	3,500 (NSW Health, 2009); 3,599 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility	Narromine Shire Council		
	Council Web-Link	http://www.narromine.nsw.gov.au/		
	Rate (\$/kL)	\$0.80/kL		
CATCHMENT AND WATER SUPPLY	Per Capita Water Consumption (L/day)	550L/day based on the NSW Health 2009 population statistics, and 703ML of potable water was supplied to customers in the 07-08 period (DWE, 2009)		
	Number of Connections	2090		
	Catchment	Central West		
	Sub-Catchment	Macquarie-Bogan		
	Catchment Management Authority (CMA)	Central West		
	CMA Web-Link	http://cw.cma.nsw.gov.au/cwcm_ourcatchment.htm		
	Catchment Protection Status	None.		
	Potable Water Source(s)	Narromine Bore (groundwater)		
WATER QUALITY	Supply Capacity	Unknown		
	Treatment Plant(s)	None		
	Level of Treatment	Aeration (NSW Health, 2009)		
	Drinking Water Guidelines	ADWG 2004 (NSW Health)		
	NSW Health Monitoring Location: NM01-Narromine			
	% compliance for water quality parameters achieving < 100%, 2003-2004	Total Coliforms	84	
	Parameter(s) tested and number of samples () 2003-2004	E.Coli (50), Total Coliforms (50)		
	% compliance for water quality parameters achieving < 100%, 2004-2005	Total Coliforms	92	
	Parameter(s) tested and number of samples () 2004-2005	E.Coli (13), Total Coliforms (13)		
	% compliance for water quality parameters achieving < 100%, 2005-2006	Total Coliforms	70	
	Parameter(s) tested and number of samples () 2005-2006	E.Coli (20), Total Coliforms (20)		
	% compliance for water quality parameters achieving < 100%, 2006-2007	Total Coliforms	96	
	Parameter(s) tested and number of samples () 2006-2007	E.Coli (25), Total Coliforms (25)		
	% compliance for water quality parameters achieving < 100%, 2007-2008	Total Coliforms	90	
	WATER SECURITY	Parameter(s) tested and number of samples () 2007-2008	Aluminium (2), Antimony (2), Arsenic (2), Barium (2), Boron (2), Cadmium (2), Calcium (2), Chloride (2), Chromium (2), Copper (2), E.Coli (51), Fluoride (2), Iodine (2), Iron (2), Lead (2), Magnesium (2), Manganese (2), Mercury (2), Molybdenum (2), Nickel (2), Nitrate (2), Nitrite (2), pH (2), Selenium (2), Silver (2), Sodium (2), Sulfate (2), Total Coliforms (51), Total Dissolved Solids (TDS) (2), Total Hardness as CaCO3 (2), True Colour (2), Turbidity (2), Zinc (2)	
		Current Water Restrictions	No water restrictions advertised on the Narromine Council website.	
Proportion of Potable Water Supplied to Households (%)		Unknown		
Distance from the Coast (km)		~ 400km		
Climate		Temperate (nearing 'Grassland') (BoM, 2005)		
Average Annual Rainfall		488mm (Source: BoM station number 51037, period 2004-2008)		
FACTOR		YES / NO	NOTES / EXPLANATION	
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	Yes	Classified as 'In Drought' according to NSW DPI Drought Map October 2009.
		Single drinking water source	Yes	Groundwater bore.
		Poor quality water source	No	
		Sewage overflow or disposal into water source	No	Groundwater source. Contamination via sewage overflows is unlikely.
		Flooding	No	
		Fauna defecating in supply	No	Repeated non-compliances reported for Total Coliforms, however due to their widespread occurrence in most soil and water environments, they are no longer regarded as the most reliable indicator of human or animal contamination.
		Fauna destroying water intake structures	No	
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	No	
		Un-lined landfills	Yes	The Central West Regional SoE Report 07-08 reports that there are 50 potentially contaminated sites in the Narromine area.
		Extensive agriculture	Yes	Livestock, grains, citrus and cotton industries (Council website).
		Low vegetation cover (dust, sediment runoff)	Yes	
		Poor access to supply	No	
		Unsustainable water extraction	No	
		Aquifer turning saline due to high extraction	Yes	Narromine has a 'moderate' water salinity hazard rating according to the Central West Regional SoE Report, 07-08.
	Hard water	No		
	Governance	Aging or inadequate pipe work and associated infrastructure	No	No reports on the condition of existing infrastructure. Age of infrastructure not report to DECCW (07-08 Water Treatment Performance Report).
		Significant water losses due to leaking pipes	No	No indication of the age of the existing reticulation system.
		High per capita water consumption	Yes	
		Inappropriate water quality standards / objectives	No	Council reports to NSW Health who use ADWG.
		Lack of infrastructure maintenance	No	No reports of infrastructure maintenance issues.
Poor management or governance		No		
Vandalism / sabotage / terrorism	No			
Insufficient trained personnel	No			

	Industries	Inadequate funding for maintenance or upgrades	No	
		Mining / minerals	No	
		Irrigation	Yes	Cropping/pasture stated to be a major industry in the region in the Central West Regional SoE Report, 07-08.
		Chemicals / process	No	
	Population	Seasonal population loadings	Unknown	
		Rapid population growth	No	Negative population growth between 2001 and 2006 census.
WATER QUALITY OR SECURITY RISK (EFFECT)		Bacteriological and / or viral contamination	No	E.Coli samples have historically been compliant.
		Algal blooms	No	
		Heavy metal contamination	No	No detection of heavy metals for the 07-08 reporting period when metals were tested (in previous years metals were not tested).
		Poor chlorine residuals	Yes	No chlorine is added to the water supply.
		Pesticide contamination	No	
		High suspended solids	No	
		Boil water notices	No	
		Deaths or illness due to water quality	No	
		Water restrictions (current and historic)	No	No water restrictions advertised on the Council website.
		Taste and odour issues	No	
		Other contamination that would affect health	Yes	Narromine has a 'moderate' water salinity hazard rating according to the Central West Regional SoE Report, 07-08.
Notes		Council refunded water rates to one community member due to dissatisfaction with water supply services (Central West Regional SoE Report, 07-08).		

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Town # 26

TOWN #	TOWN	State/Territory	NSW	
		Town Name	Coonabarabran	
		Town Population	3,000 (NSW Health, 2009); 2,609 (Census 2006, Urban Centre/Locality)	
WATER UTILITY	Name of Water Utility	Warrumbungle Shire Council		
	Council Web-Link	http://www.warrumbungle.nsw.gov.au/		
	Rate (\$/kL)	Unknown		
	Per Capita Water Consumption (L/day)	1000L/day. Based on statistic of average annual resident use = 365kL (04-05 reporting period, Warrumbungle Shire Council SoE Report, 07-08).		
	Number of Connections	3280 (Warrumbungle system)		
CATCHMENT AND WATER SUPPLY	Catchment	Central West		
	Sub-Catchment	Castlereagh		
	Catchment Management Authority (CMA)	Central West		
	CMA Web-Link	http://cw.cma.nsw.gov.au/cwcm_ourcatchment.htm		
	Catchment Protection Status	None.		
	Potable Water Source(s)	Castlereagh River (watercourse) (NSW Health, 2009) Timor Dam (surface storage) (NSW Health, 2009)		
	Supply Capacity	Castlereagh River = unknown Timor Dam = unknown		
	Treatment Plant(s)	No		
WATER QUALITY	Level of Treatment	Flocculation, filtration, chlorination.		
	Drinking Water Guidelines	ADWG 2004 (NSW Health)		
		NSW Health Monitoring Location: Coonabarabran (01)		
	% compliance for water quality parameters achieving < 100%, 2003-2004	No information.		
	% compliance for water quality parameters achieving < 100%, 2004-2005	No information.		
	% compliance for water quality parameters achieving < 100%, 2005-2006	Total Coliforms	59	
	Parameter(s) tested and number of samples () 2005-2006	E.Coli (49), Free Chlorine (2), Total Coliforms (49)		
	% compliance for water quality parameters achieving < 100%, 2006-2007	Aluminium	0	
		E. coli	98	
		Iron	0	
		Total Coliforms	73	
		Turbidity	0	
	Parameter(s) tested and number of samples () 2006-2007	Aluminium (1), Antimony (1), Arsenic (1), Barium (1), Boron (1), Cadmium (1), Calcium (1), Chloride (1), Chromium (1), Copper (1), E.Coli (45), Fluoride (1), Iodine (1), Iron (1), Lead (1), Magnesium (1), Manganese (1), Mercury (1), Molybdenum (1), Nickel (1), Nitrate (1), Nitrite (1), pH (1), Selenium (1), Silver (1), Sodium (1), Sulfate (1), Total Coliforms (45), Total Dissolved Solids (TDS) (1), Total Hardness as CaCO3 (1), True Colour (1), Turbidity (1), Zinc (1)		
	% compliance for water quality parameters achieving < 100%, 2007-2008	E. coli	98	
	Parameter(s) tested and number of samples () 2007-2008	E.Coli (48), Free Chlorine (4), pH (4)		
WATER SECURITY	Current Water Restrictions	No record of water restrictions on Council's website.		
	Proportion of Potable Water Supplied to Households (%)	Unknown		
	Distance from the Coast (km)	~ 340km		
	Climate	Subtropical (border of Subtropical, Grassland and Temperate) (BoM, 2005)		
	Average Annual Rainfall	784mm (Source: BoM station number 64008, period 2004-2008)		
FACTOR		YES / NO	NOTES / EXPLANATION	
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	Yes	Classified as 'In Drought' according to NSW DPI Drought Map October 2009.
		Single drinking water source	No	
		Poor quality water source	Yes	Castlereagh River quality stated as 'Fair' based on the Warrumbungle Shire Council SoE Report, 07-08.
		Sewage overflow or disposal into water source	Yes	Coonabarabran STP discharges to the Castlereagh River.
		Flooding	No	
		Fauna defecating in supply	Yes	River and dam water sources.
		Fauna destroying water intake structures	No	
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	Yes	Iron and aluminium samples were non-compliant in the 06-07 sampling period.
		Un-lined landfills	Yes	Illegal dumping reported in the Warrumbungle Shire Council SoE Report, 07-08.
		Extensive agriculture	Yes	Wool and beef cattle production, cereal cropping and vine growing and horticulture (Council website).
		Low vegetation cover (dust, sediment runoff)	No	
		Poor access to supply	No	
		Unsustainable water extraction	No	No record of water restrictions on Council's website.
		Aquifer turning saline due to high extraction	Unknown	
		Hard water	No	
	Governance	Aging or inadequate pipe work and associated infrastructure	No	Infrastructure was built or upgraded in 1993 according to the DECCW 07-08 Water Treatment Performance Report.
		Significant water losses due to leaking pipes	No	No record of losses.
		High per capita water consumption	Yes	1000L/day.
		Inappropriate water quality standards / objectives	No	Council reports to NSW Health who use ADWG.
		Lack of infrastructure maintenance	No	
		Poor management or governance	No	
		Vandalism / sabotage / terrorism	No	

WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	Yes	
		Un-lined landfills	Yes	The Central West Regional SoE Report 07-08 states that there are 24 potentially contaminated sites in the Wellington area, including the gasworks remediation site.
		Extensive agriculture	Yes	Cropping, wool, beef and prime lamb are major industries (Wellington Annual Report, 07-08).
		Low vegetation cover (dust, sediment runoff)	Yes	Extensive agricultural areas, low forested cover.
		Poor access to supply	No	Town is immediately adjacent to the Macquarie River.
		Unsustainable water extraction	Yes	
		Aquifer turning saline due to high extraction	Yes	Wellington has a water salinity hazard rating of 'high' (Central West Regional SoE Report, 07-08).
		Hard water	No	
		Aging or inadequate pipe work and associated infrastructure	No	Infrastructure built or augmented in 1993 according to DECCW 07-08 Water Treatment Performance Report.
	Governance	Significant water losses due to leaking pipes	No	
		High per capita water consumption	No	Per capita water consumption is not reported.
		Inappropriate water quality standards / objectives	No	Council reports to NSW Health, who use ADWG.
		Lack of infrastructure maintenance	No	
		Poor management or governance	No	
		Vandalism / sabotage / terrorism	No	
	Industries	Insufficient trained personnel	No	
		Inadequate funding for maintenance or upgrades	No	
		Mining / minerals	No	
WATER QUALITY OR SECURITY RISK (EFFECT)	Population	Irrigation	Yes	Council parks and other areas consume a significant amount of water (Central West Regional SoE Report, 07-08).
		Chemicals / process	No	
	Seasonal population loadings	Seasonal population loadings	No	
		Rapid population growth	No	Wellington experienced a negative average annual population growth (approximately 2%) between the 2001 and 2006 Census.
	Bacteriological and / or viral contamination	Bacteriological and / or viral contamination	Yes	Some samples of E.Coli were non-compliant for the 07-08 reporting period.
		Algal blooms	No	
		Heavy metal contamination	Yes	Historical issues with Aluminium.
		Poor chlorine residuals	No	
		Pesticide contamination	No	
		High suspended solids	No	
		Boil water notices	No	No boil water notices according to NSW Health summary spreadsheet.
		Deaths or illness due to water quality	No	
		Water restrictions (current and historic)	No	No record of water restrictions on the Council website.
		Taste and odour issues	No	
		Other contamination that would affect health	Yes	Wellington has a water salinity hazard rating of 'high' (Central West Regional SoE Report, 07-08).
	Notes		Wellington Council had 187 dirty water complaints from the community in the 07-08 reporting period (Central West Regional SoE Report, 07-08). Groundwater in Wellington is being studied by a university research group (led by Flinders University) as part of \$60 Million of funding to secure Australia's water supply.	

Town # 27

TOWN	State/Territory	NSW	
	Town Name	Wellington	
	Town Population	4,947 (NSW Health, 2009); 4,118 (Census 2006, State Suburb)	
WATER UTILITY	Name of Water Utility	Wellington Council	
	Council Web-Link	http://www.wellington.nsw.gov.au	
	Rate (\$/kL)	\$1.64 - \$2.02/kL (Council website, 'Fees and Charges 2009/2010')	
	Per Capita Water Consumption (L/day)	Unknown. Annual household use = 230kL (Central West Regional SoE Report, 07-08).	
CATCHMENT AND WATER SUPPLY	Number of Connections	2860	
	Catchment	Central West	
	Sub-Catchment	Macquarie-Bogan	
	Catchment Management Authority (CMA)	Central West	
	CMA Web-Link	http://www.western.cma.nsw.gov.au/	
	Catchment Protection Status	None.	
	Potable Water Source(s)	Macquarie River (watercourse)	
	Supply Capacity	Unknown	
WATER QUALITY	Treatment Plant(s)	Yes	
	Level of Treatment	Filtration, flocculation, sedimentation, chlorination, fluoridation (NSW Health, 2009).	
	Drinking Water Guidelines	ADWG 2004 (NSW Health)	
	% compliance for water quality parameters achieving < 100%, 2003-2004	NSW Health Monitoring Location: WL01-Wellington	
		Aluminium	91
		Fluoride (daily WSA)	82
		Fluoride (weekly WSA)	61
		Fluoride Ratio	70
	Parameter(s) tested and number of samples () 2003-2004	Total Coliforms	70
		Aluminium (11), Antimony (11), Arsenic (11), Barium (11), Boron (11), Cadmium (11), Calcium (11), Chloride (11), Chromium (11), Copper (11), Cyanide (11), E.Coli (64), Fluoride (11), Fluoride (daily WSA) (332), Fluoride (field result WSA) (10), Fluoride (weekly WSA) (88), Fluoride Ratio (10), Iodine (11), Iron (11), Lead (11), Magnesium (11), Manganese (11), Mercury (11), Molybdenum (11), Nickel (11), Nitrate (11), Nitrite (11), pH (11), Selenium (11), Silver (11), Sodium (11), Sulfate (11), Total Dissolved Solids (TDS) (11), Total Hardness as CaCO3 (11), True Colour (6), Turbidity (11), Zinc (11)	
		Fluoride (daily WSA)	82
		Fluoride (weekly WSA)	70
		Fluoride Ratio	91
	% compliance for water quality parameters achieving < 100%, 2004-2005	Total Coliforms	78
		Aluminium (12), Antimony (12), Arsenic (12), Barium (12), Boron (12), Cadmium (12), Calcium (12), Chloride (12), Chromium (12), Copper (12), Cyanide (2), E.Coli (58), Fluoride (12), Fluoride (daily WSA) (336), Fluoride (field result WSA) (11), Fluoride (weekly WSA) (96), Fluoride Ratio (11), Iodine (12), Iron (12), Lead (12), Magnesium (12), Manganese (12), Mercury (12), Molybdenum (12), Nickel (12), Nitrate (12), Nitrite (12), pH (12), Selenium (12), Silver (12), Sodium (12), Sulfate (12), Total Coliforms (58), Total Dissolved Solids (TDS) (12), Total Hardness as CaCO3 (12), True Colour (12), Turbidity (12), Zinc (12)	
		Fluoride	91
		Fluoride (daily WSA)	63
		Fluoride (field result WSA)	91
	% compliance for water quality parameters achieving < 100%, 2005-2006	Fluoride (weekly WSA)	40
		Fluoride Ratio	55
Total Coliforms		95	
Parameter(s) tested and number of samples () 2005-2006		Aluminium (11), Antimony (11), Arsenic (11), Barium (11), Boron (11), Cadmium (11), Calcium (11), Chloride (11), Chromium (11), Copper (11), E.Coli (57), Fluoride (11), Fluoride (daily WSA) (105), Fluoride (field result WSA) (1), Fluoride (weekly WSA) (80), Fluoride Ratio (11), Iodine (11), Iron (11), Lead (11), Magnesium (11), Manganese (11), Mercury (11), Molybdenum (11), Nickel (11), Nitrate (11), Nitrite (11), pH (11), Selenium (11), Silver (11), Sodium (11), Sulfate (11), Total Coliforms (57), Total Dissolved Solids (TDS) (11), Total Hardness as CaCO3 (11), True Colour (11), Turbidity (11), Zinc (11)	
		Aluminium	86
	Fluoride (daily WSA)	79	
	Fluoride (weekly WSA)	75	
	Fluoride Ratio	50	
% compliance for water quality parameters achieving < 100%, 2006-2007	Total Coliforms	88	
	Aluminium (7), Antimony (7), Arsenic (7), Barium (7), Boron (7), Cadmium (7), Calcium (7), Chloride (7), Chromium (7), Copper (7), E.Coli (43), Fluoride (7), Fluoride (daily WSA) (257), Fluoride (field result WSA) (4), Fluoride (weekly WSA) (72), Fluoride Ratio (4), Iodine (7), Iron (7), Lead (7), Magnesium (7), Manganese (7), Mercury (7), Molybdenum (7), Nickel (7), Nitrate (7), Nitrite (7), pH (7), Selenium (7), Silver (7), Sodium (7), Sulfate (7), Total Coliforms (43), Total Dissolved Solids (TDS) (7), Total Hardness as CaCO3 (7), True Colour (7), Turbidity (7), Zinc (7)		
	E. coli	98	
	Fluoride (daily WSA)	68	
	Fluoride (weekly WSA)	42	
% compliance for water quality parameters achieving < 100%, 2007-2008	Total Coliforms	88	
	Aluminium (1), Antimony (1), Arsenic (1), Barium (1), Boron (1), Cadmium (1), Calcium (1), Chloride (1), Chromium (1), Copper (1), E.Coli (41), Fluoride (1), Fluoride (daily WSA) (200), Fluoride (field result WSA) (1), Fluoride (weekly WSA) (60), Fluoride Ratio (1), Free Chlorine (6), Iodine (1), Iron (1), Lead (1), Magnesium (1), Manganese (1), Mercury (1), Molybdenum (1), Nickel (1), Nitrate (1), Nitrite (1), pH (1), Selenium (1), Silver (1), Sodium (1), Sulfate (1), Total Coliforms (41), Total Dissolved Solids (TDS) (1), Total Hardness as CaCO3 (1), True Colour (1), Turbidity (1), Zinc (1)		
	Current Water Restrictions		
	No restrictions on Council website.		
	Proportion of Potable Water Supplied to Households (%)		
Unknown.			
Distance from the Coast (km)			
~ 310km			
Climate			
Temperate (BoM, 2005)			
Average Annual Rainfall			
564.3mm (Source: BoM station number 65034, period 2004-2008)			
FACTOR			
YES / NO			
NOTES / EXPLANATION			
	Drought	Yes	Classified as 'In Drought' according to NSW DPI Drought Map October 2009.
	Single drinking water source	Yes	No reuse.
	Poor quality water source	No	
	Sewage overflow or disposal into water source	No	No reports of sewer overflows.
	Flooding	No	
	Fauna defecating in supply	Yes	This would be likely, as drinking water source is the Macquarie River.

WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Fauna destroying water intake structures	No	
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	Yes	
		Un-lined landfills	Yes	The Central West Regional SoE Report 07-08 states that there are 24 potentially contaminated sites in the Wellington area, including the gasworks remediation site.
		Extensive agriculture	Yes	Cropping, wool, beef and prime lamb are major industries (Wellington Annual Report, 07-08).
		Low vegetation cover (dust, sediment runoff)	Yes	Extensive agricultural areas, low forested cover.
		Poor access to supply	No	Town is immediately adjacent to the Macquarie River.
		Unsustainable water extraction	Yes	
		Aquifer turning saline due to high extraction	Yes	Wellington has a water salinity hazard rating of 'high' (Central West Regional SoE Report, 07-08).
		Hard water	No	
		Aging or inadequate pipe work and associated infrastructure	No	Infrastructure built or augmented in 1993 according to DECCW 07-08 Water Treatment Performance Report.
		Significant water losses due to leaking pipes	No	
	Governance	High per capita water consumption	No	Per capita water consumption is not reported.
		Inappropriate water quality standards / objectives	No	Council reports to NSW Health, who use ADWG.
		Lack of infrastructure maintenance	No	
		Poor management or governance	No	
		Vandalism / sabotage / terrorism	No	
		Insufficient trained personnel	No	
		Inadequate funding for maintenance or upgrades	No	
	Industries	Mining / minerals	No	
		Irrigation	Yes	Council parks and other areas consume a significant amount of water (Central West Regional SoE Report, 07-08).
		Chemicals / process	No	
	Population	Seasonal population loadings	No	
		Rapid population growth	No	Wellington experienced a negative average annual population growth (approximately 2%) between the 2001 and 2006 Census.
WATER QUALITY OR SECURITY RISK (EFFECT)	Bacteriological and / or viral contamination	Yes	Some samples of E.Coli were non-compliant for the 07-08 reporting period.	
	Algal blooms	No		
	Heavy metal contamination	Yes	Historical issues with Aluminium.	
	Poor chlorine residuals	No		
	Pesticide contamination	No		
	High suspended solids	No		
	Boil water notices	No	No boil water notices according to NSW Health summary spreadsheet.	
	Deaths or illness due to water quality	No		
	Water restrictions (current and historic)	No	No record of water restrictions on the Council website.	
	Taste and odour issues	No		
	Other contamination that would affect health	Yes	Wellington has a water salinity hazard rating of 'high' (Central West Regional SoE Report, 07-08).	
Notes			Wellington Council had 187 dirty water complaints from the community in the 07-08 reporting period (Central West Regional SoE Report, 07-08). Groundwater in Wellington is being studied by a university research group (led by Flinders University) as part of \$60 Million of funding to secure Australia's water supply.	

Town # 28

TOWN	State/Territory	NSW	
	Town Name	Gloucester	
	Town Population	2,800 (NSW Health, 2009); 2,445 (Census 2006, Urban Centre/Locality)	
WATER UTILITY	Name of Water Utility	Gloucester Shire Council	
	Council Web-Link	http://www.gloucester.nsw.gov.au/	
	Rate (\$/kL)	\$1.55/kL up to 50kL (per annum), \$1.96/kL over 50kL (per annum) (Gloucester Shire Council fees and charges, 09/10 period)	
	Per Capita Water Consumption (L/day)	System capacity is 5ML/day, 390ML produced during the 07-08 reporting period.	
CATCHMENT AND WATER SUPPLY	Number of Connections	1,700	
	Catchment	Hunter/Central Rivers	
	Sub-Catchment	Manning River	
	Catchment Management Authority (CMA)	Hunter/Central Rivers	
	CMA Web-Link	http://www.hcr.cma.nsw.gov.au/our_catchment.php3	
	Catchment Protection Status	None	
	Potable Water Source(s)	Barrington River (watercourse)	
WATER QUALITY	Supply Capacity	Unknown	
	Treatment Plant(s)	Unknown	
	Level of Treatment	Conventional Water Treatment (DECCW inventory on NSW water utilities). Chlorination, coagulation, filtration, flocculation, fluoridation, sedimentation, softening (NSW Health database)	
	Drinking Water Guidelines	ADWG 2004 (NSW Health)	
		NSW Health Monitoring Location: Gloucester	
	% compliance for water quality parameters achieving < 100%, 2003-2004	Fluoride (daily WSA)	24
		Fluoride (weekly WSA)	11
		Fluoride Ratio	71
	Parameter(s) tested and number of samples () 2003-2004	Aluminium (2), Antimony (2), Arsenic (2), Barium (2), Boron (2), Cadmium (2), Calcium (2), Chloride (2), Chromium (2), Copper (2), Cyanide (2), E.Coli (51), Fluoride (8), Fluoride (daily WSA) (230), Fluoride (field result WSA) (7), Fluoride (weekly WSA) (70), Fluoride Ratio (7), Iodine (2), Iron (2), Lead (2), Magnesium (2), Manganese (2), Mercury (2), Molybdenum (2), Nickel (2), Nitrate (2), Nitrite (2), pH (2), Selenium (2), Silver (2), Sodium (2), Sulfate (2), Total Coliforms (51), Total Dissolved Solids (TDS) (2), Total Hardness as CaCO3 (2), True Colour (1), Turbidity (2), Zinc (2)	
	% compliance for water quality parameters achieving < 100%, 2004-2005	E. coli	98
		Fluoride (daily WSA)	62
		Fluoride (weekly WSA)	16
		Fluoride Ratio	0
		pH	50
	Parameter(s) tested and number of samples () 2004-2005	Total Coliforms	88
	% compliance for water quality parameters achieving < 100%, 2005-2006	E. coli	96
		Total Coliforms	94
Parameter(s) tested and number of samples () 2005-2006	Aluminium (2), Antimony (2), Arsenic (2), Barium (2), Boron (2), Cadmium (2), Calcium (2), Chloride (2), Chromium (2), Copper (2), E.Coli (49), Fluoride (2), Iodine (2), Iron (2), Lead (2), Magnesium (2), Manganese (2), Mercury (2), Molybdenum (2), Nickel (2), Nitrate (2), Nitrite (2), pH (2), Selenium (2), Silver (2), Sodium (2), Sulfate (2), Total Coliforms (49), Total Dissolved Solids (TDS) (2), Total Hardness as CaCO3 (2), True Colour (2), Turbidity (2), Zinc (2)		
% compliance for water quality parameters achieving < 100%, 2006-2007	Total Coliforms	92	
Parameter(s) tested and number of samples () 2006-2007	Aluminium (2), Antimony (2), Arsenic (2), Barium (2), Boron (2), Cadmium (2), Calcium (2), Chloride (2), Chromium (2), Copper (2), E.Coli (51), Fluoride (2), Iodine (2), Iron (2), Lead (2), Magnesium (2), Manganese (2), Mercury (2), Molybdenum (2), Nickel (2), Nitrate (2), Nitrite (2), pH (2), Selenium (2), Silver (2), Sodium (2), Sulfate (2), Total Coliforms (51), Total Dissolved Solids (TDS) (2), Total Hardness as CaCO3 (2), True Colour (2), Turbidity (2), Zinc (2)		
% compliance for water quality parameters achieving < 100%, 2007-2008	Aluminium	50	
Parameter(s) tested and number of samples () 2007-2008	Total Coliforms	71	
	Aluminium (2), Antimony (2), Arsenic (2), Barium (2), Boron (2), Cadmium (2), Calcium (2), Chloride (2), Chromium (2), Copper (2), E.Coli (52), Fluoride (2), Iodine (2), Iron (2), Lead (2), Magnesium (2), Manganese (2), Mercury (2), Molybdenum (2), Nickel (2), Nitrate (2), Nitrite (2), pH (2), Selenium (2), Silver (2), Sodium (2), Sulfate (2), Total Coliforms (52), Total Dissolved Solids (TDS) (2), Total Hardness as CaCO3 (2), True Colour (2), Turbidity (2), Zinc (2)		
WATER SECURITY	Current Water Restrictions	No. Restrictions not advertised on the Council website or in the Gloucester Advocate.	
	Proportion of Potable Water Supplied to Households (%)	Unknown	
	Distance from the Coast (km)	~ 55km	
	Climate	Temperate (BoM, 2005)	
	Average Annual Rainfall	1028mm (Source: BoM station number 60015, period 2004-2008) or 985mm per annum according to Council website.	
FACTOR		YES / NO	NOTES / EXPLANATION
Supply	Drought	No	Classified as 'Marginal' according to NSW DPI Drought Map October 2009
	Single drinking water source	Yes	
	Poor quality water source	Yes	Faecal contamination and high aluminium levels.
	Sewage overflow or disposal into water source		
	Flooding	Yes	Significant flooding in 2001.
	Fauna defecating in supply	Yes	Open water source.
	Fauna destroying water intake structures	No	
	Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	Yes	Aluminium
	Un-lined landfills		

WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water	Extensive agriculture	Yes	Reportedly a 'major' industry according to the Council website. Traditionally in beef and dairying, with more "boutique" industries such as aqua-culture, olive groves, escargot, vineyards and wineries, table rabbits, specialist nuts and alpacas now established.
		Low vegetation cover (dust, sediment runoff)	Yes	Extensive clearing for agriculture. The area does have grass cover though.
		Poor access to supply	No	
		Unsustainable water extraction		
		Aquifer turning saline due to high extraction		
		Hard water	Yes	NSW Health report that the Gloucester treatment system incorporates water softening.
		Aging or inadequate pipe work and associated infrastructure	Yes	Plant built in 1981.
		Significant water losses due to leaking pipes		
	Governance	High per capita water consumption	Unknown	Domestic consumption (and per capita consumption) is not isolated from total water production, so this statistic is unknown.
		Inappropriate water quality standards / objectives	No	Council reports to NSW Health, who use ADWG
		Lack of infrastructure maintenance	Yes	
		Poor management or governance	Yes	Council measured some basic water quality parameters from the major river systems in the Gloucester catchment area during 07-08. Due to faulty equipment all measurements taken during the reporting period could not be used for reporting purposes (Gloucester SoE Report, 07-08).
		Vandalism / sabotage / terrorism	No	
		Insufficient trained personnel	Yes	Council measured some basic water quality parameters from the major river systems in the Gloucester catchment area during 07-08. Due to faulty equipment all measurements taken during the reporting period could not be used for reporting purposes (Gloucester SoE Report, 07-08). This may have been avoided if adequately trained personnel had identified the issue.
		Inadequate funding for maintenance or upgrades		
	Industries	Mining / minerals	Yes	There is a Coal Mine at Stratford (Gloucester Shire Council website).
		Irrigation	Yes	Agriculture is a major local industry.
		Chemicals / process	Yes	Timber mill nearby (Council website).
	Population	Seasonal population loadings		
		Rapid population growth		
WATER QUALITY OR SECURITY RISK (EFFECT)	Bacteriological and / or viral contamination	Yes	Several samples during April and May from Barrington failed to meet the NSW Health Departments Drinking Water Guidelines. In response to the failures council notified all residents to boil their water before use. Council also flushed the water mains through the affected area to assist in improving the quality (Gloucester SoE Report, 07-08).	
		Yes	Free chlorine is not tested.	
		Unknown	Pesticides not tested.	
	Boil water notices	Yes	Several samples during April and May from Barrington failed to meet the NSW Health Departments Drinking Water Guidelines. In response to the failures council notified all residents to boil their water before use. Council also flushed the water mains through the affected area to assist in improving the quality (Gloucester SoE Report, 07-08).	
		No	No current water restrictions based on Council website.	
Notes				

Town #		29			
TOWN	State/Territory	NSW			
	Town Name	Dungog			
	Town Population	2,600 (NSW Health, 2009); 2,102 (Census 2006, Urban Centre/Locality)			
WATER UTILITY	Name of Water Utility	Hunter Water Corporation			
	Council Web-Link	http://www.dungog.nsw.gov.au/			
	Rate (\$/kL)	\$1.22/kL (Hunter Water Corporation website)			
	Per Capita Water Consumption (L/day)	Unknown. 674,337kL purchased from Hunter Water in the 03-04 reporting period. This is not restricted to domestic consumption. Dungog WTP produces 150ML/day.			
	Number of Connections	205,000 (entire Hunter Water network) (07-08 reporting period, National Performance Report to the			
CATCHMENT AND WATER SUPPLY	Catchment	Hunter/Central Rivers			
	Sub-Catchment	Hunter River			
	Catchment Management Authority (CMA)	Hunter/Central Rivers			
	CMA Web-Link	http://www.hcr.cma.nsw.gov.au/our_catchment.php3			
	Catchment Protection Status	None			
	Potable Water Source(s)	Chichester Dam (surface water storage)			
	Supply Capacity	Average daily supply = 90ML, capacity = 21,500ML.			
WATER QUALITY	Treatment Plant(s)	Dungog Water Treatment Plant			
	Level of Treatment	Chlorine dosing (at Chichester Dam), then flows under gravity to Dungog Water Treatment Plant. At the WTP, coagulation and flocculation using alum and polyelectrolyte, contact filtration (sand, anthracite and gravel), chlorination, fluoridation and lime and carbon dioxide dosing for pH correction and buffering, before being returned to the Chichester Main (Hunter Water Corporation website).			
	Drinking Water Guidelines	ADWG 2004 (NSW Health)			
	% compliance for water quality parameters achieving < 100%, 2003-2004	NSW Health Monitoring Location:			
		E. coli	98		
		Fluoride (daily WSA)	94		
		Iron	90		
		pH	94		
	Parameter(s) tested and number of samples () 2003-2004	Total Coliforms	85		
		Aluminium (10), Antimony (10), Arsenic (10), Barium (10), Boron (10), Cadmium (10), Calcium (10), Chloride (10), Chromium (10), Copper (10), Cyanide (10), E.Coli (82), Fluoride (10), Fluoride (daily WSA) (62), Fluoride (weekly WSA) (4), Free Chlorine (8), Iodine (10), Iron (10), Lead (10), Magnesium (10), Manganese (10), Mercury (10), Molybdenum (10), Nickel (10), Nitrate (10), Nitrite (10), pH (17), Selenium (10), Silver (10), Sodium (10), Sulfate (10), Total Coliforms (82), Total Dissolved Solids (TDS) (10), Total Hardness as CaCO3 (10), True Colour (5), Turbidity (10), Zinc (10)			
		% compliance for water quality parameters achieving < 100%, 2004-2005	pH	96	
			Total Coliforms	92	
		Parameter(s) tested and number of samples () 2004-2005	Aluminium (11), Antimony (11), Arsenic (11), Barium (11), Boron (11), Cadmium (11), Calcium (11), Chloride (11), Chromium (11), Copper (11), Cyanide (11), E.Coli (77), Fluoride (11), Free Chlorine (19), Iodine (11), Iron (11), Lead (11), Magnesium (11), Manganese (11), Mercury (11), Molybdenum (11), Nickel (11), Nitrate (11), Nitrite (11), pH (28), Selenium (11), Silver (11), Sodium (11), Sulfate (11), Total Coliforms (77), Total Dissolved Solids (TDS) (11), Total Hardness as CaCO3 (11), True Colour (11), Turbidity (11), Zinc (11)		
	% compliance for water quality parameters achieving < 100%, 2005-2006		pH	92	
			Total Coliforms	85	
	Parameter(s) tested and number of samples () 2005-2006		Aluminium (10), Antimony (10), Arsenic (10), Barium (10), Boron (10), Cadmium (10), Calcium (10), Chloride (10), Chromium (10), Copper (10), E.Coli (75), Fluoride (10), Free Chlorine (3), Iodine (10), Iron (10), Lead (10), Magnesium (10), Manganese (10), Mercury (10), Molybdenum (10), Nickel (10), Nitrate (10), Nitrite (10), pH (13), Selenium (10), Silver (10), Sodium (10), Sulfate (10), Total Coliforms (75), Total Dissolved Solids (TDS) (10), Total Hardness as CaCO3 (10), True Colour (10), Turbidity (10), Zinc (10)		
			% compliance for water quality parameters achieving < 100%, 2006-2007	Total Coliforms	91
		Parameter(s) tested and number of samples () 2006-2007		Aluminium (12), Antimony (12), Arsenic (12), Barium (12), Boron (12), Cadmium (12), Calcium (12), Chloride (12), Chromium (12), Copper (12), E.Coli (77), Fluoride (12), Iodine (12), Iron (12), Lead (12), Magnesium (12), Manganese (12), Mercury (12), Molybdenum (12), Nickel (12), Nitrate (12), Nitrite (12), pH (12), Selenium (12), Silver (12), Sodium (12), Sulfate (12), Total Coliforms (77), Total Dissolved Solids (TDS) (12), Total Hardness as CaCO3 (12), True Colour (12), Turbidity (12), Zinc (12)	
			% compliance for water quality parameters achieving < 100%, 2007-2008	Total Coliforms	95
				Parameter(s) tested and number of samples () 2007-2008	Aluminium (12), Antimony (12), Arsenic (12), Barium (12), Boron (12), Cadmium (12), Calcium (12), Chloride (12), Chromium (12), Copper (12), E.Coli (78), Fluoride (12), Iodine (12), Iron (12), Lead (12), Magnesium (12), Manganese (12), Mercury (12), Molybdenum (12), Nickel (12), Nitrate (12), Nitrite (12), pH (12), Selenium (12), Silver (12), Sodium (12), Sulfate (12), Total Coliforms (78), Total Dissolved Solids (TDS) (12), Total Hardness as CaCO3 (12), True Colour (12), Turbidity (12), Zinc (12)
WATER SECURITY	Current Water Restrictions		No report of water restrictions on the Council website.		
	Proportion of Potable Water Supplied to Households (%)		55% Residential, 30% non-residential, 15% non-metered (statistics are for the entire Hunter Water supply system).		
	Distance from the Coast (km)	~ 70km			
	Climate	Temperate (BoM, 2005)			
	Average Annual Rainfall	982mm (Source: BoM station number 61017, period 2004-2008)			
FACTOR		YES / NO	NOTES / EXPLANATION		
	Drought	No	Classified as 'Marginal' according to NSW DPI Drought Map October 2009.		
	Single drinking water source	Yes	Tillegra Dam is currently being constructed by Hunter Water to supplement supply.		
	Poor quality water source	No			
	Sewage overflow or disposal into water source	No	Closed system from Chichester		

WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Flooding	Yes	Hunter Water website mentions challenges associated with providing drinking water during flood.
		Fauna defecating in supply	Yes	Open water source, but treatment should eliminate this.
		Fauna destroying water intake structures	No	
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	No	These are not an issue due to the WTP.
		Un-lined landfills		
		Extensive agriculture	Yes	Extensive cleared farmland.
		Low vegetation cover (dust, sediment runoff)	Yes	Widespread clearing for farming, however there is grass cover.
		Poor access to supply	No	Water flows under gravity from Chichester Dam to the Dungog WTP.
		Unsustainable water extraction	Yes	Tillegra Dam is currently being constructed by Hunter Water to supplement supply.
		Aquifer turning saline due to high extraction		
		Hard water	No	This is not an issue due to the Dungog WTP.
		Aging or inadequate pipe work and associated infrastructure	Yes	Dungog WTP was completed in 1987.
		Significant water losses due to leaking pipes		
	Governance	High per capita water consumption	Unknown	Per capita consumption is not well reported.
		Inappropriate water quality standards / objectives	No	
		Lack of infrastructure maintenance	No	
		Poor management or governance	No	
		Vandalism / sabotage / terrorism	No	
		Insufficient trained personnel		
		Inadequate funding for maintenance or upgrades		
	Industries	Mining / minerals	No	
		Irrigation	Yes	Farming nearby.
		Chemicals / process		
	Population	Seasonal population loadings	Unknown	
		Rapid population growth	No	Negative population growth between the 2001 and 2006 Census.
WATER QUALITY OR SECURITY RISK (EFFECT)	Bacteriological and / or viral contamination	Yes	Total coliforms.	
	Algal blooms	No		
	Heavy metal contamination	No	However there was iron in the water supply in 03-04.	
	Poor chlorine residuals	Yes	Free chlorine not tested.	
	Pesticide contamination		Pesticides not tested.	
	High suspended solids	No		
	Boil water notices	No		
	Deaths or illness due to water quality			
	Water restrictions (current and historic)	No		
	Taste and odour issues			
	Other contamination that would affect health			
Notes			Construction of Tillegra Dam is underway.	

Town #	30		
TOWN	State/Territory	NSW	
	Town Name	Cowra	
	Town Population	9,100 (NSW Health, 2009); 8,430 (Census 2006, Urban Centre/Locality)	
WATER UTILITY	Name of Water Utility	Cowra Shire Council	
	Council Web-Link	http://www.cowraregion.com.au/home/	
	Rate (\$/kL)	Unknown.	
	Per Capita Water Consumption (L/day)	Unknown.	
	Number of Connections	5240	
CATCHMENT AND WATER SUPPLY	Catchment	Lachlan	
	Sub-Catchment	-	
	Catchment Management Authority (CMA)	Lachlan	
	CMA Web-Link	http://www.lachlan.cma.nsw.gov.au/	
	Catchment Protection Status	None.	
	Potable Water Source(s)	Lachlan River (watercourse) (Cowra supply source according to NSW Health) Wyangala Dam (Cowra supply source according to Council website)	
	Supply Capacity	Unknown.	
WATER QUALITY	Treatment Plant(s)	None	
	Level of Treatment	Filtration, chlorination, fluoridation.	
	NSW Health Monitoring Location: CO01-Cowra		
	% compliance for water quality parameters achieving < 100%, 2003-2004	Aluminium	27
		E. coli	99
		Fluoride (daily WSA)	93
		Fluoride (weekly WSA)	91
		Fluoride Ratio	91
		pH	91
		Thermotolerant Coliforms	83
		Total Coliforms	78
		Total Dissolved Solids (TDS)	91
	Parameter(s) tested and number of samples () 2003-2004	Aluminium (11), Antimony (11), Arsenic (11), Barium (11), Boron (11), Cadmium (11), Calcium (11), Chloride (11), Chromium (11), Copper (11), Cyanide (11), E.Coli (139), Fluoride (13), Fluoride (daily WSA) (279), Fluoride (field result WSA) (9), Fluoride (weekly WSA) (82), Fluoride Ratio (11), Iodine (11), Iron (11), Lead (11), Magnesium (11), Manganese (11), Mercury (11), Molybdenum (11), Nickel (11), Nitrate (11), Nitrite (11), pH (11), Selenium (11), Silver (11), Sodium (11), Sulfate (11), Thermotolerant Coliforms (6), Total Coliforms (139), Total Dissolved Solids (TDS) (11), Total Hardness as CaCO3 (11), True Colour (5), Turbidity (11), Zinc (11)	
	% compliance for water quality parameters achieving < 100%, 2004-2005	Aluminium	8
		E. coli	99
		Fluoride (daily WSA)	95
		Fluoride (weekly WSA)	98
		pH	92
		Total Coliforms	79
		Total Hardness as CaCO3	83
	Parameter(s) tested and number of samples () 2004-2005	Aluminium (12), Antimony (12), Arsenic (12), Barium (12), Boron (12), Cadmium (12), Calcium (12), Chloride (12), Chromium (12), Copper (12), Cyanide (2), E.Coli (124), Fluoride (12), Fluoride (daily WSA) (286), Fluoride (field result WSA) (12), Fluoride (weekly WSA) (88), Fluoride Ratio (12), Iodine (12), Iron (12), Lead (12), Magnesium (12), Manganese (12), Mercury (12), Molybdenum (12), Nickel (12), Nitrate (12), Nitrite (12), pH (12), Selenium (12), Silver (12), Sodium (12), Sulfate (12), Thermotolerant Coliforms (124), Total Coliforms (124), Total Dissolved Solids (TDS) (12), Total Hardness as CaCO3 (12), True Colour (12), Turbidity (12), Zinc (12)	
	% compliance for water quality parameters achieving < 100%, 2005-2006	Aluminium	44
		E. coli	98
		Fluoride (daily WSA)	96
		Fluoride (weekly WSA)	99
		Iron	94
		Total Coliforms	85
		Total Hardness as CaCO3	94
	Parameter(s) tested and number of samples () 2005-2006	Aluminium (16), Antimony (16), Arsenic (16), Barium (16), Boron (16), Cadmium (16), Calcium (16), Chloride (16), Chromium (16), Copper (16), E.Coli (142), Fluoride (16), Fluoride (daily WSA) (294), Fluoride (field result WSA) (13), Fluoride (weekly WSA) (84), Fluoride Ratio (13), Iodine (16), Iron (16), Lead (16), Magnesium (16), Manganese (16), Mercury (16), Molybdenum (16), Nickel (16), Nitrate (16), Nitrite (16), pH (16), Selenium (16), Silver (16), Sodium (16), Sulfate (16), Total Coliforms (142), Total Dissolved Solids (TDS) (16), Total Hardness as CaCO3 (16), True Colour (16), Turbidity (16), Zinc (16)	
	% compliance for water quality parameters achieving < 100%, 2006-2007	Aluminium	50
		E. coli	96
		Fluoride (daily WSA)	98
		Fluoride (weekly WSA)	97
		Total Coliforms	71
	Parameter(s) tested and number of samples () 2006-2007	Aluminium (12), Antimony (12), Arsenic (12), Barium (12), Boron (12), Cadmium (12), Calcium (12), Chloride (12), Chromium (12), Copper (12), E.Coli (119), Fluoride (12), Fluoride (daily WSA) (363), Fluoride (field result WSA) (9), Fluoride (weekly WSA) (102), Fluoride Ratio (9), Iodine (12), Iron (12), Lead (12), Magnesium (12), Manganese (12), Mercury (12), Molybdenum (12), Nickel (12), Nitrate (12), Nitrite (12), pH (12), Selenium (12), Silver (12), Sodium (12), Sulfate (12), Total Coliforms (119), Total Dissolved Solids (TDS) (12), Total Hardness as CaCO3 (12), True Colour (12), Turbidity (12), Zinc (12)	
	% compliance for water quality parameters achieving < 100%, 2007-2008	Aluminium	36
		E. coli	98
		Fluoride (daily WSA)	97
		Iodine	82
		Total Coliforms	72
	Parameter(s) tested and number of samples () 2007-2008	Aluminium (11), Antimony (11), Arsenic (11), Barium (11), Boron (11), Cadmium (11), Calcium (11), Chloride (11), Chromium (11), Copper (11), Cyanide (11), E.Coli (125), Fluoride (11), Fluoride (daily WSA) (180), Fluoride (field result WSA) (7), Fluoride (weekly WSA) (50), Fluoride Ratio (7), Iodine (11), Iron (11), Lead (11), Magnesium (11), Manganese (11), Mercury (11), Molybdenum (11), Nickel (11), Nitrate (11), Nitrite (11), pH (11), Selenium (11), Silver (11), Sodium (11), Sulfate (11), Total Coliforms (125), Total Dissolved Solids (TDS) (11), Total Hardness as CaCO3 (11), True Colour (5), Turbidity (11), Zinc (11)	
	WATER SECURITY	Current Water Restrictions	Yes. Level 2 water restrictions.
Proportion of Potable Water Supplied to Households (%)		Unknown.	
Distance from the Coast (km)		~ 240km	

V SE		Climate	Temperate (BoM, 2005)	
		Average Annual Rainfall	640mm per annum. Cowra Shire Council website.	
		FACTOR	YES / NO	
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	Yes	Classified as 'In Drought' according to NSW DPI Drought Map October 2009.
		Single drinking water source	Yes	
		Poor quality water source	No	
		Sewage overflow or disposal into water source	No	
		Flooding	No	
		Fauna defecating in supply	Yes	Source is river water and large reservoir (dam); contamination due to wildlife is likely.
		Fauna destroying water intake structures	No	
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	Yes	Iron and aluminium.
		Un-lined landfills	No	No reports of unlined landfills.
		Extensive agriculture	Yes	Agriculture is stated as a major industry in the Cowra Shire Council Annual Report, 07-08, including irrigation cropping and fodder production, mixed farming enterprises, and other intensive agriculture.
		Low vegetation cover (dust, sediment runoff)	No	
		Poor access to supply	No	
		Unsustainable water extraction	No	
		Aquifer turning saline due to high extraction	No	No reports of aquifer turning saline. Salinity levels monitored and reported in the Cowra Shire Council Annual Report, 07-08.
		Hard water	No	No reports of overly hard water. Total hardness 100% compliant for 07-08 reporting period.
		Aging or inadequate pipe work and associated infrastructure	No	
		Significant water losses due to leaking pipes	No	No reports of water system losses.
	Governance	High per capita water consumption	No	Water consumption per capita unknown.
		Inappropriate water quality standards / objectives	No	Reports to NSW Health, who use ADWG.
		Lack of infrastructure maintenance	No	
		Poor management or governance	No	
		Vandalism / sabotage / terrorism	No	
		Insufficient trained personnel	No	
	Industries	Inadequate funding for maintenance or upgrades	No	
		Mining / minerals	Yes	Stated as a major industry in the region in the Cowra Shire Council Annual Report, 07-08.
		Irrigation	Yes	
	Population	Chemicals / process	No	
		Seasonal population loadings	Yes	Tourism is stated to be one of the major industries in the shire (Cowra Annual Report, 07-08).
		Rapid population growth	No	Population growth = 0.84% between 2001 and 2006 Census, which is less than the NSW average of 1.6% (ABS, 2009).
	WATER QUALITY OR SECURITY RISK (EFFECT)		Bacteriological and / or viral contamination	Yes
Algal blooms			No	No report of algal blooms.
Heavy metal contamination			Yes	Aluminium and iron in supply.
Poor chlorine residuals			Yes	Free chlorine not tested.
Pesticide contamination			No	No reports of pesticide issues.
High suspended solids			Yes	Reports of colour issues on the Cowra Shire Council website.
Boil water notices			No	No boil water notices according to NSW Health summary spreadsheet.
Deaths or illness due to water quality			No	
Water restrictions (current and historic)			Yes	Level 2 water restrictions currently in place.
Taste and odour issues			No	
Other contamination that would affect health			No	
Notes				

Town # 31

TOWN	State/Territory	NSW	
	Town Name	Wentworth	
	Town Population	1,200 (NSW Health, 2009); 1,303 (Census 2006, Urban Centre/Locality)	
WATER UTILITY	Name of Water Utility	Wellington Shire Council	
	Council Web-Link	http://www.wentworth.nsw.gov.au/	
	Rate (\$/kL)	\$1.15/kL up to 250kL, \$2.70 over 250kL.	
	Per Capita Water Consumption (L/day)	Unknown. WTP supply capacity is 1ML/day (NSW DECCW inventory of NSW water utilities 07-08), 226ML treated to potable in 07-08 reporting period. Average annual household consumption is 450kL (Riverina and Murray Regional Organisation of Councils SoE Report, 07-08).	
CATCHMENT AND WATER SUPPLY	Number of Connections	2,230	
	Catchment	Lower Murray Darling	
	Sub-Catchment	-	
	Catchment Management Authority (CMA)	Lower Murray Darling	
	CMA Web-Link	http://www.lmd.cma.nsw.gov.au/	
	Catchment Protection Status	None.	
	Potable Water Source(s)	Murray River (watercourse)	
WATER QUALITY	Supply Capacity	Unknown	
	Treatment Plant(s)	Wentworth Water Treatment Plant	
	Level of Treatment	Conventional treatment (DECCW), filtration, flocculation, coagulation, sand filter, activated carbon, chlorination (NSW Health).	
	Drinking Water Guidelines	ADWG 2004 (NSW Health)	
		NSW Health Monitoring Location: WW01-Wentworth	
	% compliance for water quality parameters achieving < 100%, 2003-2004	Aluminium	75
		E. coli	77
		pH	60
		Total Coliforms	63
	Parameter(s) tested and number of samples () 2003-2004	Aluminium (4), Antimony (4), Arsenic (4), Barium (4), Boron (4), Cadmium (4), Calcium (4), Chloride (4), Chromium (4), Copper (4), Cyanide (4), E.Coli (57), Fluoride (4), Free Chlorine (3), Iodine (4), Iron (4), Lead (4), Magnesium (4), Manganese (4), Mercury (4), Molybdenum (4), Nickel (4), Nitrate (4), Nitrite (4), pH (5), Selenium (4), Silver (4), Sodium (4), Sulfate (4), Total Coliforms (57), Total Dissolved Solids (TDS) (4), Total Hardness as CaCO3 (4), True Colour (1), Turbidity (4), Zinc (4)	
	% compliance for water quality parameters achieving < 100%, 2004-2005	E. coli	88
		Total Coliforms	76
	Parameter(s) tested and number of samples () 2004-2005	Aluminium (2), Antimony (2), Arsenic (2), Barium (2), Boron (2), Cadmium (2), Calcium (2), Chloride (2), Chromium (2), Copper (2), Cyanide (2), E.Coli (51), Fluoride (2), Iodine (2), Iron (2), Lead (2), Magnesium (2), Manganese (2), Mercury (2), Molybdenum (2), Nickel (2), Nitrate (2), Nitrite (2), pH (2), Selenium (2), Silver (2), Sodium (2), Sulfate (2), Total Coliforms (51), Total Dissolved Solids (TDS) (2), Total Hardness as CaCO3 (2), True Colour (2), Turbidity (2), Zinc (2)	
	% compliance for water quality parameters achieving < 100%, 2005-2006	Total Coliforms	94
	Parameter(s) tested and number of samples () 2005-2006	Aluminium (2), Antimony (2), Arsenic (2), Barium (2), Boron (2), Cadmium (2), Calcium (2), Chloride (2), Chromium (2), Copper (2), Cyanide (2), E.Coli (52), Fluoride (2), Iodine (2), Iron (2), Lead (2), Magnesium (2), Manganese (2), Mercury (2), Molybdenum (2), Nickel (2), Nitrate (2), Nitrite (2), pH (2), Selenium (2), Silver (2), Sodium (2), Sulfate (2), Total Coliforms (52), Total Dissolved Solids (TDS) (2), Total Hardness as CaCO3 (2), True Colour (2), Turbidity (2), Zinc (2)	
	% compliance for water quality parameters achieving < 100%, 2006-2007	Total Coliforms	98
	Parameter(s) tested and number of samples () 2006-2007	Aluminium (1), Antimony (1), Arsenic (1), Barium (1), Boron (1), Cadmium (1), Calcium (1), Chloride (1), Chromium (1), Copper (1), E.Coli (48), Fluoride (1), Iodine (1), Iron (1), Lead (1), Magnesium (1), Manganese (1), Mercury (1), Molybdenum (1), Nickel (1), Nitrate (1), Nitrite (1), pH (1), Selenium (1), Silver (1), Sodium (1), Sulfate (1), Total Coliforms (48), Total Dissolved Solids (TDS) (1), Total Hardness as CaCO3 (1), True Colour (1), Turbidity (1), Zinc (1)	
	% compliance for water quality parameters achieving < 100%, 2007-2008	Aluminium	50
		Total Coliforms	92
		Total Dissolved Solids	50
	Parameter(s) tested and number of samples () 2007-2008	Aluminium (2), Antimony (2), Arsenic (2), Barium (2), Boron (2), Cadmium (2), Calcium (2), Chloride (2), Chromium (2), Copper (2), E.Coli (52), Fluoride (2), Iodine (2), Iron (2), Lead (2), Magnesium (2), Manganese (2), Mercury (2), Molybdenum (2), Nickel (2), Nitrate (2), Nitrite (2), pH (2), Selenium (2), Silver (2), Sodium (2), Sulfate (2), Total Coliforms (52), Total Dissolved Solids (TDS) (2), Total Hardness as CaCO3 (2), True Colour (2), Turbidity (2), Zinc (2)	
WATER SECURITY	Current Water Restrictions	Yes. Level 2 water restrictions. Hours of watering = 12 hours per week on any day between the hours of 6pm and 10am.	
	Proportion of Potable Water Supplied to Households (%)	Unknown	
	Distance from the Coast (km)	~ 475km	
	Climate	Grassland (BoM, 2005)	
	Average Annual Rainfall	195.67mm (Source: BoM station number 47041)	
FACTOR		YES / NO	NOTES / EXPLANATION
	Drought	Yes	Classified as 'In Drought' according to NSW DPI Drought Map October 2009.
	Single drinking water source	Yes	Murray River.
	Poor quality water source	Yes	Council's submission to the NSW Inquiry into Secure and Sustainable Water Supply and Sewerage Services for Non Metropolitan NSW states that that there are, by necessity, three water treatment plants for a small population due to the local water quality.

WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Sewage overflow or disposal into water		
		Flooding		
		Fauna defecating in supply	Yes	Open water source. Should not be an issue due to the water treatment plant.
		Fauna destroying water intake structures	No	
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	Yes	Aluminium
		Un-lined landfills		
		Extensive agriculture	Yes	
		Low vegetation cover (dust, sediment	Yes	
		Poor access to supply	No	
		Unsustainable water extraction	Yes	Water source is a regulated river subject to interstate processes.
		Aquifer turning saline due to high extraction	No	SoE Report suggests that the Murray is not overly saline in this location.
		Hard water	No	Results indicate good compliance for hardness.
		Aging or inadequate pipe work and associated infrastructure	No	Infrastructure was built or augmented in 1991 (NSW DECCW inventory of water utilities 07-08).
		Significant water losses due to leaking pipes	Unknown	
	Governance	High per capita water consumption	Unknown	
		Inappropriate water quality standards / objectives	No	Council reports to NSW Health who use ADWG.
		Lack of infrastructure maintenance	Yes	Infrastructure upgrade and maintenance required, but capital expenditure cannot be raised (according to Council submission to the NSW Inquiry).
		Poor management or governance	No	
		Vandalism / sabotage / terrorism	No	
		Insufficient trained personnel	No	
		Inadequate funding for maintenance or upgrades	Yes	Council's submission to the NSW Inquiry into Secure and Sustainable Water Supply and Sewerage Services for Non Metropolitan NSW states that that there are, by necessity, three water treatment plants for a small population due to the local water quality, making the financial viability of the water services very doubtful without funding grants for capital works.
	Industries	Mining / minerals	Yes	Snapper and Ginko mineral mines.
		Irrigation	Yes	Agriculture.
		Chemicals / process		
	Population	Seasonal population loadings	Yes	High tourism as the town is located near the junction of the Murray and Darling Rivers.
		Rapid population growth	No	Negative population growth between 2001 and 2006 Census.
WATER QUALITY OR SECURITY RISK (EFFECT)		Bacteriological and / or viral contamination	No	
		Algal blooms	No	One major outbreak (lasting 6 months) in 06-07 reporting period.
		Heavy metal contamination	Yes	Aluminium
		Poor chlorine residuals	Yes	Free chlorine is not measured.
		Pesticide contamination		Unknown. Pesticides not measured.
		High suspended solids	Yes	
		Boil water notices	No	
		Deaths or illness due to water quality	No	None reported.
		Water restrictions (current and historic)	Yes	The town has been on repeated water restrictions of various levels. Recently downgraded from Level 3 to Level 2.
		Taste and odour issues		
		Other contamination that would affect	No	
Notes				

Town # 32

TOWN	State/Territory	NSW	
	Town Name	Tumbarumba	
	Town Population	1,800 (NSW Health, 2009); 1,487 (Census 2006, Urban Centre/Locality)	
WATER UTILITY	Name of Water Utility	Tumbarumba Shire Council	
	Council Web-Link	http://www.tumbashire.nsw.gov.au/	
	Rate (\$/kL)	\$1.04/kL up to 200kL, \$1.74/kL over 200kL	
	Per Capita Water Consumption (L/day)	Unknown. GHD completed a water balance in the Drought Mitigation Strategy but daily demand did not include distinction of domestic consumption.	
CATCHMENT AND WATER SUPPLY	Number of Connections	1,140	
	Catchment	Murray River	
	Sub-Catchment	-	
	Catchment Management Authority (CMA)	Murray River	
	CMA Web-Link	http://www.murray.cma.nsw.gov.au/	
	Catchment Protection Status	None.	
	Potable Water Source(s)	Tumbarumba Creek	
WATER QUALITY	Supply Capacity	0.5ML/day for past 3 years (supply restricted in conjunction with water restrictions)	
	Treatment Plant(s)	None	
	Level of Treatment	Chlorination	
	Drinking Water Guidelines	ADWG 2004 (NSW Health)	
		NSW Health Monitoring Location: TM01-Tumbarumba	
	% compliance for water quality parameters achieving < 100%, 2003-2004	E. coli	98
		Total Coliforms	37
	Parameter(s) tested and number of samples () 2003-2004	Aluminium (2), Antimony (2), Arsenic (2), Barium (2), Boron (2), Cadmium (2), Calcium (2), Chloride (2), Chromium (2), Copper (2), E.Coli (51), Flouride (2), Iodine (2), Iron (2), Lead (2), Magnesium (2), Manganese (2), Mercury (2), Molybdenum (2), Nickel (2), Nitrate (2), Nitrite (2), pH (2), Selenium (2), Silver (2), Sodium (2), Sulfate (2), Total Coliforms (51), Total Dissolved Solids (TDS) (2), Total Hardness as CaCO3 (2), True Colour (2), Turbidity (2), Zinc (2)	
	% compliance for water quality parameters achieving < 100%, 2004-2005	E. coli	96
		Iron	50
		Total Coliforms	49
	Parameter(s) tested and number of samples () 2004-2005	Aluminium (2), Antimony (2), Arsenic (2), Barium (2), Boron (2), Cadmium (2), Calcium (2), Chloride (2), Chromium (2), Copper (2), E.Coli (53), Flouride (2), Iodine (2), Iron (2), Lead (2), Magnesium (2), Manganese (2), Mercury (2), Molybdenum (2), Nickel (2), Nitrate (2), Nitrite (2), pH (2), Selenium (2), Silver (2), Sodium (2), Sulfate (2), Total Coliforms (53), Total Dissolved Solids (TDS) (2), Total Hardness as CaCO3 (2), True Colour (2), Turbidity (2), Zinc (2)	
	% compliance for water quality parameters achieving < 100%, 2005-2006	Total Coliforms	54
	Parameter(s) tested and number of samples () 2005-2006	Aluminium (2), Antimony (2), Arsenic (2), Barium (2), Boron (2), Cadmium (2), Calcium (2), Chloride (2), Chromium (2), Copper (2), E.Coli (52), Flouride (2), Iodine (2), Iron (2), Lead (2), Magnesium (2), Manganese (2), Mercury (2), Molybdenum (2), Nickel (2), Nitrate (2), Nitrite (2), pH (2), Selenium (2), Silver (2), Sodium (2), Sulfate (2), Total Coliforms (52), Total Dissolved Solids (TDS) (2), Total Hardness as CaCO3 (2), True Colour (2), Turbidity (2), Zinc (2)	
	% compliance for water quality parameters achieving < 100%, 2006-2007	Aluminium	33
		Iron	67
		Lead	67
	Total Coliforms	39	
	Turbidity	33	
Parameter(s) tested and number of samples () 2006-2007	Aluminium (3), Antimony (3), Arsenic (3), Barium (3), Boron (3), Cadmium (3), Calcium (3), Chloride (3), Chromium (3), Copper (3), E.Coli (51), Flouride (3), Iodine (3), Iron (3), Lead (3), Magnesium (3), Manganese (3), Mercury (3), Molybdenum (3), Nickel (3), Nitrate (3), Nitrite (3), pH (3), Selenium (3), Silver (3), Sodium (3), Sulfate (3), Total Coliforms (51), Total Dissolved Solids (TDS) (3), Total Hardness as CaCO3 (3), True Colour (3), Turbidity (3), Zinc (3)		
% compliance for water quality parameters achieving < 100%, 2007-2008	Iron	0	
	Total Coliforms	48	
Parameter(s) tested and number of samples () 2007-2008	Aluminium (2), Antimony (2), Arsenic (2), Barium (2), Boron (2), Cadmium (2), Calcium (2), Chloride (2), Chromium (2), Copper (2), E.Coli (50), Flouride (2), Iodine (2), Iron (2), Lead (2), Magnesium (2), Manganese (2), Mercury (2), Molybdenum (2), Nickel (2), Nitrate (2), Nitrite (2), pH (2), Selenium (2), Silver (2), Sodium (2), Sulfate (2), Total Coliforms (50), Total Dissolved Solids (TDS) (2), Total Hardness as CaCO3 (2), True Colour (2), Turbidity (2), Zinc (2)		
WATER SECURITY	Current Water Restrictions	Yes. Level 2. The use of sprinklers & watering systems is permitted seven (7) days a week between the hours of 3pm and 6pm; garden watering is permitted seven (7) days a week between 3pm and 6pm daily, with trigger nozzle hand held hoses only; no pool filling, top ups only; washing of vehicles is permitted on lawn areas, with trigger nozzle hand held hoses only; hosing of pavements is NOT permitted unless for health reasons as approved by Council; the Mayor and General Manager are to approve volumes for industrial and commercial users.	
	Proportion of Potable Water Supplied to Households (%)	Unknown	
	Distance from the Coast (km)	~ 200km	
	Climate	Temperate (BoM, 2005)	
	Average Annual Rainfall	791mm (Source: BoM station number 72043)	
FACTOR		YES / NO	NOTES / EXPLANATION
SE) and Water Supply	Drought	No	Classified as 'Marginal' according to NSW DPI Drought Map October 2009.
	Single drinking water source	No	Council also use Burra Creek for supply. The GHD Draft Drought Mitigation Strategy also states that Council have recently commissioned a new groundwater bore. Further work is currently being commissioned to enlarge the Tumbarumba Reservoir.
	Poor quality water source	Yes	GHD report suggests poor quality in Tumbarumba Creek.
	Sewage overflow or disposal into water source		
	Flooding		
	Fauna defecating in supply	Yes	Open water source, and very low compliance with Total Coliforms.
	Fauna destroying water intake structures	No	
	Natural mineral pollutants (e.g. uranium, nitrates, iron, flouride)	Yes	Historical non-compliances with metals.
	Un-lined landfills		

WATER QUALITY OR SECURITY RISK (CAU)	Catchment	Extensive agriculture	Yes	Grazing, timber, grapes, horticulture, fishing and other agriculture industries.
		Low vegetation cover (dust, sediment runoff)	No	Local clearing, but township is close to the Bago State Forest, which is an extensive tract of vegetated forest.
		Poor access to supply	No	
		Unsustainable water extraction	Yes	The town draws water from a major regulated river with reduced flow.
		Aquifer turning saline due to high extraction	No	
		Hard water	No	Compliant with guidelines for hardness.
		Aging or inadequate pipework and associated infrastructure	Yes	Inadequate supply. Council is undertaking works to improve the situation.
		Significant water losses due to leaking pipes	Unknown	The GHD Drought Mitigation Strategy did not include water losses in the water balance - these were considered negligible.
		High per capita water consumption	Unknown	No confident description of per capita consumption.
		Inappropriate water quality standards / objectives	No	Council reports to NSW Health who use ADWG.
	Governance	Lack of infrastructure maintenance	No	
		Poor management or governance	No	
		Vandalism / sabotage / terrorism	No	
		Insufficient trained personnel	No	
		Inadequate funding for maintenance or upgrades	No	Currently commissioning and undertaking upgrades.
	Industries	Mining / minerals	No	
		Irrigation	Yes	Some.
		Chemicals / process	Yes	Grapes/wine industry.
	Population	Seasonal population loadings	No	Tourism industry, but doesn't appear to be highly seasonal.
		Rapid population growth	No	Negative population growth between the 2001 and 2006 Census.
WATER QUALITY OR SECURITY RISK (EFFECT)		Bacteriological and / or viral contamination	Yes	Total coliforms non-compliant.
		Algal blooms		
		Heavy metal contamination	Yes	
		Poor chlorine residuals	Unknown	Free chlorine is not tested.
		Pesticide contamination	Unknown	Not tested.
		High suspended solids	Yes	33% compliance for turbidity in 06-07 reporting period.
		Boil water notices	No	
		Deaths or illness due to water quality	No	
		Water restrictions (current and historic)	Yes	
		Taste and odour issues	No	
		Other contamination that would affect health		
		Notes	2 water service complaints per 1000 customers in the 07-08 reporting period.	

Town # 33

TOWN	State/Territory	NSW	
	Town Name	Berrigan	
	Town Population	1,000 (NSW Health, 2009); 899 (Census 2006, Urban Centre/Locality)	
WATER UTILITY	Name of Water Utility	Berrigan Shire Council	
	Council Web-Link	http://www.berriganshire.nsw.gov.au/	
	Rate (\$/kL)	\$0.90/kL (treated supply), \$0.45/kL unfiltered supply (dual supply).	
CATCHMENT AND WATER SUPPLY	Per Capita Water Consumption (L/day)	220L/day. 114ML treated to potable in 07-08 period (DECCW inventory of NSW water utilities).	
	Number of Connections	3,490	
	Catchment	Murray River	
	Sub-Catchment	-	
	Catchment Management Authority (CMA)	Murray River	
	CMA Web-Link	http://www.murray.cma.nsw.gov.au/	
	Catchment Protection Status	None.	
WATER QUALITY	Potable Water Source(s)	Berrigan Channel (watercourse) Murray River (watercourse)	
	Supply Capacity	Unknown. Capacity of the treatment plant is 1ML/day.	
	Treatment Plant(s)	Yes	
	Level of Treatment	Filtration, flocculation, coagulation, sedimentation, chlorination, fluoridation.	
	Drinking Water Guidelines	ADWG 2004 (NSW Health)	
		NSW Health Monitoring Location: BR02-Berrigan	
	% compliance for water quality parameters achieving < 100%, 2003-2004	Fluoride (daily WSA)	97
		Fluoride (weekly WSA)	99
		Fluoride Ratio	91
		Total Coliforms	98
	Parameter(s) tested and number of samples () 2003-2004	Aluminium (2), Antimony (2), Arsenic (2), Barium (2), Boron (2), Cadmium (2), Calcium (2), Chloride (2), Chromium (2), Copper (2), Cyanide (2), E.Coli (49), Fluoride (11), Fluoride (daily WSA) (366), Fluoride (field result WSA) (11), Fluoride (weekly WSA) (104), Fluoride Ratio (11), Iodine (2), Iron (2), Lead (2), Magnesium (2), Manganese (2), Mercury (2), Molybdenum (2), Nickel (2), Nitrate (2), Nitrite (2), pH (2), Selenium (2), Silver (2), Sodium (2), Sulfate (2), Total Coliforms (49), Total Dissolved Solids (TDS) (2), Total Hardness as CaCO3 (2), True Colour (1), Turbidity (2), Zinc (2)	
	% compliance for water quality parameters achieving < 100%, 2004-2005	Fluoride (daily WSA)	93
		Fluoride (weekly WSA)	93
		Fluoride Ratio	75
	Parameter(s) tested and number of samples () 2004-2005	Aluminium (2), Antimony (2), Arsenic (2), Barium (2), Boron (2), Cadmium (2), Calcium (2), Chloride (2), Chromium (2), Copper (2), Cyanide (2), E.Coli (45), Fluoride (12), Fluoride (daily WSA) (367), Fluoride (field result WSA) (12), Fluoride (weekly WSA) (104), Fluoride Ratio (12), Iodine (2), Iron (2), Lead (2), Magnesium (2), Manganese (2), Mercury (2), Molybdenum (2), Nickel (2), Nitrate (2), Nitrite (2), pH (2), Selenium (2), Silver (2), Sodium (2), Sulfate (2), Total Coliforms (45), Total Dissolved Solids (TDS) (2), Total Hardness as CaCO3 (2), True Colour (2), Turbidity (2), Zinc (2)	
	% compliance for water quality parameters achieving < 100%, 2005-2006	Fluoride (daily WSA)	90
		Fluoride (weekly WSA)	97
	Parameter(s) tested and number of samples () 2005-2006	Aluminium (1), Antimony (1), Arsenic (1), Barium (1), Boron (1), Cadmium (1), Calcium (1), Chloride (1), Chromium (1), Copper (1), E.Coli (47), Fluoride (11), Fluoride (daily WSA) (366), Fluoride (field result WSA) (11), Fluoride (weekly WSA) (100), Fluoride Ratio (11), Iodine (1), Iron (1), Lead (1), Magnesium (1), Manganese (1), Mercury (1), Molybdenum (1), Nickel (1), Nitrate (1), Nitrite (1), pH (1), Selenium (1), Silver (1), Sodium (1), Sulfate (1), Total Coliforms (47), Total Dissolved Solids (TDS) (1), Total Hardness	
	% compliance for water quality parameters achieving < 100%, 2006-2007	Fluoride (daily WSA)	82
		Fluoride (weekly WSA)	94
		Iron	50
		Total Coliforms	98
	Parameter(s) tested and number of samples () 2006-2007	Aluminium (2), Antimony (2), Arsenic (2), Barium (2), Boron (2), Cadmium (2), Calcium (2), Chloride (2), Chromium (2), Copper (2), E.Coli (44), Fluoride (12), Fluoride (daily WSA) (366), Fluoride (field result WSA) (12), Fluoride (weekly WSA) (96), Fluoride Ratio (12), Iodine (2), Iron (2), Lead (2), Magnesium (2), Manganese (2), Mercury (2), Molybdenum (2), Nickel (2), Nitrate (2), Nitrite (2), pH (2), Selenium (2), Silver (2), Sodium (2), Sulfate (2), Total Chlorine (29), Total Coliforms (44), Total Dissolved Solids (TDS) (2), Total Hardness as CaCO3 (2), True Colour (2), Turbidity (2), Zinc (2)	
	% compliance for water quality parameters achieving < 100%, 2007-2008	Fluoride (daily WSA)	97
	Parameter(s) tested and number of samples () 2007-2008	Aluminium (2), Antimony (2), Arsenic (2), Barium (2), Boron (2), Cadmium (2), Calcium (2), Chloride (2), Chromium (2), Copper (2), E.Coli (42), Fluoride (10), Fluoride (daily WSA) (366), Fluoride (field result WSA) (10), Fluoride (weekly WSA) (102), Fluoride Ratio (10), Free Chlorine (1), Iodine (2), Iron (2), Lead (2), Magnesium (2), Manganese (2), Mercury (2), Molybdenum (2), Nickel (2), Nitrate (2), Nitrite (2), pH (2), Selenium (2), Silver (2), Sodium (2), Sulfate (2), Total Chlorine (35), Total Coliforms (42), Total Dissolved Solids (TDS) (2), Total Hardness as CaCO3 (2), True Colour (2), Turbidity (2), Zinc (2)	
WATER SECURITY	Current Water Restrictions	Yes. Stage 2. Gardens and lawns can be watered on specified watering days from 7 am to 9 am and 6 pm to 8 pm on allocation days (odds and evens system), with a hand-held hose fitted with trigger nozzle or with a watering can or bucket or by a manual dripper system and/or movable sprinklers operating through a tap timer or by an automatic watering system from Midnight to 4am on allocated days.	
	Proportion of Potable Water Supplied to Households (%)	Unknown. Annual household consumption = 250KL in 07-08.	
	Distance from the Coast (km)	~ 410km	
	Climate	Temperate/Grassland (on the border of both climatic regions) (BoM, 2005)	
	Average Annual Rainfall	294mm (Source: BoM station number 74009, period 2006-2008)	
Water Supply	FACTOR	YES / NO	NOTES / EXPLANATION
	Drought	Yes	Classified as 'In Drought' according to NSW DPI Drought Map October
	Single drinking water source	No	
	Poor quality water source	No	Compliance is pretty good, except for iron results in 06-07 period. Water treatment plant appears effective.
	Sewage overflow or disposal into water	No	No reports of sewer overflows in Regional SoE Report 07-08.
	Flooding	No	No report of recent flooding in the Regional SoE Report 07-08.
	Fauna defecating in supply	Yes	Open water sources. Should not be an issue due to water treatment plant.
	Fauna destroying water intake structures	No	
	Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	Yes	Iron.
	Un-lined landfills	Yes	Berrigan annual report states that Council is required by law to restore the present tip sites. Assume this may include some form of leachate/lining issue.

WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and	Extensive agriculture	Yes	
		Low vegetation cover (dust, sediment runoff)	Yes	
		Poor access to supply	No	
		Unsustainable water extraction	Yes	Water restrictions, plus the town draws from the Murray, which is a river subject to interstate processes.
		Aquifer turning saline due to high extraction	No	Murray River showed reasonable results for the 07-08 reporting period (Regional SoE Report, 07-08).
		Hard water	No	Hardness was compliant for the reporting period.
		Aging or inadequate pipe work and associated infrastructure	Yes	Last upgrade or retrofit was completed in 1990.
		Significant water losses due to leaking pipes	Yes	In 2006, 100ML were lost from the raw water supply, and 64ML was lost from the treated water supply.
	Governance	High per capita water consumption	No	Per capita consumption is ok for this region, although it is still higher than Melbourne, who have an average per capita consumption of 170L/day (Berrigan Demand Management Plan, 2006).
		Inappropriate water quality standards / objectives	No	Council reports to NSW Health who use ADWG.
		Lack of infrastructure maintenance	No	
		Poor management or governance	No	
		Vandalism / sabotage / terrorism	No	
		Insufficient trained personnel		
	Industries	Inadequate funding for maintenance or upgrades		
		Mining / minerals	Yes	Pine Lodge Gravel Pit for the supply of road making materials, sand and
		Irrigation	Yes	Stated on the Council website to be their major industry.
	Population	Chemicals / process		
		Seasonal population loadings	No	No reports of high seasonal loadings for the area on Council website or in Regional SoE Report.
	Rapid population growth	No	Negative population growth between the 2001 and 2006 Census.	
WATER QUALITY OR SECURITY RISK (EFFECT)	Bacteriological and / or viral contamination	No		
	Algal blooms	No	One outbreak in the previous year (07) that lasted 8 weeks.	
	Heavy metal contamination	Yes	Poor historical compliance regarding Iron.	
	Poor chlorine residuals	Unknown	Free chlorine is not tested.	
	Pesticide contamination	Unknown	Pesticides are not tested.	
	High suspended solids	No		
	Boil water notices	No		
	Deaths or illness due to water quality			
	Water restrictions (current and historic)	Yes		
	Taste and odour issues	No	No water quality complaints recorded in the DECCW inventory of NSW Water Utilities.	
	Other contamination that would affect	No	None reported.	
Notes		RAMROC are facilitating the Water4Food program, which is a community-based program aimed at maintaining a dialogue between the community and government bodies regarding the provision of water for food production.		

Town # 34

TOWN	State/Territory	NSW	
	Town Name	Narrandera	
	Town Population	5,000 (NSW Health, 2009); 3,961 (Census 2006, Urban Centre/Locality)	
WATER UTILITY	Name of Water Utility	Narrandera Shire Council	
	Council Web-Link	http://www.narrandera.nsw.gov.au/cmst/n/nova.asp	
	Rate (\$/kL)	\$0.595 per kL plus \$200 access charge per annum	
	Per Capita Water Consumption (L/day)	Unknown (not reported in the Murray Regional Organisation of Councils SoE Report, 07-08).	
	Number of Connections	2010	
CATCHMENT AND WATER SUPPLY	Catchment	Murrumbidgee	
	Sub-Catchment	-	
	Catchment Management Authority (CMA)	Murrumbidgee	
	CMA Web-Link	http://www.murrumbidgee.cma.nsw.gov.au/	
	Catchment Protection Status	None	
	Potable Water Source(s)	Narrandera Bore (groundwater)	
	Supply Capacity	Unknown	
WATER QUALITY	Treatment Plant(s)	None	
	Level of Treatment	Aeration and chlorination	
	Drinking Water Guidelines	ADWG 2004 (NSW Health)	
		NSW Health Monitoring Location: ND01-Narrandera	
	% compliance for water quality parameters achieving < 100%, 2003-2004	Aluminium	91
		Iodide	67
		Iodine	45
	Parameter(s) tested and number of samples () 2003-2004	Aluminium (11), Antimony (11), Arsenic (11), Barium (11), Boron (11), Cadmium (11), Calcium (11), Chloride (11), Chromium (11), Copper (11), Cyanide (11), E.Coli (70), Fluoride (11), Iodide (3), Iodine (11), Iron (11), Lead (11), Magnesium (11), Manganese (11), Mercury (11), Molybdenum (11), Nickel (11), Nitrate (11), Nitrite (11), pH (11), Selenium (11), Silver (11), Sodium (11), Sulfate (11), Total Coliforms (70), Total Dissolved Solids (TDS) (11), Total Hardness as CaCO3 (11), True Colour (5), Turbidity (11), Zinc (11)	
	% compliance for water quality parameters achieving < 100%, 2004-2005	Aluminium	86
		Iodine	0
		Lead	86
		Total Coliforms	93
	Parameter(s) tested and number of samples () 2004-2005	Aluminium (7), Antimony (7), Arsenic (7), Barium (7), Boron (7), Cadmium (7), Calcium (7), Chloride (7), Chromium (7), Copper (7), E.Coli (61), Fluoride (7), Iodide (7), Iodine (7), Iron (7), Lead (7), Magnesium (7), Manganese (7), Mercury (7), Molybdenum (7), Nickel (7), Nitrate (7), Nitrite (7), pH (7), Selenium (7), Silver (7), Sodium (7), Sulfate (7), Total Coliforms (61), Total Dissolved Solids (TDS) (7), Total Hardness as CaCO3 (7), True Colour (7), Turbidity (7), Zinc (7)	
	% compliance for water quality parameters achieving < 100%, 2005-2006	Iodine	0
		Iron	70
		Turbidity	90
	Parameter(s) tested and number of samples () 2005-2006	Aluminium (10), Antimony (10), Arsenic (10), Barium (10), Boron (10), Cadmium (10), Calcium (10), Chloride (10), Chromium (10), Copper (10), E.Coli (65), Fluoride (10), Iodide (8), Iodine (10), Iron (10), Lead (10), Magnesium (10), Manganese (10), Mercury (10), Molybdenum (10), Nickel (10), Nitrate (10), Nitrite (10), pH (17), Selenium (10), Silver (10), Sodium (10), Sulfate (10), Total Coliforms (65), Total Dissolved Solids (TDS) (10), Total Hardness as CaCO3 (10), True Colour (10), Turbidity (10), Zinc (10)	
	% compliance for water quality parameters achieving < 100%, 2006-2007	Iodine	73
		Iron	91
		Total Coliforms	99
	Parameter(s) tested and number of samples () 2006-2007	Aluminium (11), Antimony (11), Arsenic (11), Barium (11), Boron (11), Cadmium (11), Calcium (11), Chloride (11), Chromium (11), Copper (11), E.Coli (72), Fluoride (11), Iodide (3), Iodine (11), Iron (11), Lead (11), Magnesium (11), Manganese (11), Mercury (11), Molybdenum (11), Nickel (11), Nitrate (11), Nitrite (11), pH (11), Selenium (11), Silver (11), Sodium (11), Sulfate (11), Total Coliforms (72), Total Dissolved Solids (TDS) (11), Total Hardness as CaCO3 (11), True Colour (11), Turbidity (11), Zinc (11)	
	% compliance for water quality parameters achieving < 100%, 2007-2008	E. coli	95
		Iodine	67
		Iron	75
		Lead	83
		Total Coliforms	90
	Parameter(s) tested and number of samples () 2007-2008	Aluminium (12), Antimony (12), Arsenic (12), Barium (12), Boron (12), Cadmium (12), Calcium (12), Chloride (12), Chromium (12), Copper (12), E.Coli (78), Fluoride (12), Iodide (5), Iodine (12), Iron (12), Lead (12), Magnesium (12), Manganese (12), Mercury (12), Molybdenum (12), Nickel (12), Nitrate (12), Nitrite (12), pH (12), Selenium (12), Silver (12), Sodium (12), Sulfate (12), Total Coliforms (78), Total Dissolved Solids (TDS) (12), Total Hardness as CaCO3 (12), True Colour (12), Turbidity (12), Zinc (12)	
	WATER SECURITY	Current Water Restrictions	Yes. No fixed sprinkler, no washing cars (Narrandera Shire Council SoE Report, 07-08).
Proportion of Potable Water Supplied to Households (%)		Unknown	
Distance from the Coast (km)		~ 380km	
Climate		Grassland (BoM, 2005)	
Average Annual Rainfall		450mm (according to Council website)	
FACTOR		YES / NO	NOTES / EXPLANATION
	Drought	Yes	Classified as 'In Drought' according to NSW DPI Drought Map October 2009)

WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Single drinking water source	Yes	Council have attempted to provide multiple groundwater sources for drinking, but have had issues with bores collapsing and the water being high in iron and manganese.
		Poor quality water source	Yes	Iron content in one groundwater bore means it is now inoperable.
		Sewage overflow or disposal into water	No	No reports of sewer overflows.
		Flooding	No	
		Fauna defecating in supply	No	Drinking water source is groundwater bore.
		Fauna destroying water intake structures	No	
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	Yes	Bore water is high in iron and manganese and is slightly corrosive (Council website and Narrandera Shire Council SoE Report, 07-08).
		Un-lined landfills	No	No reports of unlined landfills in the area.
		Extensive agriculture	Yes	Pig farming, flour mill and aquaculture identified in the Murray Regional Organisation of Councils SoE Report (07-08).
		Low vegetation cover (dust, sediment	Yes	
		Poor access to supply	Yes	
		Unsustainable water extraction	Yes	Current supply is not adequate. Council have attempted to access more groundwater but have not been successful.
		Aquifer turning saline due to high extraction	Yes	Reports of salinity issues in Narrandera. Water table only 3 metres under surface in some locations.
		Hard water	No	
		Aging or inadequate pipe work and associated infrastructure	Yes	One of Council's operating bores collapsed.
		Significant water losses due to leaking	No	No report of water losses.
	Governance	High per capita water consumption	Unknown	Water consumption per capita unknown.
		Inappropriate water quality standards / objectives	No	Reports to NSW Health, who use ADWG.
		Lack of infrastructure maintenance	No	
		Poor management or governance	Yes	Groundwater bores have been installed and abandoned due to high levels of iron and manganese in supply.
		Vandalism / sabotage / terrorism	No	
		Insufficient trained personnel	Yes	Groundwater bores have been installed and abandoned due to high levels of iron and manganese in supply.
		Inadequate funding for maintenance or upgrades	Yes	Issues with groundwater bore have not yet been resolved.
	Industries	Mining / minerals	No	
		Irrigation	Yes	
		Chemicals / process	No	
	Population	Seasonal population loadings	No	No report of seasonal population loadings.
		Rapid population growth	Yes	Average annual population growth between 2001 and 2006 = 4%, which is greater than the NSW average of 1.6% (ABS, 2009).
WATER QUALITY OR SECURITY RISK (EFFECT)	Bacteriological and / or viral contamination	Yes	5% of samples were non-compliant for the 07-08 reporting period (NSW Health, 2009).	
	Algal blooms	No	According to the Murray Regional Organisation of Councils SoE Report,	
	Heavy metal contamination	Yes	See 07-08 water quality results (NSW Health, 2009).	
	Poor chlorine residuals	Yes	Free chlorine not sampled.	
	Pesticide contamination	No	Pesticides were not sampled for the reporting period.	
	High suspended solids	No		
	Boil water notices	Yes	Boil water alert issued on the 27 March 2007.	
	Deaths or illness due to water quality	No		
	Water restrictions (current and historic)	Yes		
	Taste and odour issues	Yes	High iron content in bore water.	
	Other contamination that would affect health	Yes	Salinity issues in the area (Murray Regional Organisation of Councils SoE Report, 07-08).	
Notes			According to the Council website, options are currently being investigated to improve water quality.	

Town # 35

TOWN	State/Territory	NSW	
	Town Name	Yamba	
	Town Population	4,700 (NSW Health, 2009); 5,514 (Census 2006, Urban Centre/Locality)	
WATER UTILITY	Name of Water Utility	Clarence Valley Council	
	Council Web-Link	http://www.clarence.nsw.gov.au/cmst/cvc009/nova.asp	
	Rate (\$/kL)	\$2.30/kL	
	Per Capita Water Consumption (L/day)	Unknown.	
CATCHMENT AND WATER SUPPLY	Number of Connections	20560	
	Catchment	Northern Rivers	
	Sub-Catchment	Lower Clarence	
	Catchment Management Authority (CMA)	Northern Rivers	
	CMA Web-Link	http://www.northern.cma.nsw.gov.au/map_nrcma.php	
	Catchment Protection Status	Appears to be in or near a Wild Rivers Catchment.	
	Potable Water Source(s)	Nymboida River (watercourse) Rushforth Reservoir (surface storage)	
	Supply Capacity	Rushforth Rd Reservoir	100ML
		Additional reservoir	32ML
		On 19th October 2009, Clarence Valley Council were supplying 341 ML/day, and consumption was 20.48ML (Clarence Valley Council website).	
WATER QUALITY	Treatment Plant(s)	None	
	Level of Treatment	Chloramination, Fluoridation: Raw water from Nymboida River is initially held in the 100 ML reservoir at Rushforth Rd, South Grafton, where algae are destroyed by electronic pulse emissions. Sediment is allowed to settle to the bottom, and water is taken from mid level of the 100ML reservoir to the 32 ML reservoir. Before the water enters the 32 ML reservoir it is disinfected with a mixture of chlorine and ammonia (chloramination). Fluoride is also added at this stage, at the rate of 1ppm. From the 32 ML reservoir the water is transferred into the trunk (pipe) system.	
	Drinking Water Guidelines	ADWG 2004 (NSW Health)	
		NSW Health Monitoring Location: CV08-Lower Clarence	
	% compliance for water quality parameters achieving < 100%, 2003-2004	Aluminium	86
		E. coli	96
		Fluoride (daily WSA)	93
		Fluoride (weekly WSA)	90
		Fluoride Ratio	90
		Molybdenum	93
		pH	93
		Thermotolerant Coliforms	95
		Total Coliforms	5
	Parameter(s) tested and number of samples () 2003-2004	Aluminium (14), Antimony (14), Arsenic (14), Barium (14), Boron (14), Cadmium (14), Calcium (14), Chloride (14), Chromium (14), Copper (14), Cyanide (14), E.Coli (303), Fluoride (14), Fluoride (daily WSA) (334), Fluoride (field result WSA) (10), Fluoride (weekly WSA) (92), Fluoride Ratio (10), Iodine (14), Iron (14), Lead (14), Magnesium (14), Manganese (14), Mercury (14), Molybdenum (14), Nickel (14), Nitrate (14), Nitrite (14), pH (14), Selenium (14), Silver (14), Sodium (14), Sulfate (14), Thermotolerant Coliforms (303), Total Coliforms (303), Total Dissolved Solids (TDS) (14), Total Hardness as CaCO3 (14), True Colour (6), Turbidity (14), Zinc (14)	
	% compliance for water quality parameters achieving < 100%, 2004-2005	Aluminium	83
		E. coli	98
		Fluoride (daily WSA)	95
		Iron	92
		Thermotolerant Coliforms	98
		Total Coliforms	7
	Parameter(s) tested and number of samples () 2004-2005	Aluminium (12), Antimony (12), Arsenic (12), Barium (12), Boron (12), Cadmium (12), Calcium (12), Chloride (12), Chromium (12), Copper (12), Cyanide (2), E.Coli (298), Fluoride (12), Fluoride (daily WSA) (361), Fluoride (field result WSA) (8), Fluoride (weekly WSA) (100), Fluoride Ratio (8), Iodine (12), Iron (12), Lead (12), Magnesium (12), Manganese (12), Mercury (12), Molybdenum (12), Nickel (12), Nitrate (12), Nitrite (12), pH (12), Selenium (12), Silver (12), Sodium (12), Sulfate (12), Thermotolerant Coliforms (298), Total Coliforms (298), Total Dissolved Solids (TDS) (12), Total Hardness as CaCO3 (12), True Colour (12), Turbidity (12), Zinc (12)	
	% compliance for water quality parameters achieving < 100%, 2005-2006	E. coli	98
		Fluoride (daily WSA)	92
		Fluoride (weekly WSA)	96
		Iron	92
		pH	85
		Thermotolerant Coliforms	99
		Total Coliforms	6
	Parameter(s) tested and number of samples () 2005-2006	Aluminium (13), Antimony (13), Arsenic (13), Barium (13), Boron (13), Cadmium (13), Calcium (13), Chloride (13), Chromium (13), Copper (13), E.Coli (67), Fluoride (13), Fluoride (daily WSA) (361), Fluoride (field result WSA) (11), Fluoride (weekly WSA) (90), Fluoride Ratio (11), Iodine (13), Iron (13), Lead (13), Magnesium (13), Manganese (13), Mercury (13), Molybdenum (13), Nickel (13), Nitrate (13), Nitrite (13), pH (13), Selenium (13), Silver (13), Sodium (13), Sulfate (13), Thermotolerant Coliforms (284), Total Coliforms (298), Total Dissolved Solids (TDS) (13), Total Hardness as CaCO3 (13), True Colour (13), Turbidity (13), Zinc (13)	
	% compliance for water quality parameters achieving < 100%, 2006-2007	E. coli	99
		Fluoride (daily WSA)	98
		Iron	64
		pH	91
		Thermotolerant Coliforms	99
		Total Coliforms	14
	Parameter(s) tested and number of samples () 2006-2007	Aluminium (11), Antimony (11), Arsenic (11), Barium (11), Boron (11), Cadmium (11), Calcium (11), Chloride (11), Chromium (11), Copper (11), E.Coli (297), Fluoride (11), Fluoride (daily WSA) (296), Fluoride (field result WSA) (9), Fluoride (weekly WSA) (78), Fluoride Ratio (9), Iodine (11), Iron (11), Lead (11), Magnesium (11), Manganese (11), Mercury (11), Molybdenum (11), Nickel (11), Nitrate (11), Nitrite (11), pH (11), Selenium (11), Silver (11), Sodium (11), Sulfate (11), Thermotolerant Coliforms (257), Total Coliforms (297), Total Dissolved Solids (TDS) (11), Total Hardness as CaCO3 (11), True Colour (11), Turbidity (11), Zinc (11)	
	% compliance for water quality parameters	Fluoride (daily WSA)	98

		70 compliance for water quality parameters achieving < 100%, 2007-2008	Iron	70	
		Parameter(s) tested and number of samples () 2007-2008	Total Coliforms	11	
WATER SECURITY		Current Water Restrictions	Yes. The use of sprinklers and fixed hoses are banned permanently between 9.00am and 4.00pm every day.		
		Proportion of Potable Water Supplied to Households (%)	Unknown.		
		Distance from the Coast (km)	0km		
		Climate	Subtropical (BoM, 2005)		
		Average Annual Rainfall	1340mm (Source: BoM station number 58012, period 2004-2008)		
FACTOR			YES / NO	NOTES / EXPLANATION	
WATER QUALITY OR SECURITY RISK (CAUSE)		Catchment and Water Supply	Drought	No	Classified as 'Satisfactory' according to NSW DPI Drought Map October
			Single drinking water source	Yes	
			Poor quality water source	Yes	Very high levels of faecal contamination.
			Sewage overflow or disposal into water	Yes	High faecal contamination. Potentially due to sewer overflows.
			Flooding	Yes	History of flooding in this region.
			Fauna defecating in supply	Yes	
			Fauna destroying water intake structures	No	
			Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	Yes	Iron.
			Un-lined landfills	No	
			Extensive agriculture	Yes	
			Low vegetation cover (dust, sediment runoff)	No	
			Poor access to supply	No	
			Unsustainable water extraction	Yes	Environmental flows affected (Clarence Valley Council website).
			Aquifer turning saline due to high extraction	No	Not reported as an issue.
			Hard water	No	
		Governance	Aging or inadequate pipe work and associated infrastructure	No	
			Significant water losses due to leaking	No	
			High per capita water consumption	No	
			Inappropriate water quality standards / objectives	No	Council reports to NSW Health, who use ADWG.
			Lack of infrastructure maintenance	No	
			Poor management or governance	No	
		Industries	Vandalism / sabotage / terrorism	No	
			Insufficient trained personnel	No	
			Inadequate funding for maintenance or upgrades	No	
		Population	Mining / minerals	Unknown	
			Irrigation	Yes	
			Chemicals / process	Unknown	
WATER QUALITY OR SECURITY RISK (EFFECT)	Seasonal population loadings	Yes	Peak season occurs in Summer.		
	Rapid population growth	No	Negative population growth between the 2001 and 2006 Census.		
	Bacteriological and / or viral contamination	Yes	Total Coliform levels are very high, and some non-compliances for E.Coli.		
	Algal blooms	No	None reported.		
	Heavy metal contamination	No			
	Poor chlorine residuals	Yes	Free Chlorine not sampled.		
	Pesticide contamination	No			
	High suspended solids	No			
	Boil water notices	No	No record of boil water notices in NSW Health summary spreadsheet.		
	Deaths or illness due to water quality	No			
Water restrictions (current and historic)	Yes				
Taste and odour issues	Yes	Iron non-compliances.			
Other contamination that would affect	Yes	Very high contamination by faecal coliforms.			
Notes			Council is currently undertaking major sewage augmentation, that will incorporate a major reuse component. Have constructed a Regional Water Supply Strategy with Coffs Harbour Council (see http://cvchws.gov.com.au/).		

Town # 36				
TOWN	State/Territory	NSW		
	Town Name	Bega		
	Town Population	4,250 (NSW Health, 2009); 4,537 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility	Bega Valley Shire Council		
	Council Web-Link	www.begavalley.nsw.gov.au		
	Rate (\$/kL)	\$2.10/kL		
	Per Capita Water Consumption (L/day)	Unknown. Residential water use = 1800ML/Yr for 07-08 reporting period.		
CATCHMENT AND WATER SUPPLY	Number of Connections	13,800		
	Catchment	Southern Rivers		
	Sub-Catchment	Bega River		
	Catchment Management Authority (CMA)	Southern Rivers		
	CMA Web-Link	http://www.southern.cma.nsw.gov.au/		
	Catchment Protection Status	None		
	Potable Water Source(s)	Bega Bores (groundwater)		
WATER QUALITY	Supply Capacity	Unknown. ~ 3300ML of reticulated water was consumed in the shire for the 07-08 reporting period.		
	Treatment Plant(s)	None		
	Level of Treatment	Chlorination, fluoridation.		
	Drinking Water Guidelines	ADWG 2004 (NSW Health)		
		NSW Health Monitoring Location:		
	% compliance for water quality parameters achieving < 100%, 2003-2004	Fluoride (daily WSA)	57	
		Fluoride Ratio	71	
		Total Coliforms	98	
	Parameter(s) tested and number of samples () 2003-2004	Aluminium (12), Antimony (12), Arsenic (12), Barium (12), Boron (12), Cadmium (12), Calcium (12), Chloride (12), Chromium (12), Copper (12), Cyanide (12), E.Coli (91), Fluoride (12), Fluoride (daily WSA) (327), Fluoride (field result WSA) (7), Fluoride Ratio (7), Iodine (12), Iron (12), Lead (12), Magnesium (12), Manganese (12), Mercury (12), Molybdenum (12), Nickel (12), Nitrate (12), Nitrite (12), pH (12), Selenium (12), Silver (12), Sodium (12), Sulfate (12), Total Coliforms (91), Total Dissolved Solids (TDS) (12), Total Hardness as CaCO3 (12), True Colour (5), Turbidity (12), Zinc (12)		
	% compliance for water quality parameters achieving < 100%, 2004-2005	Fluoride (daily WSA)	80	
		Fluoride Ratio	82	
		Total Coliforms	99	
	Parameter(s) tested and number of samples () 2004-2005	Aluminium (12), Antimony (12), Arsenic (12), Barium (12), Boron (12), Cadmium (12), Calcium (12), Chloride (12), Chromium (12), Copper (12), Cyanide (2), E.Coli (89), Fluoride (12), Fluoride (daily WSA) (339), Fluoride (field result WSA) (11), Fluoride Ratio (11), Iodine (12), Iron (12), Lead (12), Magnesium (12), Manganese (12), Mercury (12), Molybdenum (12), Nickel (12), Nitrate (12), Nitrite (12), pH (12), Selenium (12), Silver (12), Sodium (12), Sulfate (12), Total Coliforms (89), Total Dissolved Solids (TDS) (12), Total Hardness as CaCO3 (12), True Colour (12), Turbidity (12), Zinc (12)		
	% compliance for water quality parameters achieving < 100%, 2005-2006	Fluoride (daily WSA)	76	
		Fluoride Ratio	89	
		Total Coliforms	99	
	Parameter(s) tested and number of samples () 2005-2006	Aluminium (11), Antimony (11), Arsenic (11), Barium (11), Boron (11), Cadmium (11), Calcium (11), Chloride (11), Chromium (11), Copper (11), E.Coli (88), Fluoride (11), Fluoride (daily WSA) (339), Fluoride (field result WSA) (9), Fluoride Ratio (9), Iodine (11), Iron (11), Lead (11), Magnesium (11), Manganese (11), Mercury (11), Molybdenum (11), Nickel (11), Nitrate (11), Nitrite (11), pH (11), Selenium (11), Silver (11), Sodium (11), Sulfate (11), Total Coliforms (72), Total Dissolved Solids (TDS) (11), Total Hardness as CaCO3 (11), True Colour (11), Turbidity (11), Zinc (11)		
	% compliance for water quality parameters achieving < 100%, 2006-2007	Fluoride (daily WSA)	79	
		Fluoride (weekly WSA)	80	
		Total Coliforms	97	
	Parameter(s) tested and number of samples () 2006-2007	Aluminium (10), Antimony (10), Arsenic (10), Barium (10), Boron (10), Cadmium (10), Calcium (10), Chloride (10), Chromium (10), Copper (10), E.Coli (98), Fluoride (10), Fluoride (daily WSA) (343), Fluoride (field result WSA) (7), Fluoride (weekly WSA) (109), Fluoride Ratio (7), Iodine (10), Iron (10), Lead (10), Magnesium (10), Manganese (10), Mercury (10), Molybdenum (10), Nickel (10), Nitrate (10), Nitrite (10), pH (17), Selenium (10), Silver (10), Sodium (10), Sulfate (10), Total Coliforms (98), Total Dissolved Solids (TDS) (10), Total Hardness as CaCO3 (10), True Colour (10), Turbidity (10), Zinc (10)		
% compliance for water quality parameters achieving < 100%, 2007-2008	Fluoride (daily WSA)	62		
	Fluoride (weekly WSA)	52		
	Fluoride Ratio	89		
	Iron	92		
	Total Coliforms	99		
Parameter(s) tested and number of samples () 2007-2008	Aluminium (12), Antimony (12), Arsenic (12), Barium (12), Boron (12), Cadmium (12), Calcium (12), Chloride (12), Chromium (12), Copper (12), E.Coli (114), Fluoride (12), Fluoride (daily WSA) (333), Fluoride (field result WSA) (9), Fluoride (weekly WSA) (85), Fluoride Ratio (9), Free Chlorine (1), Iodine (12), Iron (12), Lead (12), Magnesium (12), Manganese (12), Mercury (12), Molybdenum (12), Nickel (12), Nitrate (12), Nitrite (12), pH (12), Selenium (12), Silver (12), Sodium (12), Sulfate (12), Total Coliforms (114), Total Dissolved Solids (TDS) (12), Total Hardness as CaCO3 (12), True Colour (12), Turbidity (12), Zinc (12)			
WATER SECURITY	Current Water Restrictions	No domestic water restrictions advertised on the Council website, but irrigation water allocation was zero from July - September 2009.		
	Proportion of Potable Water Supplied to Households (%)	60%		
	Distance from the Coast (km)	~ 29km		
	Climate	Temperate		
	Average Annual Rainfall	608mm (Source: BoM station number 69139, period 2004-2008)		
FACTOR		YES / NO	NOTES / EXPLANATION	
E)	nd Water Supply	Drought	Yes	Classified as 'In Drought' according to NSW DPI Drought Map October
		Single drinking water source	Yes	
		Poor quality water source	No	Good compliance even though only using disinfection and fluoridation.
		Sewage overflow or disposal into water	Yes	Estimated volume accidentally discharged in the 07-08 reporting period =
		Flooding	Yes	Occasional flooding in the region.
		Fauna defecating in supply	No	Groundwater source.
		Fauna destroying water intake structures	No	
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	Yes	Iron.
		Un-lined landfills		
		Extensive agriculture	Yes	Strong dairy and beef cattle industry.

WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment & Infrastructure	Low vegetation cover (dust, sediment runoff)	No	Extensive clearing for agriculture in the local Bega area, but good ground cover with grasses and crops.
		Poor access to supply	No	
		Unsustainable water extraction	No	No water restrictions.
		Aquifer turning saline due to high extraction	No	No issues with salt detected in the water quality testing.
		Hard water	No	Compliant with hardness.
		Aging or inadequate pipe work and associated infrastructure		
		Significant water losses due to leaking	Unknown	
	Governance	High per capita water consumption	Unknown	
		Inappropriate water quality standards / objectives	No	Council reports to NSW Health who use ADWG.
		Lack of infrastructure maintenance	No	Council are active in maintenance and gaining funding for upgrades.
		Poor management or governance	No	
		Vandalism / sabotage / terrorism	No	
		Insufficient trained personnel	No	
		Inadequate funding for maintenance or upgrades	No	
	Industries	Mining / minerals		
		Irrigation	Yes	
		Chemicals / process	No	
	Population	Seasonal population loadings	Yes	Large tourism industry.
		Rapid population growth	No	Average yearly population growth = 0.50% in comparison to the state average of 1.6% for the same period (2001-2006) (ABS, 2009).
WATER QUALITY OR SECURITY RISK (EFFECT)		Bacteriological and / or viral contamination	No	
		Algal blooms	No	
		Heavy metal contamination	No	
		Poor chlorine residuals	No	Only one test completed.
		Pesticide contamination	Unknown	
		High suspended solids	No	Compliant for this parameter.
		Boil water notices	No	
		Deaths or illness due to water quality		
		Water restrictions (current and historic)	Yes	Historic water restrictions. Recent restrictions on irrigation allocations.
		Taste and odour issues	Yes	Taste issues.
		Other contamination that would affect health		
Notes				

Town # 37

TOWN	State/Territory	NSW	
	Town Name	Bundanoon	
	Town Population	2 228 (NSW Health, 2009); 2,035 (Census 2006, Urban Centre/Locality)	
WATER UTILITY	Name of Water Utility	Wingecarribee Shire Council	
	Council Web-Link	http://www.wsc.nsw.gov.au	
	Rate (\$/kL)	\$2.05/kL	
	Per Capita Water Consumption (L/day)	Unknown. 5,273ML used for residential consumption, Wingecarribee Shire Council SoE Report, 07-08.	
CATCHMENT AND WATER SUPPLY	Number of Connections	17,870	
	Catchment	Southern Rivers	
	Sub-Catchment	Shoalhaven	
	Catchment Management Authority (CMA)	Southern Rivers	
	CMA Web-Link	http://www.southern.cma.nsw.gov.au/	
	Catchment Protection Status	None	
WATER QUALITY	Potable Water Source(s)	Bundanoon Creek Dam (surface storage)	
	Supply Capacity	Unknown	
	Treatment Plant(s)	Yes	
	Level of Treatment	Flocculation, coagulation, filtration, dissolved air flotation,	
	Drinking Water Guidelines	ADWG 2004 (NSW Health)	
		NSW Health Monitoring Location: WI03-Bundanoon	
	% compliance for water quality parameters achieving < 100%, 2003-2004	E. coli	99
		Fluoride (daily WSA)	81
		Fluoride (weekly WSA)	69
		Fluoride Ratio	60
		Total Coliforms	86
	Parameter(s) tested and number of samples () 2003-2004	Aluminium (12), Antimony (12), Arsenic (12), Barium (12), Boron (12), Cadmium (12), Calcium (12), Chloride (12), Chromium (12), Copper (12), Cyanide (4), E.Coli (276), Fluoride (12), Fluoride (daily WSA) (367), Fluoride (field result WSA) (10), Fluoride (weekly WSA) (48), Fluoride Ratio (10), Iodine (12), Iron (12), Lead (12), Magnesium (12), Manganese (12), Mercury (12), Molybdenum (12), Nickel (12), Nitrate (12), Nitrite (12), pH (12), Selenium (12), Silver (12), Sodium (12), Sulfate (12), Total Coliforms (276), Total Dissolved Solids (TDS) (12), Total Hardness as CaCO3 (12), True Colour (12), Turbidity (12), Zinc (12)	
	% compliance for water quality parameters achieving < 100%, 2004-2005	Aluminium	92
		E. coli	99
		Fluoride (daily WSA)	77
		Fluoride (weekly WSA)	61
		Fluoride Ratio	67
	Total Coliforms	86	
	Parameter(s) tested and number of samples () 2004-2005	Aluminium (12), Antimony (12), Arsenic (12), Barium (12), Boron (12), Cadmium (12), Calcium (12), Chloride (12), Chromium (12), Copper (12), Cyanide (2), E.Coli (271), Fluoride (12), Fluoride (daily WSA) (367), Fluoride (field result WSA) (12), Fluoride (weekly WSA) (46), Fluoride Ratio (12), Iodine (12), Iron (12), Lead (12), Magnesium (12), Manganese (12), Mercury (12), Molybdenum (12), Nickel (12), Nitrate (12), Nitrite (12), pH (12), Selenium (12), Silver (12), Sodium (12), Sulfate (12), Total Coliforms (271), Total Dissolved Solids (TDS) (12), Total Hardness as CaCO3 (12), True Colour (12), Turbidity (12), Zinc (12)	
	% compliance for water quality parameters achieving < 100%, 2005-2006	Aluminium	92
Fluoride (daily WSA)		73	
Fluoride (weekly WSA)		73	
Fluoride Ratio		82	
pH		77	
Total Coliforms	87		
Parameter(s) tested and number of samples () 2005-2006	Aluminium (13), Antimony (13), Arsenic (13), Barium (13), Boron (13), Cadmium (13), Calcium (13), Chloride (13), Chromium (13), Copper (13), E.Coli (267), Fluoride (13), Fluoride (daily WSA) (364), Fluoride (field result WSA) (11), Fluoride (weekly WSA) (66), Fluoride Ratio (11), Iodine (13), Iron (13), Lead (13), Magnesium (13), Manganese (13), Mercury (13), Molybdenum (13), Nickel (13), Nitrate (13), Nitrite (13), pH (13), Selenium (13), Silver (13), Sodium (13), Sulfate (13), Total Coliforms (267), Total Dissolved Solids (TDS) (13), Total Hardness as CaCO3 (13), True Colour (13), Turbidity (13), Zinc (13)		
% compliance for water quality parameters achieving < 100%, 2006-2007	Fluoride (daily WSA)	74	
	Fluoride (weekly WSA)	76	
	Fluoride Ratio	91	
	pH	91	
	Total Coliforms	91	
Parameter(s) tested and number of samples () 2006-2007	Aluminium (11), Antimony (11), Arsenic (11), Barium (11), Boron (11), Cadmium (11), Calcium (11), Chloride (11), Chromium (11), Copper (11), E.Coli (280), Fluoride (11), Fluoride (daily WSA) (365), Fluoride (field result WSA) (11), Fluoride (weekly WSA) (75), Fluoride Ratio (11), Iodine (11), Iron (11), Lead (11), Magnesium (11), Manganese (11), Mercury (11), Molybdenum (11), Nickel (11), Nitrate (11), Nitrite (11), pH (11), Selenium (11), Silver (11), Sodium (11), Sulfate (11), Total Coliforms (280), Total Dissolved Solids (TDS) (11), Total Hardness as CaCO3 (11), True Colour (11), Turbidity (11)		
% compliance for water quality parameters achieving < 100%, 2007-2008	Fluoride (daily WSA)	78	
	Fluoride (weekly WSA)	50	
	Fluoride Ratio	71	
	pH	83	
	Total Coliforms	93	
Parameter(s) tested and number of samples () 2007-2008	Aluminium (12), Antimony (12), Arsenic (12), Barium (12), Boron (12), Cadmium (12), Calcium (12), Chloride (12), Chromium (12), Copper (12), E.Coli (281), Fluoride (12), Fluoride (daily WSA) (230), Fluoride (field result WSA) (10), Fluoride (weekly WSA) (54), Fluoride Ratio (7), Iodine (12), Iron (12), Lead (12), Magnesium (12), Manganese (12), Mercury (12), Molybdenum (12), Nickel (12), Nitrate (12), Nitrite (12), pH (12), Selenium (12), Silver (12), Sodium (12), Sulfate (12), Total Coliforms (281), Total Dissolved Solids (TDS) (12), Total Hardness as CaCO3 (12), True Colour (12), Turbidity (12), Zinc (12)		
SECURITY	Current Water Restrictions	Yes. Level 1. Hand held hoses on the garden at any time of the day or night. Hosing of hard surfaces like paths, driveways, paved areas and houses is banned. Cars can be washed anytime with a bucket, then hosed off with a hand held hose fitted with a trigger nozzle. Fixed hoses and sprinklers may be used at any time during the months of April to October inclusive. Fixed hoses and sprinklers can be used in the morning from 7am to 10am and at night from 6pm to 9pm on any day during the months of November to March inclusive. Drip irrigation systems can be used at any time.	

WATER		Proportion of Potable Water Supplied to Households (%)		Unknown	
		Distance from the Coast (km)		~ 50km	
		Climate		Temperate	
		Average Annual Rainfall		972mm (Source: BoM station number 68100, period 2004-2008)	
FACTOR				YES / NO	NOTES / EXPLANATION
WATER QUALITY OR SECURITY RISK (CAUSE)		Catchment and Water Supply	Drought	Yes	Classified as 'In Drought' according to NSW DPI Drought Map October 2009.
			Single drinking water source	Yes	
			Poor quality water source		
			Sewage overflow or disposal into water		
			Flooding		
			Fauna defecating in supply	Yes	Open water source. Faecal coliform bacteria levels are high, and increase dramatically with rain events. Dry weather sources are probably direct faecal contamination by unfenced stock (Wingecarribee Shire Council SoE Report 07-08).
			Fauna destroying water intake structures	No	
			Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)		
			Un-lined landfills	Yes	Incidences of illegal dumping are high in the shire.
			Extensive agriculture		
			Low vegetation cover (dust, sediment)		
			Poor access to supply	No	
			Unsustainable water extraction		
			Aquifer turning saline due to high extraction		
			Hard water	No	Compliant for hardness.
			Aging or inadequate pipe work and associated infrastructure		
		Significant water losses due to leaking			
		Governance	High per capita water consumption		
			Inappropriate water quality standards / objectives	No	Council reports to NSW Health, who use ADWG.
			Lack of infrastructure maintenance		
			Poor management or governance		
			Vandalism / sabotage / terrorism		
			Insufficient trained personnel		
		Industries	Inadequate funding for maintenance or upgrades	No	Council has ~\$100,000 water fund surplus for the 07-08 period.
			Mining / minerals	Yes	26 quarries and 2 coal mines operate in the Wingecarribee Shire.
			Irrigation	Yes	
			Chemicals / process		
		Population	Seasonal population loadings		
			Rapid population growth		
		WATER QUALITY OR SECURITY RISK (EFFECT)		Bacteriological and / or viral contamination	Yes
Algal blooms				Nutrient levels (P&N) routinely exceed guideline values in many locations (Wingecarribee Shire Council SoE Report, 07-08).	
Heavy metal contamination					
Poor chlorine residuals					
Pesticide contamination					
High suspended solids	Yes			Turbidity levels are high, and correlate with soil and bank erosion, level of development and impervious surfaces (Wingecarribee Shire Council SoE Report, 07-08).	
Boil water notices					
Deaths or illness due to water quality					
Water restrictions (current and historic)					
Taste and odour issues					
Other contamination that would affect					
Notes					

Town # 38

TOWN	State/Territory	NSW		
	Town Name	Tenterfield		
	Town Population	3300 (NSW Health, 2009); 2,035 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility	Tenterfield Shire Council		
	Council Web-Link	http://www.tenterfield.nsw.gov.au/		
	Rate (\$/kL)	\$1.45/kL (domestic supply for 08/09 period, Tenterfield Shire Council Annual Report, 07-08) and \$3.30/kL for bulk water purchases (Tenterfield Revenue Policy, 07-08)		
	Per Capita Water Consumption (L/day)	148L/day. Based on 54.08kL/person/yr (Tenterfield SoE Report, 07-08) and 2006 Census population statistics. Water use in the Tenterfield Shire = 369,563kL for the 07-08 reporting period (Tenterfield SoE Report, 07-08).		
	Number of Connections	1780		
CATCHMENT AND WATER SUPPLY	Catchment	Border Rivers - Gwydir		
	Sub-Catchment	Border Rivers		
	Catchment Management Authority (CMA)	Border Rivers - Gwydir		
	CMA Web-Link	http://brq.cma.nsw.gov.au/index.php?page=home_page		
	Catchment Protection Status	None.		
	Potable Water Source(s)	Tenterfield Creek Dam (dam on watercourse) (NSW Health) Shirley Park Bore (Tenterfield Shire Council Annual Report, 07-08)		
	Supply Capacity	Tenterfield Creek Dam total storage = 1300ML (Tenterfield Shire Council Annual Report, 07-08) Shirley Park Bore = licensed annual yield 160ML (Tenterfield Shire Council Annual Report, 07-08)		
WATER QUALITY	Treatment Plant(s)	Yes. Water Treatment Plant. Average weekly production 6.6ML.		
	Level of Treatment	Tertiary		
	Treatment Process	Filtration, coagulation, sedimentation, powdered activated carbon, soda ash, chlorination (NSW Health, 2009).		
	Drinking Water Guidelines	ADWG 2004 (NSW Health)		
		NSW Health Monitoring Location: TF01-Tenterfield		
	% compliance for water quality parameters achieving < 100%, 2003-2004	Total Coliforms	43	
	Parameter(s) tested and number of samples () 2003-2004	E.Coli (30), Thermotolerant Coliforms (30), Total Coliforms (30)		
	% compliance for water quality parameters achieving < 100%, 2004-2005	Total Coliforms	53	
	Parameter(s) tested and number of samples () 2004-2005	E.Coli (36), Thermotolerant Colifrms (36), Total Coliforms (36)		
	% compliance for water quality parameters achieving < 100%, 2005-2006	Total Coliforms	82	
	Parameter(s) tested and number of samples () 2005-2006	E.Coli (33), Thermotolerant Colifrms (33), Total Coliforms (33)		
	% compliance for water quality parameters achieving < 100%, 2006-2007	Lead	50	
		Total Coliforms	98	
	Parameter(s) tested and number of samples () 2006-2007	Aluminium (1), Antimony (2), Arsenic (2), Barium (2), Boron (2), Cadmium (2), Calcium (1), Chloride (1), Chromium (2), Copper (2), Cyanide (1), E.Coli (42), Fluoride (2), Iodide (1), Iodine (1), Iron (2), Lead (2), Magnesium (2), Manganese (2), Mercury (2), Molybdenum (2), Nickel (2), Nitrate (2), Nitrite (2), pH (2), Selenium (2), Silver (2), Sodium (2), Sulfate (2), Thermotolerant Coliforms (42), Total Coliforms (42), Total Dissolved Solids (TDS) (2), Total Hardness as CaCO3 (2), True Colour (1), Turbidity (2), Zinc (1)		
% compliance for water quality parameters achieving < 100%, 2007-2008	Total Coliforms	86		
Parameter(s) tested and number of samples () 2007-2008	E.Coli (36), Thermotolerant Coliforms (27), Total Coliforms (36)			
WATER SECURITY	Current Water Restrictions	Yes. Level 1 water restrictions. Fixed hoses/sprinklers 2 hrs/day between 530 and 730pm daily. Micro-sprays/garden watering systems 2 hrs/day between 530 and 730pm daily.		
	Proportion of Potable Water Supplied to Households (%)	Unknown		
	Distance from the Coast (km)	~ 130km		
	Climate	Temperate		
	Average Annual Rainfall	850mm (Tenterfield SoE Report, 07-08)		
FACTOR		YES / NO	NOTES / EXPLANATION	
RISK (CAUSE)	Catchment and Water Supply	Drought	No	Classified as 'Satisfactory/Marginal' according to NSW DPI Drought Map October 2009.
		Single drinking water source	Yes	
		Poor quality water source	Yes	
		Sewage overflow or disposal into water source	Yes	Tenterfield STP was constructed for 2000EP and was processing approximately 3500EP until recently (~2008). The STP was found to be non-compliant with its environment protection license, as the effluent had non-compliant pH and Total Suspended Solids levels. Effluent is discharged to Tenterfield Creek. A new STP is currently being constructed (IDAL technology is being used).
		Flooding	Yes	Severe flooding in January 2008 (Tenterfield Shire Council Annual Report, 07-08).
		Fauna defecating in supply	Yes	Drinking water source is river water.
		Fauna destroying water intake structures	No	
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	No	Unlikely that lead is naturally occurring in the drinking water.
		Un-lined landfills	Yes	No reports of unlined landfills but illegal dumping is an ongoing issue in the Shire (Tenterfield Shire Council Annual Report, 07-08).
		Extensive agriculture	Yes	Vegetable production. Sheep and cattle grazing. Rapid expansion of timber plantations on private land since 2002. (Tenterfield Shire Council Annual Report, 07-08).
		Low vegetation cover (dust, sediment runoff)	Yes	Council receives complaints regarding dust (from unsealed roads and cleared land) however no complaints were received for the 07-08 reporting period.
		Poor access to supply	No	
		Unsustainable water extraction	Yes	Water restrictions in place.
		Aquifer turning saline due to high extraction	No	No reports of salinity issues for the area.

WATER QUALITY OR SECURITY RISK (EFFECT)	WATER QUALITY OR SECURITY RISK (EFFECT)	Hard water	No	
		Aging or inadequate pipe work and associated infrastructure	Yes	Dam built in 1930 and upgraded in 1974. Water treatment plant built in 1930 and upgraded in 1958 and 1985.
		Significant water losses due to leaking pipes	Yes	Council is one of 34 Water Supply Authorities in NSW that has secured funding from the Federal Government for the investigation and implementation of a Water Loss Reduction Program. Stage 1 of the works, involving the investigation of the Tenterfield Water reticulation system and reservoirs for water losses due to leaks, etc has been completed by a consultant. The results indicate that further investigation is required to ascertain the extent and location of the water loss within Tenterfield . This work will be undertaken in 2008/09 by a contractor. (Tenterfield Annual Report, 07-08).
	Governance	High per capita water consumption	No	Lower than Aus average of 285L/day.
		Inappropriate water quality standards / objectives	No	Council reports to NSW Health who use ADWG.
		Lack of infrastructure maintenance	No	Council have undertaken infrastructure upgrades as required and are currently awaiting the completion of a new sewage treatment plant (Tenterfield Shire Council Annual Report, 07-08).
		Poor management or governance	No	
		Vandalism / sabotage / terrorism	No	
		Insufficient trained personnel	No	
		Inadequate funding for maintenance or upgrades	Yes	Council's planned upgrades were delayed (installation of fluoridation unit and sewage treatment plant upgrades) due to inadequate funding.
	Industries	Mining / minerals	No	
		Irrigation	Yes	
		Chemicals / process	No	
Population	Seasonal population loadings	No	Negative population growth between the 2001 and 2006 Census.	
	Rapid population growth	No	Population growth was negative (approximately 7% change) for the period between the 2001 and 2006 Census.	
WATER QUALITY OR SECURITY RISK (EFFECT)	Bacteriological and / or viral contamination	Yes	Some issues with Total Coliforms.	
	Algal blooms	No	None reported.	
	Heavy metal contamination	Yes	Non-compliance issues for lead (see above).	
	Poor chlorine residuals	Yes	Free Chlorine is not measured.	
	Pesticide contamination	No		
	High suspended solids	No		
	Boil water notices	No		
	Deaths or illness due to water quality	No		
	Water restrictions (current and historic)	Yes		
	Taste and odour issues	No		
Other contamination that would affect	No			
Notes			Council received higher than normal dirty water complaints between January and March 2008. Council has planned a program of scour to rectify the issue (Tenterfield Shire Council Annual Report, 07-08).	

Town #		39	
TOWN	State/Territory	NSW	
	Town Name	Corowa	
	Town Population	5,500 (NSW Health, 2009); 5,628 (Census 2006, (Corowa Part) Urban Centre/Locality)	
WATER UTILITY	Name of Water Utility	Corowa Shire Council	
	Council Web-Link	http://www.corowa.nsw.gov.au/	
	Rate (\$/kL)	Unknown.	
	Per Capita Water Consumption (L/day)	Unknown. Average annual water use per household = 220kL.	
CATCHMENT AND WATER SUPPLY	Number of Connections	4800	
	Catchment	Murray River	
	Sub-Catchment	-	
	Catchment Management Authority (CMA)	Murray River	
	CMA Web-Link	http://www.murray.cma.nsw.gov.au/	
	Catchment Protection Status	None.	
WATER QUALITY	Potable Water Source(s)	Murray River (watercourse)	
	Supply Capacity	Unknown	
	Treatment Plant(s)	Yes. Mulwala Filtration Plant, Gulai Road, Mulwala	
	Level of Treatment	Dissolved Air Flotation, Coagulation, Chlorination	
	Drinking Water Guidelines	ADWG 2004 (NSW Health)	
	NSW Health Monitoring Location: CW01-Corowa		
	% compliance for water quality parameters achieving < 100%, 2003-2004	pH	75
	Parameter(s) tested and number of samples () 2003-2004	Total Coliforms	98
		Aluminium (12), Antimony (12), Arsenic (12), Barium (12), Boron (12), Cadmium (12), Calcium (12), Chloride (12), Chromium (12), Copper (12), Cyanide (12), E.Coli (47), Fluoride (12), Iodine (12), Iron (12), Lead (12), Magnesium (12), Manganese (12), Mercury (12), Molybdenum (12), Nickel (12), Nitrate (12), Nitrite (12), pH (12), Selenium (12), Silver (12), Sodium (12), Sulfate (12), Total Coliforms (47), Total Dissolved Solids (TDS) (12), Total Hardness as CaCO3 (12), True Colour (5), Turbidity (12), Zinc (12)	
	% compliance for water quality parameters achieving < 100%, 2004-2005	pH	83
Parameter(s) tested and number of samples () 2004-2005	Aluminium (12), Antimony (12), Arsenic (12), Barium (12), Boron (12), Cadmium (12), Calcium (12), Chloride (12), Chromium (12), Copper (12), Cyanide (2), E.Coli (51), Fluoride (12), Iodine (12), Iron (12), Lead (12), Magnesium (12), Manganese (12), Mercury (12), Molybdenum (12), Nickel (12), Nitrate (12), Nitrite (12), pH (12), Selenium (12), Silver (12), Sodium (12), Sulfate (12), Total Coliforms (51), Total Dissolved Solids (TDS) (12), Total Hardness as CaCO3 (12), True Colour (12), Turbidity (12), Zinc (12)		
	Aluminium (12), Antimony (12), Arsenic (12), Barium (12), Boron (12), Cadmium (12), Calcium (12), Chloride (12), Chromium (12), Copper (12), E.Coli (51), Fluoride (12), Iodine (12), Iron (12), Lead (12), Magnesium (12), Manganese (12), Mercury (12), Molybdenum (12), Nickel (12), Nitrate (12), Nitrite (12), pH (12), Selenium (12), Silver (12), Sodium (12), Sulfate (12), Total Coliforms (51), Total Dissolved Solids (TDS) (12), Total Hardness as CaCO3 (12), True Colour (12), Turbidity (12), Zinc (12)		
% compliance for water quality parameters achieving < 100%, 2005-2006	Fluoride (daily WSA)	86	
	Fluoride (weekly WSA)	67	
Parameter(s) tested and number of samples () 2005-2006	pH	75	
	Total Coliforms	96	
% compliance for water quality parameters achieving < 100%, 2006-2007	Aluminium (12), Antimony (12), Arsenic (12), Barium (12), Boron (12), Cadmium (12), Calcium (12), Chloride (12), Chromium (12), Copper (12), E.Coli (49), Fluoride (12), Fluoride (daily WSA) (22), Fluoride (field result WSA) (1), Fluoride (weekly WSA) (6), Iodine (12), Iron (12), Lead (12), Magnesium (12), Manganese (12), Mercury (12), Molybdenum (12), Nickel (12), Nitrate (12), Nitrite (12), pH (12), Selenium (12), Silver (12), Sodium (12), Sulfate (12), Total Coliforms (49), Total Dissolved Solids (TDS) (12), Total Hardness as CaCO3 (12), True Colour (12), Turbidity (12), Zinc (12)		
	pH	64	
Parameter(s) tested and number of samples () 2006-2007	Total Coliforms	96	
	Aluminium (11), Antimony (11), Arsenic (11), Barium (11), Boron (11), Cadmium (11), Calcium (11), Chloride (11), Chromium (11), Copper (11), E.Coli (45), Fluoride (11), Iodine (11), Iron (11), Lead (11), Magnesium (11), Manganese (11), Mercury (11), Molybdenum (11), Nickel (11), Nitrate (11), Nitrite (11), pH (11), Selenium (11), Silver (11), Sodium (11), Sulfate (11), Total Coliforms (45), Total Dissolved Solids (TDS) (11), Total Hardness as CaCO3 (11), True Colour (11), Turbidity (11), Zinc (11)		
% compliance for water quality parameters achieving < 100%, 2007-2008	Aluminium	92	
	pH	67	
Parameter(s) tested and number of samples () 2007-2008	Total Coliforms	98	
	Aluminium (12), Antimony (12), Arsenic (12), Barium (12), Boron (12), Cadmium (12), Calcium (12), Chloride (12), Chromium (12), Copper (12), E.Coli (50), Fluoride (12), Iodine (12), Iron (12), Lead (12), Magnesium (12), Manganese (12), Mercury (12), Molybdenum (12), Nickel (12), Nitrate (12), Nitrite (12), pH (12), Selenium (12), Silver (12), Sodium (12), Sulfate (12), Total Coliforms (50), Total Dissolved Solids (TDS) (12), Total Hardness as CaCO3 (12), True Colour (12), Turbidity (12), Zinc (12)		
WATER SECURITY	Current Water Restrictions	Yes. Stage 3A water restrictions. 4 hours of garden watering per week (7.00am – 8.00am and 6.00pm – 7.00pm, 2 days per week); odd numbered houses Tuesday and Saturday; even numbered houses Wednesday and Sunday; no lawn watering allowed; car washing with hand held hose with trigger nozzle allowed on lawn any time.	
	Proportion of Potable Water Supplied to Households (%)	Unknown.	
	Distance from the Coast (km)	~ 340km	
	Climate	Temperate	
	Average Annual Rainfall	455mm (Source: BoM station number 69139, period 2004-2008)	
FACTOR		YES / NO	NOTES / EXPLANATION
d Water Supply	Drought	Yes	Classified as 'In Drought' according to NSW DPI Drought Map October 2009.
	Single drinking water source	Yes	
	Poor quality water source	Yes	Aluminium in supply, (NSW Health, 07-08 reporting period).
	Sewage overflow or disposal into water source	Yes	Effluent discharges from the Mulwala Sewage Treatment Works that exceeded the environment protection license standards (Murray Regional Organisation of Councils Annual Report, 07-08).
	Flooding	No	
	Fauna defecating in supply	Yes	Water supply is Murray River, which is likely to experience high wildlife activity.
	Fauna destroying water intake structures	No	
	Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	Yes	Aluminium (07-08).
	Un-lined landfills	No	No reports of unlined landfills.

WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment area	Extensive agriculture	Yes	Sheep, cattle and pig meat industries. Piggery feedlot and abattoir in the area.
		Low vegetation cover (dust, sediment runoff)	Yes	
		Poor access to supply	No	
		Unsustainable water extraction	Yes	Stage 3A water restrictions.
		Aquifer turning saline due to high extraction	Yes	Salinity is a reported issue.
		Hard water	No	Hardness levels are historically compliant.
		Aging or inadequate pipe work and associated infrastructure	No	Water filtration plant in use.
	Governance	Significant water losses due to leaking pipes	No	No indication of water losses.
		High per capita water consumption	No	Unknown per capita water consumption.
		Inappropriate water quality standards / objectives	No	Council reports to NSW Health, who use ADWG.
		Lack of infrastructure maintenance	No	
		Poor management or governance	No	
		Vandalism / sabotage / terrorism	No	
		Insufficient trained personnel	No	
	Industries	Inadequate funding for maintenance or upgrades	No	
		Mining / minerals	Yes	Sand and gravel extraction. Concrete production.
		Irrigation	Yes	Irrigation for meat industries.
Chemicals / process		Yes	Munitions production - dangerous goods, explosives, general chemicals storage, non-thermal treatment of hazardous and other waste, thermal treatment of hazardous waste (Thales Australia Limited). Thales Australia issued with a cleanup notice under their environment protection license.	
Population	Seasonal population loadings	No	Tourism is a growing industry.	
	Rapid population growth	No	Population growth = 1.1% between 2001 and 2006 Census, which is less than NSW population growth of 1.6% (ABS, 2009).	
WATER QUALITY OR SECURITY RISK (EFFECT)	Bacteriological and / or viral contamination	Yes	Total coliforms.	
	Algal blooms	Yes	Incidence of blue-green algae outbreak (lasting 6 months) reported for Corowa in the Murray Regional Organisation of Councils SoE Report, 07-08.	
	Heavy metal contamination	Yes		
	Poor chlorine residuals	Yes	Free chlorine is not measured.	
	Pesticide contamination	No	No reports of pesticide contamination.	
	High suspended solids	No		
	Boil water notices	No	No reported boil water notices.	
	Deaths or illness due to water quality	No		
	Water restrictions (current and historic)	Yes	Stage 3A water restrictions.	
	Taste and odour issues	No		
	Other contamination that would affect health	Yes	Salinity and acid sulfate soils reported to affect the Corowa Shire as reported in the Murray Regional Organisation of Councils SoE Report, 07-08.	
Notes				

Town # 40

TOWN	State/Territory	NSW	
	Town Name	Jindabyne East	
	Town Population	2095 (NSW Health)	
WATER UTILITY	Name of Water Utility	Snowy River Shire Council	
	Council Web-Link	http://www.snowyriver.nsw.gov.au/content/Public/Homepage.aspx	
	Rate (\$/kL)	\$1.61/kL	
	Per Capita Water Consumption (L/day)	Unknown	
	Number of Connections	3,900 (for Snowy River Shire Council system), DWE Annual Performance Report 07-08	
CATCHMENT AND WATER SUPPLY	Catchment	Southern Rivers	
	Sub-Catchment	-	
	Catchment Management Authority (CMA)	Southern Rivers	
	CMA Web-Link	www.southern.cma.nsw.gov.au	
	Catchment Protection Status	None. Some of the upstream area is the Snowy Mountains National Park.	
	Potable Water Source(s)	Lake Jindabyne (surface storage)	
	Supply Capacity	9ML/day; 217ML treated to potable in 07-08.	
WATER QUALITY	Treatment Plant(s)	No	
	Level of Treatment	Chlorination, fluoridation.	
	Drinking Water Guidelines	ADWG (Council reports to NSW Health)	
	NSW Health Monitoring Location: Supply System SR02		
	% compliance for water quality parameters achieving < 100%, 2003-2004	E. coli	96
		pH	50
		Total Coliforms	61
	Parameter(s) tested and number of samples () 2003-2004	Aluminium (2), Antimony (2), Arsenic (2), Barium (2), Boron (2), Cadmium (2), Calcium (2), Chloride (2), Chromium (2), Copper (2), Cyanide (2), E.Coli (49), Fluoride (12), Fluoride (daily WSA) (365), Fluoride (weekly WSA) (108), Iodine (2), Iron (2), Lead (2), Magnesium (2), Manganese (2), Mercury (2), Molybdenum (2), Nickel (2), Nitrate (2), Nitrite (2), pH (2), Selenium (2), Silver (2), Sodium (2), Sulfate (2), Total Coliforms (49), Total Dissolved Solids (TDS) (2), Total Hardness as CaCO3 (2), True Colour (1),	
	% compliance for water quality parameters achieving < 100%, 2004-2005	E. coli	98
		Fluoride (daily WSA)	92
		Fluoride (weekly WS	84
		Total Coliforms	84
	Parameter(s) tested and number of samples () 2004-2005	Aluminium (1), Antimony (1), Arsenic (1), Barium (1), Boron (1), Cadmium (1), Calcium (1), Chloride (1), Chromium (1), Copper (1), E.Coli (50), Fluoride (0), Fluoride (daily WSA) (365), Fluoride (weekly WSA) (108), Iodine (1), Iron (1), Lead (1), Magnesium (1), Manganese (1), Mercury (1), Molybdenum (1), Nickel (1), Nitrate (1), Nitrite (1), pH (1), Selenium (1), Silver (1), Sodium (1), Sulfate (1), Total Coliforms (50), Total Dissolved Solids (TDS) (1), Total Hardness as CaCO3 (1), True Colour (1), Turbidity	
	% compliance for water quality parameters achieving < 100%, 2005-2006	E. coli	98
		Fluoride (daily WSA)	62
		Fluoride (weekly WS	59
		Fluoride Ratio	25
		pH	50
		Total Coliforms	92
		Turbidity	50
	Parameter(s) tested and number of samples () 2005-2006	Aluminium (2), Antimony (2), Arsenic (2), Barium (2), Boron (2), Cadmium (2), Calcium (2), Chloride (2), Chromium (2), Copper (2), E.Coli (51), Fluoride (12), Fluoride (daily WSA) (223), Fluoride (field result WSA) (5), Fluoride (weekly WSA) (39), Fluoride Ratio (4), Iodine (2), Iron (2), Lead (2), Magnesium (2), Manganese (2), Mercury (2), Molybdenum (2), Nickel (2), Nitrate (2), Nitrite (2), pH (2), Selenium (2), Silver (2), Sodium (2), Sulfate (2), Total Coliforms (51), Total Dissolved Solids (TDS) (2), Total Hardness as CaCO3 (2), True Colour (2), Turbidity (2), Zinc (2)	
	% compliance for water quality parameters achieving < 100%, 2006-2007	E. coli	96
		Fluoride (daily WSA)	69
Fluoride (weekly WS		64	
Fluoride Ratio		73	
pH		67	
Total Coliforms		79	
Parameter(s) tested and number of samples () 2006-2007	Aluminium (3), Antimony (3), Arsenic (3), Barium (3), Boron (3), Cadmium (3), Calcium (3), Chloride (3), Chromium (3), Copper (3), E.Coli (53), Fluoride (11), Fluoride (daily WSA) (359), Fluoride (field result WSA) (11), Fluoride (weekly WSA) (47), Fluoride Ratio (11), Iodine (3), Iron (3), Lead (3), Magnesium (3), Manganese (3), Mercury (3), Molybdenum (3), Nickel (3), Nitrate (3), Nitrite (3), pH (3), Selenium (3), Silver (3), Sodium (3), Sulfate (3), Total Coliforms (53), Total Dissolved Solids (TDS) (3), Total Hardness as CaCO3 (3), True Colour (3), Turbidity (3), Zinc (3)		
% compliance for water quality parameters achieving < 100%, 2007-2008	E. coli	96	
	Fluoride (daily WSA)	75	
	Fluoride (field result	91	
	Fluoride (weekly WS	63	
	Fluoride Ratio	60	
	pH	67	
Parameter(s) tested and number of samples () 2007-2008	Aluminium (3), Antimony (3), Arsenic (3), Barium (3), Boron (3), Cadmium (3), Calcium (3), Chloride (3), Chromium (3), Copper (3), E.Coli (52), Fluoride (12), Fluoride (daily WSA) (283), Fluoride (field result WSA) (11), Fluoride (weekly WSA) (43), Fluoride Ratio (10), Iodine (3), Iron (3), Lead (3), Magnesium (3), Manganese (3), Mercury (3), Molybdenum (3), Nickel (3), Nitrate (3), Nitrite (3), pH (3), Selenium (3), Silver (3), Sodium (3), Sulfate (3), Total Coliforms (52), Total Dissolved Solids (TDS) (3), Total Hardness as CaCO3 (3), True Colour (3), Turbidity (3), Zinc (3)		
	Current Water Restrictions	No	

WATER SECURITY		Proportion of Potable Water Supplied to Households (%)		Unknown	
		Distance from the Coast (km)		130km	
		Climate		Sub-alpine (Southern Rivers CMA, 2009)	
		Average Annual Rainfall		534mm (Source: BoM station number 071021 Jindabyne (Lynwood), period 2004-2008)	
FACTOR				YES / NO	NOTES / EXPLANATION
WATER QUALITY OR SECURITY RISK (CAUSE)		Catchment and Water Supply	Drought	Yes	Classified as 'In Drought' according to NSW DPI Drought Map October 2009.
			Single drinking water source	Yes	
			Poor quality water source	No	Alpine region, lake/surface water supply.
			Sewage overflow or disposal into water	Yes	Media reports to suggest sewer overflow into supply.
			Flooding	No	
			Fauna defecating in supply	Yes	Surface water storage.
			Fauna destroying water intake structures	No	
			Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	No	Compliance with natural mineral pollutants is good.
			Un-lined landfills		
			Extensive agriculture	No	
			Low vegetation cover (dust, sediment)	No	
			Poor access to supply	No	
			Unsustainable water extraction	Yes	Visible draw down in the lake.
			Aquifer turning saline due to high		
			Hard water		
		Aging or inadequate pipe work and associated infrastructure	No	Last augmented/upgraded in 2007 (DWE, 07-08)	
		Significant water losses due to leaking			
		Governance	High per capita water consumption		
			Inappropriate water quality standards / objectives	No	Council reports to NSW Health who use ADWG.
			Lack of infrastructure maintenance	No	
			Poor management or governance	No	
			Vandalism / sabotage / terrorism	No	
			Insufficient trained personnel		
		Inadequate funding for maintenance or upgrades			
		Industries	Mining / minerals	No	
			Irrigation	No	
			Chemicals / process	No	
Population	Seasonal population loadings	Yes	Alpine region. Highly seasonal- winter peak.		
	Rapid population growth	No	1.1% (Regional SoE Report)		
WATER QUALITY OR SECURITY RISK (EFFECT)		Bacteriological and / or viral contamination	Yes	Ecoli non-compliances.	
		Algal blooms	No	None recorded on the DWE website as of 16th November 2009.	
		Heavy metal contamination	No	No record of heavy metals in water quality results.	
		Poor chlorine residuals		Free chlorine not tested.	
		Pesticide contamination		Pesticides not tested.	
		High suspended solids	No	Compliant for these parameters.	
		Boil water notices	Yes	2009 alert recorded on NSW Health database.	
		Deaths or illness due to water quality	Yes	Illnesses reported in the media due to contaminated drinking water.	
		Water restrictions (current and historic)	No	No current water restrictions.	
		Taste and odour issues			
		Other contamination that would affect health	No		
Notes					

Town Profiles – VIC

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Review of Regional Water Quality & Security

Appendices
Volume 2

Town # 41

TOWN	State/Territory	VIC		
	Town Name	Daylesford		
	Town Population	3,073 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility	Central Highlands Water		
	Rate (\$/kL)	Tier 1 \$1.30/kL, Tier 2 \$1.57/kL, Tier 3 \$1.96/kL		
	Per Capita Water Consumption (L/day)	435L/capita/day - under Stage 2 restrictions, 598L/capita/day - current unrestricted demand		
CATCHMENT AND WATER SUPPLY	Number of Connections	2,589		
	Catchment	Cairn Curran - Proclaimed Water Supply Catchment		
	Sub-Catchment	River Basin - Upper Loddon		
	Catchment Management Authority (CMA)	North Central Catchment Management Authority		
	CMA Web-Link	www.nccma.vic.gov.au/		
	Catchment Protection Status	Proclaimed Water Supply Catchment, good condition		
	Potable Water Source(s)	Wombat Reservoir - 568ML Bullarto Reservoir - 219ML Hepburn Reservoir - 35ML Wallaby Creek (drought relief only)		
	Supply Capacity	Combined Annual Entitlement - up to 916 ML in any year Wombat Reservoir Entitlement - < 5 ML per day Bullarto Reservoir Entitlement - < 2 ML per day Hepburn Reservoir Entitlement - < 0.5ML per day Wallaby Creek Entitlement - < 0.4ML per day		
	WATER QUALITY	Treatment Plant(s)	Daylesford WTP	
		Level of Treatment	Dissolved Air Flotation and Filtration (DAFF) plant with disinfection by chlorine	
Drinking Water Guidelines		Australian Drinking Water Guidelines (2004) and Safe Drinking Water Regulations (2005)		
Results (% compliance for the 07-08 reporting period)		E. Coli	Complied (100%)	
WATER SECURITY		Heavy Metals	100%	
		pH	Complied (based on overall average)	
	Current Water Restrictions	Yes Stage 2 - Started 17/12/06 For details refer to: http://www.ourwater.vic.gov.au/saving/restrictions		
	Proportion of Potable Water Supplied to Households (%)	Residential - 51% Industrial - 22% Concessional - 6% Non Revenue - 21%		
	Distance from the Coast (km)	Approx 100km South		
	Climate	Temperate		
	Average Annual Rainfall	579.5mm		
FACTOR		YES / NO	NOTES / EXPLANATION	
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	YES	Majority of Victoria experiencing drought (or Exceptional Circumstances, whereby farmers can apply for rebates) http://www.daff.gov.au/agriculture-food/drought/ec/victoria
		Single drinking water source	NO	
		Poor quality water source	NO	
		Sewage overflow or disposal into water	NO	
		Flooding		
		Fauna defecating in supply		
		Fauna destroying water intake structures		
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)		
		Un-lined landfills		
		Extensive agriculture		
		Low vegetation cover (dust, sediment)		
		Poor access to supply		
		Unsustainable water extraction		
		Aquifer turning saline due to high extraction		
		Hard water		
	Governance	Aging or inadequate pipe work and associated infrastructure		
		Significant water losses due to leaking pipes		
		High per capita water consumption	NO	
		Inappropriate water quality standards / objectives	NO	
		Lack of infrastructure maintenance		
	Industries	Poor management or governance		
		Vandalism / sabotage / terrorism		
		Insufficient trained personnel	?	
	Population	Inadequate funding for maintenance or upgrades	NO	
		Mining / minerals	NO	
		Irrigation	NO	
Chemicals / process		NO		
	Seasonal population loadings			
	Rapid population growth	NO	Decline in Population between 2001 and 2006	
OR SECURITY RISK (EFFECT)	Bacteriological and / or viral contamination	YES	Detection of E. coli in basin	
	Algal blooms	NO		
	Heavy metal contamination	NO		
	Poor chlorine residuals	NO		
	Pesticide contamination	NO		
	Boil water notices	NO		
	Deaths or illness due to water quality	NO		
	Water restrictions (current and historic)	YES	Stage 2 - Started 17/12/06	
	Taste and odour issues	NO		

WATER QUALITY (EF)	Other contamination that would affect health	YES	Sodium bisulfite entered water supply due to mislabelled chemical. Central Highlands Water advised that, in relation to the sodium bisulfite incident at the Daylesford treatment plant, the issue was due to mislabelled water treatment chemical being delivered to the treatment plant. The product was relabelled from the chemical manufacturer to the chemical distributor. Although a small amount of the product was dosed into the drinking water, no health risk was evident. The incident had prompted corrective action by the chemical distributor, to no longer rename and relabel the product.
Notes		Using long term historical inflow averages, the current likelihood of water restrictions in the Daylesford system is approximately 1 in 7 years (86% reliability of supply). While using a continued low inflow scenario water restrictions are likely to occur approximately 1 in every 4 years (74% reliability of supply).	

Town # 42

TOWN	State/Territory		VIC		
	Town Name		Maryborough		
	Town Population		7,692 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility		Central Highlands Water		
	Rate (\$/kL)		Tier 1 \$1.30/kL, Tier 2 \$1.57/kL, Tier 3 \$1.96/kL		
	Per Capita Water Consumption (L/day)		398L/day - under stage 2 restrictions, 586L/day - current unrestricted demand		
CATCHMENT AND WATER SUPPLY	Number of Connections		5,400		
	Catchment		Loddon River (Laanecoorie) - Proclaimed Water Supply Catchment		
	Sub-Catchment		River Basin - Upper Loddon		
	Catchment Management Authority (CMA)		North Central Catchment Management Authority		
	CMA Web-Link		www.nccma.vic.gov.au/		
	Catchment Protection Status		Proclaimed Water Supply Catchment, Poor to Moderate condition.		
	Potable Water Source(s)		Evansford - 1351ML		
			Talbot Reservoir - 846ML		
			Tullaroop Reservoir - 1200ML		
	Supply Capacity		Centenary Reservoir - 180ML		
Combined Annual Entitlement - Up to 300 ML in any year					
Evansford - < 6 ML per day					
Talbot Reservoir - < 2 ML per day					
WATER QUALITY	Treatment Plant(s)		Maryborough WTP		
	Level of Treatment		Conventional sedimentation and filtration plant with disinfection by chlorine		
	Drinking Water Guidelines		ADWG, 2004 and SDWG, 2005		
	Results (% compliance for the 07-08 reporting period)		Suspended Solids	Did not comply	
			Faecal Coliforms	100%	
WATER SECURITY	THM's, TDS, Hardness and Iron		Did not comply		
	Current Water Restrictions		Yes, Stage 4 - started 30/04/09		
	Proportion of Potable Water Supplied to Households (%)		Residential - 60% Industrial - 16% Concessional - 4% Non Revenue - 20%		
	Distance from the Coast (km)		Approx 150km south-east		
	Climate		Temperate		
Average Annual Rainfall		524 mm			
FACTOR				YES / NO	NOTES / EXPLANATION
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	YES	Severe drought conditions continued across Central Highland Water's area of operation during 2007-08. This created challenges to maintaining water quality with low reservoir levels, emergency supplies and limited resource for mains cleaning programs.	
		Single drinking water source	NO		
		Poor quality water source	YES		
		Sewage overflow or disposal into water	NO		
		Flooding			
		Fauna defecating in supply			
		Fauna destroying water intake structures			
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	YES	Iron levels did not comply with standards.	
		Un-lined landfills	NO		
		Extensive agriculture			
		Low vegetation cover (dust, sediment runoff)			
		Poor access to supply			
		Unsustainable water extraction			
		Aquifer turning saline due to high extraction			
		Hard water	YES	Hardness testing did not meet standards.	
	Governance	Aging or inadequate pipe work and associated infrastructure			
		Significant water losses due to leaking pipes			
		High per capita water consumption	NO		
		Inappropriate water quality standards / objectives	NO		
		Lack of infrastructure maintenance	Unknown	Issues associated with not having sufficient water for flushing mains	
		Poor management or governance	NO		
	Industries	Vandalism / sabotage / terrorism	NO		
		Insufficient trained personnel	Unknown		
		Inadequate funding for maintenance or upgrades			
	Population	Mining / minerals	NO		
		Irrigation	NO		
		Chemicals / process	NO		
WATER QUALITY OR SECURITY RISK (EFFECT)	Seasonal population loadings				
	Rapid population growth	NO			
	Bacteriological and / or viral contamination	YES	Detection of E. coli at Talbot break tank, Tank dosed with sodium hypochlorite and then re-		
	Algal blooms	YES	Centenary reservoir taken offline for a total of 13 days during the reporting period due to blue green algae break-outs. In each instance algacide dosing used to correct problem.		
	Heavy metal contamination	NO			
	Poor chlorine residuals				
	Pesticide contamination	NO			
	Boil water notices	NO			
	Deaths or illness due to water quality	NO			
	Water restrictions (current and historic)	YES	Stage 4 - started 30/04/09.		
Taste and odour issues	NO	Unknown			
Other contamination that would affect health	YES	Elevated trihalomethanes - Issue lasted 112 days. Chloramination plant commissioned after reporting period (November 2008).			
Notes		During the past year, temporary aerators have been used at Tullaroop Reservoir to help improve water quality and prevent algal blooms. Plans are in place to install a permanent aeration system to help improve source water quality.			

Town # 43

TOWN	State/Territory		VIC	
	Town Name		Warracknabeal	
	Town Population		2,490 (Census 2006, Urban Centre/Locality)	
WATER UTILITY	Name of Water Utility		Grampians Wimmera Mallee Water	
	Rate (\$/kL)		\$1.30/kL - fully treated water	
	Per Capita Water Consumption (L/day)		Unknown	
	Number of Connections		Unknown	
CATCHMENT AND WATER SUPPLY	Catchment		Wimmera	
	Sub-Catchment		Not within a designated catchment	
	Catchment Management Authority (CMA)		Wimmera Catchment Management Authority	
	CMA Web-Link		http://wcma.vic.gov.au	
	Catchment Protection Status		None.	
	Potable Water Source(s)		Previously the Wimmera-Mallee channel system - now supplied by the Wimmera Mallee Pipeline (this should result in WQ improvements).	
WATER QUALITY	Supply Capacity		Unknown	
	Treatment Plant(s)		Warracknabeal WTP	
	Level of Treatment		Coagulation, flocculation, dissolved air flotation, filtration, disinfection, pH correction.	
	Drinking Water Guidelines		Australian Drinking Water Guidelines (2004) and Safe Drinking Water Regulations (2005)	
	Results (% compliance for the 07-08 reporting period)		E.Coli	100%
WATER SECURITY			Aluminium and THM's	Did not comply with standards
	Current Water Restrictions		Yes Stage 4 - Started 10/02/09	
	Proportion of Potable Water Supplied to Households (%)		Unknown	
	Distance from the Coast (km)		Approx 230km South	
	Climate		Temperate	
	Average Annual Rainfall		445.6 mm	
FACTOR			YES / NO	NOTES / EXPLANATION
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply		YES	Majority of Victoria experiencing drought (or Exceptional Circumstances, whereby farmers can apply for rebates) http://www.daff.gov.au/agriculture-food/drought/ec/victoria
		Drought	YES	Based on available information
		Single drinking water source	YES	Issues with previous open channel system
		Poor quality water source	YES	
		source	NO	
		Flooding	NO	
		Fauna defecating in supply		
		Fauna destroying water intake structures		
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)		
		Un-lined landfills	NO	
		Extensive agriculture		
		runoff)		
		Poor access to supply		
		Unsustainable water extraction		
		Aquifer turning saline due to high		
	Governance	Hard water	NO	
		Aging or inadequate pipe work and associated infrastructure		
		pipes		
		High per capita water consumption		
		Inappropriate water quality standards / objectives	NO	
	Industri es	Lack of infrastructure maintenance	??	
		Poor management or governance	NO	
		Vandalism / sabotage / terrorism	NO	
		Insufficient trained personnel	?	
		Inadequate funding for maintenance or upgrades	NO	
	Pop ulati	Mining / minerals	NO	
		Irrigation	NO	
Chemicals / process		NO		
WATER QUALITY OR SECURITY RISK (EFFECT)	Seasonal population loadings			
	Rapid population growth	NO		
	Pathogenic contamination	NO		
	Algal blooms	NO		
	Heavy metal contamination	NO		
	Poor chlorine residuals	?		
	Pesticide contamination	NO		
	Boil water notices	NO		
	Deaths or illness due to water quality	NO		
	Water restrictions (current and historic)	YES	Stage 4 - Started 10/02/09	
	Taste and odour issues	YES	High Salinity. As of November 2008 improvement in salinity 3,500 EC units to less than 500 EC due to change in water supply	
	Other contamination that would affect health	YES	Aluminium - caused by changes in the raw water pH as part of operational changes made to the raw water storages. Elevated Trihalomethanes.	
Notes		Air scouring of mains took place in May 2008 to improve water quality. Town now connected to GWM pipeline which should improve quality along with the proposed construction of new raw water storages. Town also not compliant with THM's during last reporting period.		

Town # 44

TOWN	State/Territory	VIC	
	Town Name	Seymour	
	Town Population	6,063 (Census 2006, Urban Centre/Locality)	
WATER UTILITY	Name of Water Utility	Goulburn Valley Water	
	Rate (\$/kL)	Treated Water - \$0.75/kL Raw Water - \$0.38/kL	
	Per Capita Water Consumption (L/day)	Unknown	
	Number of Connections	Unknown	
CATCHMENT AND WATER SUPPLY	Catchment	Goulburn Broken	
	Sub-Catchment	Not within a designated Catchment	
	Catchment Management Authority (CMA)	Goulburn Broken Catchment Management Authority	
	CMA Web-Link	http://www.gbcma.vic.gov.au/	
	Catchment Protection Status	None. Catchment condition is Good to Excellent.	
	Potable Water Source(s)	Heywoods Hill Raw Water Storage - sourced from Goulburn River	
	Supply Capacity	Unknown	
WATER QUALITY	Treatment Plant(s)	Seymour WTP	
	Level of Treatment	Coagulation, flocculation, up flow clarification, filtration, chlorination.	
	Drinking Water Guidelines	Australian Drinking Water Guidelines (2004) and Safe Drinking Water Regulations (2005)	
	Results (% compliance for 2008 reporting period)	Aluminium	Exceeded guidelines
		pH	Exceeded guidelines
WATER SECURITY	Current Water Restrictions	Yes Stage 1 - Started 20/10/07	
	Proportion of Potable Water Supplied to Households (%)	Unknown	
	Distance from the Coast (km)	Approx 170km South	
	Climate	Temperate	
	Average Annual Rainfall	593.4mm	
FACTOR		YES / NO	NOTES / EXPLANATION
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	YES Majority of Victoria experiencing drought (or Exceptional Circumstances, whereby farmers can apply for rebates) http://www.daff.gov.au/agriculture-food/drought/ec/victoria
		Single drinking water source	YES Based on available information
		Poor quality water source	
		Sewage overflow or disposal into water	NO
		Flooding	NO
		Fauna defecating in supply	
		Fauna destroying water intake structures	
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	
		Un-lined landfills	NO
		Extensive agriculture	
		Low vegetation cover (dust, sediment)	
		Poor access to supply	
		Unsustainable water extraction	
		Aquifer turning saline due to high	
	Governance	Hard water	NO
		Aging or inadequate pipe work and associated infrastructure	
		Significant water losses due to leaking	
		High per capita water consumption	
		Inappropriate water quality standards / objectives	NO
		Lack of infrastructure maintenance	Unknown
	Industries	Poor management or governance	NO
		Vandalism / sabotage / terrorism	NO
		Insufficient trained personnel	Unknown
	Population	Inadequate funding for maintenance or upgrades	NO
		Mining / minerals	NO
		Irrigation	NO
		Chemicals / process	NO
		Seasonal population loadings	
		Rapid population growth	NO Decline in Population between 2001 and 2006
WATER QUALITY OR SECURITY RISK (EFFECT)	Pathogenic contamination	NO	
	Algal blooms	YES	Algal Bloom in May 2008
	Heavy metal contamination	NO	
	Poor chlorine residuals	?	
	Pesticide contamination	NO	
	Boil water notices	NO	
	Deaths or illness due to water quality	NO	
	Water restrictions (current and historic)	YES	Stage 1 - Started 20/10/07
	Taste and odour issues	YES	Complaints received after algae outbreak in May 2008
Other contamination that would affect health		YES	Aluminium - the non-compliance was due to a short term process control issue at the water treatment plants. pH exceeded ADWG.
Notes			

Town # 45

TOWN	State/Territory	VIC		
	Town Name	Castlemaine		
	Town Population	7,248 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility	Coliban Water		
	Rate (\$/kL)	Step 1 - \$1.34/kL, Step 2 - \$1.62/kL, Step 3 - \$2.66/kL		
	Per Capita Water Consumption (L/day)	338 L/capita/day		
	Number of Connections	6,924 (2004/2005 period)		
CATCHMENT AND WATER SUPPLY	Catchment	Cairn Curran - Proclaimed		
	Sub-Catchment	River Basin - Loddon River South		
	Catchment Management Authority (CMA)	North Central Catchment Management Authority		
	CMA Web-Link	http://www.nccma.vic.gov.au/		
	Catchment Protection Status	Proclaimed, Poor to Moderate condition		
	Potable Water Source(s)	Malmsbury Reservoir - (via Coliban Main Channel) into McCay Reservoir, via the Poverty Gully Channel McCay Reservoir (primarily used as a service reservoir)		
	Supply Capacity	Bulk Entitlement of 50,260ML/annum for the Coliban Supply System (includes several other towns and supply areas)		
WATER QUALITY	Treatment Plant(s)	Castlemaine WTP		
	Level of Treatment	Filtration, Taste / odour / algae toxin removal, pH Correction, Disinfection, Alum / alum chlorhydrate, Activated Carbon.		
	Drinking Water Guidelines	Australian Drinking Water Guidelines (2004) and Safe Drinking Water Regulations (2005)		
	Results (% compliance for 2008 reporting period)	E.Coli	Complied	
		Aluminium	Complied	
WATER SECURITY	Current Water Restrictions	Yes	Stage 4 - Started 01/09/06	
		For details refer to: http://www.ourwater.vic.gov.au/saving/restrictions		
	Proportion of Potable Water Supplied to Households (%)	39% to Residential, 25% Rural Consumption , 17.5% Non Residential		
	Distance from the Coast (km)	Approx 150km South		
	Climate	Temperate		
Average Annual Rainfall	592.7mm			
WATER QUALITY OR SECURITY RISK (CAUSE)				
WATER QUALITY OR SECURITY RISK (EFFECT)	Catchment and Water Supply	FACTOR	YES / NO	NOTES / EXPLANATION
		Drought	YES	Majority of Victoria experiencing drought (or Exceptional Circumstances, whereby farmers can apply for rebates) http://www.daff.gov.au/agriculture-food/drought/ec/victoria
		Single drinking water source	NO	
		Poor quality water source	YES	Due to low reservoir levels
		Sewage overflow or disposal into water	NO	
		Flooding	NO	
		Fauna defecating in supply		
		Fauna destroying water intake structures		
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)		
		Un-lined landfills	NO	
		Extensive agriculture		
		Low vegetation cover (dust, sediment)		
		Poor access to supply		
		Unsustainable water extraction		
		Aquifer turning saline due to high extraction		
		Hard water	NO	
		Aging or inadequate pipe work and associated infrastructure		
	Significant water losses due to leaking			
	Governance	High per capita water consumption	NO	
		Inappropriate water quality standards / objectives	NO	
		Lack of infrastructure maintenance	Unknown	
		Poor management or governance	NO	
		Vandalism / sabotage / terrorism	NO	
		Insufficient trained personnel	Unknown	
	Industries	Inadequate funding for maintenance or upgrades	NO	
		Mining / minerals	NO	
		Irrigation	NO	
	Population	Chemicals / process	NO	
Seasonal population loadings				
Rapid population growth		NO		
WATER QUALITY OR SECURITY RISK (EFFECT)	Pathogenic contamination	NO	E.coli detected in November 2007, although re-sample was clear.	
	Algal blooms	YES	Tullaroop Reservoir had blue green algae problem - although it is unclear whether or not this impacted upon the Castlemaine water supply.	
	Heavy metal contamination	NO		
	Poor chlorine residuals	Unknown		
	Pesticide contamination	NO		
	Boil water notices	NO		
	Deaths or illness due to water quality	NO		
	Water restrictions (current and historic)	YES	Stage 4 - Started 01/09/06	
	Taste and odour issues	YES	Refer below re: Coliban notice of change in aesthetic quality.	
	Other contamination that would affect health	NO		

Notes	June 2008 - Fluoride dosing of Castlemaine's water supply started after a directive from the Department of Human Services. Castlemaine also has a water reclamation plant with water provided to the golf club. May 2009 - Media release from Coliban about change in water quality due to low reservoir levels (advised that there may be changes to taste/odour that customers are used to).
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Town #		46			
TOWN	State/Territory	VIC			
	Town Name	Hamilton			
	Town Population	9,379 (Census 2006, Urban Centre/Locality)			
WATER UTILITY	Name of Water Utility	Wannon Water			
	Rate (\$/kL)	Step 1 - \$1.60/kL, Step 2 - \$1.92/kL, Step 3 - \$2.88/kL			
	Per Capita Water Consumption (L/day)	298 L/capita/day			
CATCHMENT AND WATER SUPPLY	Number of Connections	4,898			
	Catchment	Grampians			
	Sub-Catchment	River Basin - Glenelg			
	Catchment Management Authority (CMA)	Glenelg Hopkins Catchment Management Authority			
	CMA Web-Link	http://www.ghcma.vic.gov.au/			
	Catchment Protection Status	None. Poor to Moderate condition.			
	Potable Water Source(s)	Hayes Reservoir, Cruckoor Reservoir, Hartwicks Reservoir Hamilton Service Basins 1 & 2 Surface Water from the Victoria Ranges catchment (extracted from numerous small streams) Groundwater flow- numerous bores			
	Supply Capacity	Surface Water Bulk Entitlement of 3,435 ML The maximum capacity of the supply system is approximately 12.8 ML/d Hamilton Aquifer - 120 ML/annum			
	WATER QUALITY	Treatment Plant(s)	Hamilton WTP		
		Level of Treatment	Disinfection, Coagulation, Flocculation, Clarification, Filtration		
Drinking Water Guidelines		Australian Drinking Water Guidelines (2004) and Safe Drinking Water Regulations (2005)			
Results (% compliance for 2008 reporting period)		E Coli	100%		
		Aluminium	Did not comply		
		pH	Did not comply		
		Iron	Did not comply		
WATER SECURITY	Current Water Restrictions	Yes Stage 3 - Started 03/11/07 For details refer to: http://www.ourwater.vic.gov.au/saving/restrictions			
	Proportion of Potable Water Supplied to Households (%)	Unknown			
	Distance from the Coast (km)	Approx 60km South-West			
	Climate	Temperate			
Average Annual Rainfall	613.3mm				
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	FACTOR	YES / NO	NOTES / EXPLANATION	
		Drought	YES	Majority of Victoria experiencing drought (or Exceptional Circumstances, whereby farmers can apply for rebates) http://www.daff.gov.au/agriculture-food/drought/ec/victoria	
		Single drinking water source	NO		
		Poor quality water source	YES	Groundwater quality issues, treatment plant unable to cope.	
		Sewage overflow or disposal into water	NO		
		Flooding	NO		
		Fauna defecating in supply			
		Fauna destroying water intake structures			
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	YES	Iron exceeded guidelines.	
		Un-lined landfills	NO		
		Extensive agriculture			
		Low vegetation cover (dust, sediment)			
		Poor access to supply			
		Unsustainable water extraction			
		Aquifer turning saline due to high	Unknown		
		Hard water	NO		
		Aging or inadequate pipe work and associated infrastructure	YES	Treatment plant is inadequate for current feed water. Action to redesign and reconstruct existing stream off take structures in the southern Grampians to ensure compliance with passing flows from 2010 (Reference: Wannon Water - Water Supply Demand Strategy)	
		Significant water losses due to leaking pipes			
		Governance	High per capita water consumption	NO	
			Inappropriate water quality standards / objectives	NO	
			Lack of infrastructure maintenance	??	
			Poor management or governance	NO	
			Vandalism / sabotage / terrorism	NO	
			Insufficient trained personnel	Unknown	
		Industries	Inadequate funding for maintenance or upgrades	NO	
			Mining / minerals	NO	
			Irrigation	NO	
	Population	Chemicals / process	NO		
		Seasonal population loadings			
		Rapid population growth	NO		
WATER QUALITY OR SECURITY RISK (EFFECT)	Pathogenic contamination	NO			
	Algal blooms	NO			
	Heavy metal contamination	NO			
	Poor chlorine residuals	Unknown			
	Pesticide contamination	NO			
	Boil water notices	NO			
	Deaths or illness due to water quality	NO			
	Water restrictions (current and historic)	YES	Stage 3 - Started 03/11/07		
	Taste and odour issues	YES	70 Complaints received relating to aesthetics (0.75 complaints per 100 customers).		
	Other contamination that would affect health	YES	High Aluminium levels.		
Notes		The quality of the raw water entering the water treatment plant has deteriorated to the point where it is outside the design specifications of the water treatment plant. Changes have since been made to improve quality.			

Town # 47

TOWN	State/Territory	VIC		
	Town Name	Thornton		
	Town Population	164 (Census 2006, State Suburb)		
WATER UTILITY	Name of Water Utility	Goulburn Valley Water		
	Rate (\$/kL)	\$0.75/kL (Treated Water)		
	Per Capita Water Consumption (L/day)	Unknown		
CATCHMENT AND WATER SUPPLY	Number of Connections	Unknown		
	Catchment	Goulburn Broken		
	Sub-Catchment	Not within a designated Catchment		
	Catchment Management Authority (CMA)	Goulburn Broken Catchment Management Authority		
	CMA Web-Link	http://www.gbcm.vic.gov.au/		
	Catchment Protection Status	Good to Excellent		
	Potable Water Source(s)	Rubicon River		
WATER QUALITY	Supply Capacity	Unknown		
	Treatment Plant(s)	Thornton WTP		
	Level of Treatment	Chlorination		
	Drinking Water Guidelines	Australian Drinking Water Guidelines (2004) and Safe Drinking Water Regulations (2005)		
	Results (% compliance for 2008 reporting period)	E Coli	100%	
		pH	Aesthetic limits exceeded	
		Other	Dichloroacetic acid and Trichloroacetic acid exceeded ADWG - Attributed to high organic content of raw water Benzo(a)pyrene detected in raw water supply	
WATER SECURITY	Current Water Restrictions	Yes Stage 1 - 01/10/07 For details refer to: http://www.ourwater.vic.gov.au/saving/restrictions		
	Proportion of Potable Water Supplied to Households (%)	Unknown		
	Distance from the Coast (km)	Approx 160km South		
	Climate	Temperate		
	Average Annual Rainfall	703.9mm		
FACTOR		YES / NO	NOTES / EXPLANATION	
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	YES	Majority of Victoria experiencing drought (or Exceptional Circumstances whereby farmers can apply for rebates) http://www.daff.gov.au/agriculture-food/drought/ec/victoria
		Single drinking water source	YES	Rubicon River
		Poor quality water source	YES	From 1 July to 5 July 2007 and 24 to 27 December 2007 drinking water was tankered from Alexandra to Thornton due to high turbidity in the Rubicon River.
		Sewage overflow or disposal into water source	NO	
		Flooding	NO	
		Fauna defecating in supply		
		Fauna destroying water intake structures		
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)		
		Un-lined landfills	NO	
		Extensive agriculture		
		Low vegetation cover (dust, sediment runoff)		
		Poor access to supply		
		Unsustainable water extraction	N/A	
		Aquifer turning saline due to high extraction	N/A	
		Hard water	NO	
		Aging or inadequate pipe work and associated infrastructure		
		Significant water losses due to leaking pipes		
	Governance	High per capita water consumption		
		Inappropriate water quality standards / objectives	NO	
		Lack of infrastructure maintenance	Unknown	
		Poor management or governance	NO	
		Vandalism / sabotage / terrorism	NO	
	Industries	Insufficient trained personnel	Unknown	
		Inadequate funding for maintenance or upgrades	NO	
		Mining / minerals	NO	
	Population	Irrigation	NO	
		Chemicals / process	NO	
WATER QUALITY OR SECURITY RISK (EFFECT)	Population	Seasonal population loadings	NO	
		Rapid population growth	Unknown	Census data unavailable for 2001
	Pathogenic contamination	NO		
	Algal blooms	NO		
	Heavy metal contamination	NO		
	Poor chlorine residuals	Unknown		
	Pesticide contamination	NO		
	Boil water notices	NO		
	Deaths or illness due to water quality	NO		
	Water restrictions (current and historic)	YES	Stage 1 - 01/10/07	
Taste and odour issues	NO			
Other contamination that would affect health	YES	Benzo(a)pyrene detected in raw water during one sampling event, subsequent sample clear.		
Notes		Planning and design for a pipeline to provide fully treated water to Thornton and Eildon from Alexandra recently undertaken. Due for completion 2009/10.		

Town #		48		
TOWN	State/Territory	VIC		
	Town Name	Riddells Creek		
	Town Population	2,625 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility	Western Water		
	Rate (\$/kL)	\$1.49/kL		
	Per Capita Water Consumption (L/day)	Unknown		
CATCHMENT AND WATER SUPPLY	Number of Connections	Unknown		
	Catchment	Upper Yarra Thomson catchments and Yarra Valley tributaries and Jacksons Creek Catchment		
	Sub-Catchment	Weribee River Basin		
	Catchment Management Authority (CMA)	Port Phillip and Westernport Catchment Management Authority		
	CMA Web-Link	http://www.ppwcm.vic.gov.au/		
	Catchment Protection Status	Varies from tributary to tributary		
	Potable Water Source(s)	Surface water from above subcatchments Rosslynne Reservoir Wright Reservoir and Forster Reservoir used as back up		
	Supply Capacity	Unknown		
WATER QUALITY	Treatment Plant(s)	Rosslynne Water Filtration Plant (chloramination)		
	Level of Treatment	Fluoridation and primary chlorination by Melbourne Water Secondary disinfection (Chloramination) at Loemans Rd Pump Station Additional chlorination by booster chlorinators along reticulation system as required		
	Drinking Water Guidelines	Australian Drinking Water Guidelines (2004) and Safe Drinking Water Regulations (2005)		
	Results (% compliance for 2008 reporting period)	E Coli	100%	
WATER SECURITY	Current Water Restrictions	Yes Stage 3a - Started 01/04/07 For details refer to: http://www.ourwater.vic.gov.au/saving/restrictions		
	Proportion of Potable Water Supplied to Households (%)	Unknown		
	Distance from the Coast (km)	Approx 95km South-West		
	Climate	Temperate		
	Average Annual Rainfall	838.7mm		
FACTOR		YES / NO	NOTES / EXPLANATION	
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	YES	Majority of Victoria experiencing drought (or Exceptional Circumstances, whereby farmers can apply for rebates) http://www.daff.gov.au/agriculture-food/drought/ec/victoria
		Single drinking water source	NO	
		Poor quality water source	NO	
		Sewage overflow or disposal into water	NO	
		Flooding	NO	
		Fauna defecating in supply		
		Fauna destroying water intake structures		
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)		
		Un-lined landfills	NO	
		Extensive agriculture		
		Low vegetation cover (dust, sediment		
		Poor access to supply		
		Unsustainable water extraction	N/A	
		Aquifer turning saline due to high	N/A	
		Hard water	NO	
	Governance	Aging or inadequate pipe work and associated infrastructure		
		Significant water losses due to leaking pipes		
		High per capita water consumption		
		Inappropriate water quality standards / objectives	NO	
		Lack of infrastructure maintenance	Unknown	
		Poor management or governance	NO	
	Industries	Vandalism / sabotage / terrorism	NO	
		Insufficient trained personnel	Unknown	
		Inadequate funding for maintenance or upgrades	NO	
	Population	Mining / minerals	NO	
		Irrigation	NO	
		Chemicals / process	NO	
	Seasonal population loadings	NO		
	Rapid population growth	YES	Growth rate of 3.18% P.A between 2001 and 2006	
WATER QUALITY OR SECURITY RISK (EFFECT)	Pathogenic contamination	NO		
	Algal blooms	YES	Blue Green Algae Bloom - Alert Level 3 (August 2007 - October 2007)	
	Heavy metal contamination	NO		
	Poor chlorine residuals	Unknown		
	Pesticide contamination	NO		
	Boil water notices	NO		
	Deaths or illness due to water quality	NO		
	Water restrictions (current and historic)	YES	Stage 3a - Started 01/04/07	
	Taste and odour issues	NO		
Other contamination that would affect health	NO			
Notes		Water for the most part is sourced from Melbourne. At times this can vary between Melbourne water and a Rosslynne Reservoir/ Melbourne water blend to ensure that the Rosslynne Water Filtration Plant and associated infrastructure are maintained.		

Town #		49		
TOWN	State/Territory	VIC		
	Town Name	Beulah		
	Town Population	219 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility	Grampians Wimmera Mallee Water		
	Rate (\$/kL)	\$1.19/kL - partially treated water		
	Per Capita Water Consumption (L/day)	Unknown		
	Number of Connections	Unknown		
CATCHMENT AND WATER SUPPLY	Catchment	Wimmera River Basin		
	Sub-Catchment	Not within a designated Catchment		
	Catchment Management Authority (CMA)	Mallee Catchment Management Authority		
	CMA Web-Link	http://www.malleecma.vic.gov.au/		
	Catchment Protection Status	None. Very Poor to Moderate condition.		
	Potable Water Source(s)	Unknown		
	Supply Capacity	Unknown		
WATER QUALITY	Treatment Plant(s)	Beulah WTP ?		
	Level of Treatment	Disinfection		
	Drinking Water Guidelines	Australian Drinking Water Guidelines (2004) and Safe Drinking Water Regulations (2005)		
	Results (% compliance for 2008 reporting period)	E Coli	100%	
		Turbidity	Did not comply with standards	
THM's		Did not comply with standards		
WATER SECURITY	Current Water Restrictions	Yes Stage 4 - Started 10/02/09		
	Proportion of Potable Water Supplied to Households (%)	Unknown		
	Distance from the Coast (km)	Approx 260km West		
	Climate	Temperate		
	Average Annual Rainfall	374.3 mm		
FACTOR		YES / NO	NOTES / EXPLANATION	
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	YES	Majority of Victoria experiencing drought (or Exceptional Circumstances, whereby farmers can apply for rebates) http://www.daff.gov.au/agriculture-food/drought/ec/victoria
		Single drinking water source	YES?	
		Poor quality water source	YES	
		Sewage overflow or disposal into water source	NO	
		Flooding	NO	
		Fauna defecating in supply		
		Fauna destroying water intake structures		
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)		
		Un-lined landfills	NO	
		Extensive agriculture		
		Low vegetation cover (dust, sediment runoff)		
		Poor access to supply		
		Unsustainable water extraction		
		Aquifer turning saline due to high extraction		
		Hard water	NO	
	Governance	Aging or inadequate pipe work and associated infrastructure		
		Significant water losses due to leaking pipes		
		High per capita water consumption	NO	
		Inappropriate water quality standards / objectives	NO	
		Lack of infrastructure maintenance	Unknown	
		Poor management or governance	NO	
	Industries	Vandalism / sabotage / terrorism	NO	
		Insufficient trained personnel	Unknown	
		Inadequate funding for maintenance or upgrades	NO	
	Population	Mining / minerals	NO	
		Irrigation	NO	
		Chemicals / process	NO	
	Seasonal population loadings			
	Rapid population growth	YES	Growth rate of 1.58% P.A between 2001 and 2006.	
WATER QUALITY OR SECURITY RISK (EFFECT)	Pathogenic contamination	NO		
	Algal blooms	NO		
	Heavy metal contamination	NO		
	Poor chlorine residuals	Unknown		
	Pesticide contamination	NO		
	Boil water notices	NO		
	Deaths or illness due to water quality	NO		
	Water restrictions (current and historic)	YES	Stage 4 - Started 10/02/09	
	Taste and odour issues	NO		
Other contamination that would affect health	YES	Elevated Trihalomethanes.		
Notes		Proposed to Connect to the Wimmera Mallee Pipeline and construct new raw water storages for Beulah. Three other towns (Jung, Nullawil and Quambatook) within the GWM region are experiencing the same water quality and security issues		

Town # 50					
TOWN	State/Territory		VIC		
	Town Name		Avoca		
	Town Population		951 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility		Central Highlands Water		
	Rate (\$/kL)		Tier 1 \$1.30/kL, Tier 2 \$1.57/kL, Tier 3 \$1.96/kL		
	Per Capita Water Consumption (L/day)		292 L/capita/day - Current unrestricted demand		
	Number of Connections		608		
CATCHMENT AND WATER SUPPLY	Catchment		Avoca River		
	Sub-Catchment		River Basin - Avoca		
	Catchment Management Authority (CMA)		North Central Catchment Management Authority		
	CMA Web-Link		www.nccma.vic.gov.au/		
	Catchment Protection Status		None. Very Poor condition.		
	Potable Water Source(s)		Sugarloaf Reservoir - 363 ML		
			Lead Dam - 118 ML		
			Bung Bong Bore		
	Supply Capacity		Surface Water Combined Annual Entitlement - up to 233 ML in any year		
Sugarloaf Reservoir - at a rate not exceeding 0.84ML/day					
Lead Dam - no extraction limit					
Groundwater Licence - 200ML/year					
WATER QUALITY	Treatment Plant(s)		Avoca WTP		
	Level of Treatment		Conventional sedimentation and filtration plant with disinfection by chlorine.		
	Drinking Water Guidelines		Australian Drinking Water Guidelines (2004) and Safe Drinking Water Regulations (2005)		
	Results (% compliance for 2008 reporting period)		Suspended Solids	Did not comply with standards	
			E Coli	100%	
WATER SECURITY	Current Water Restrictions		Yes	Stage 2 - Started 12/11/07	
			For details refer to: http://www.ourwater.vic.gov.au/saving/restrictions		
	Proportion of Potable Water Supplied to Households (%)		Residential - 60% Industrial - 14% Concessional - 6% Non Revenue - 20%		
	Distance from the Coast (km)		Approx 160km South-East		
	Climate		Temperate		
Average Annual Rainfall		536.2 mm			
WATER QUALITY OR SECURITY RISK (CAUSE)					
	Catchment and Water Supply	FACTOR		YES / NO	NOTES / EXPLANATION
		Drought		YES	Severe drought conditions continued across Central Highland Water's area of operation during 2007–08. This created challenges to maintaining water quality with low reservoir levels, emergency supplies and limited resource for mains cleaning programs.
		Single drinking water source		NO	
		Poor quality water source		YES	Groundwater with high salinity was being blended with surface water to supplement supplies - this has caused a number of quality issues.
		Sewage overflow or disposal into water source		NO	
		Flooding		NO	
		Fauna defecating in supply			
		Fauna destroying water intake structures			
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)		YES	Iron levels did not comply with standards.
		Un-lined landfills		NO	
		Extensive agriculture			
		Low vegetation cover (dust, sediment runoff)			
		Poor access to supply			
		Unsustainable water extraction			
		Aquifer turning saline due to high extraction			
		Hard water		YES	Hardness testing did not meet standards.
		Aging or inadequate pipe work and associated infrastructure			
	Significant water losses due to leaking pipes				
	Governance	High per capita water consumption		NO	
		Inappropriate water quality standards / objectives		NO	
		Lack of infrastructure maintenance		Unknown	
		Poor management or governance		NO	
		Vandalism / sabotage / terrorism		NO	
		Insufficient trained personnel		Unknown	
	Industries	Inadequate funding for maintenance or upgrades		NO	
		Mining / minerals		NO	
		Irrigation		NO	
	Population	Chemicals / process		NO	
Seasonal population loadings					
Rapid population growth		NO	Decline in Population between 2001 and 2006		
WATER QUALITY OR SECURITY RISK (EFFECT)	Pathogenic contamination		NO		
	Algal blooms		NO		
	Heavy metal contamination		NO		
	Poor chlorine residuals		NO		
	Pesticide contamination		NO		
	Boil water notices		NO		
	Deaths or illness due to water quality		NO		
	Water restrictions (current and historic)		YES	Stage 2 - Started 12/11/07	
	Taste and odour issues		NO	Salinity Issues associated with the use of groundwater.	

SEC	Other contamination that would affect health	YES	Elevated trihalomethanes - Issue lasted 119 days. Chloramination plant commissioned after reporting period (November 2008).
Notes		The Avoca water supply systems consists of Sugarloaf Reservoir, Bung Bong Bore groundwater supply and Lead Dam. The Avoca system has predominantly relied on water from Sugarloaf Reservoir. However since rainfall in the region has been less reliable this has resulted in a greater reliance on Bung Bong Bore. Whilst the groundwater supply is reliable, it is characterised by relatively high natural salinity and hardness levels.	

Town # 51

TOWN	State/Territory		VIC	
	Town Name		Woori Yallock	
	Town Population		2,000 (Census 2006, Urban Centre/Locality)	
WATER UTILITY	Name of Water Utility		Yarra Valley Water	
	Rate (\$/kL)		Block 1 - \$1.25/kL, Block 2 - \$1.47/kL, Block 3 - \$ 2.17/kL	
	Per Capita Water Consumption (L/day)		Unknown	
	Number of Connections		Unknown	
CATCHMENT AND WATER SUPPLY	Catchment		Thompson and Upper Yarra Catchments	
	Sub-Catchment		Not within a designated water supply catchment - River Basin is Yarra	
	Catchment Management Authority (CMA)		Port Phillip and Westemport Catchment Management Authority	
	CMA Web-Link		http://www.ppwcma.vic.gov.au/	
	Catchment Protection Status		Varies from tributary to tributary (generally Poor to Moderate)	
	Potable Water Source(s)		Unknown	
	Supply Capacity		Unknown	
WATER QUALITY	Treatment Plant(s)		Lusatia Park WTP	
	Level of Treatment		Unknown	
	Drinking Water Guidelines		Australian Drinking Water Guidelines (2004) and Safe Drinking Water Regulations (2005)	
	Results (% compliance for 2008 reporting period)		E Coli	100%
			Other	High Iron and Turbidity Levels recorded although overall standards were
WATER SECURITY	Current Water Restrictions		No	
	Proportion of Potable Water Supplied to Households (%)		Unknown	
	Distance from the Coast (km)		Approx 85km South-West	
	Climate		Temperate	
	Average Annual Rainfall		693.6mm	
	FACTOR		YES / NO	NOTES / EXPLANATION
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	YES	Majority of Victoria experiencing drought (or Exceptional Circumstances, whereby farmers can apply for rebates) http://www.daff.gov.au/agriculture-food/drought/ec/victoria
		Single drinking water source	Unknown	
		Poor quality water source	NO	
		Sewage overflow or disposal into water	NO	
		Flooding	YES	Caused a number of issues in June/July 2007
		Fauna defecating in supply		
		Fauna destroying water intake structures		
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)		
		Un-lined landfills	NO	
		Extensive agriculture		
		Low vegetation cover (dust, sediment)		
		Poor access to supply		
		Unsustainable water extraction	N/A	
		Aquifer turning saline due to high extraction	N/A	
		Hard water	NO	
	Governance	Aging or inadequate pipe work and associated infrastructure		
		Significant water losses due to leaking		
		High per capita water consumption		
		Inappropriate water quality standards / objectives	NO	
		Lack of infrastructure maintenance	Unknown	
	Industries	Poor management or governance	NO	
		Vandalism / sabotage / terrorism	NO	
		Insufficient trained personnel	Unknown	
	Population	Inadequate funding for maintenance or upgrades	NO	
		Mining / minerals	NO	
		Irrigation	NO	
		Chemicals / process	NO	
		Seasonal population loadings	NO	
WATER QUALITY OR SECURITY RISK (EFFECT)	Rapid population growth	NO		
	Pathogenic contamination	NO		
	Algal blooms	NO		
	Heavy metal contamination	NO		
	Poor chlorine residuals	Unknown		
	Pesticide contamination	NO		
	Boil water notices	YES	Elevated turbidity and iron levels during June/July 2007	
	Deaths or illness due to water quality	NO		
	Water restrictions (current and historic)	NO		
	Taste and odour issues	NO		
Other contamination that would affect	NO			
Notes		This was due to heavy rainfall around the Upper Yarra Reservoir, which caused high inflows of water into the reservoir, in a very short period of time. This heavy rainfall has caused naturally occurring sediments to flow into the Reservoir, which caused the water in the Upper Yarra Reservoir to be highly turbid. Filters installed in early 2008 to improve WQ.		

Town # 52

TOWN	State/Territory	VIC		
	Town Name	Myrtleford		
	Town Population	2,728 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility	North East Water		
	Rate (\$/kL)	\$2.00/kL		
	Per Capita Water Consumption (L/day)	Unknown. Total demand on water supply system - 633 ML/annum.		
	Number of Connections	1,524		
CATCHMENT AND WATER SUPPLY	Catchment	Ovens River (Wangaratta)		
	Sub-Catchment	Buffalo Creek Catchment		
	Catchment Management Authority (CMA)	North East Catchment Management Authority		
	CMA Web-Link	http://www.necma.vic.gov.au/		
	Catchment Protection Status	None. Good to Excellent condition.		
	Potable Water Source(s)	Buffalo Creek		
	Supply Capacity	Surface Water Entitlement - 1212 ML/annum		
		Groundwater Licence for 75ML - bore out of order		
WATER QUALITY	Treatment Plant(s)	Myrtleford UV plant		
	Level of Treatment	UV Disinfection (Ozone/Granular Activated Carbon disinfection system has been taken offline).		
	Drinking Water Guidelines	Australian Drinking Water Guidelines (2004) and Safe Drinking Water Regulations (2005)		
	Results (% compliance for 2008 reporting period)	Suspended Solids	High Turbidity (may indicate high SS)	
		Faecal Coliforms	98.3% (E. coli)	
		Colour	Did not meet guidelines	
Iron		Did not meet guidelines		
WATER SECURITY	Current Water Restrictions	No		
	Proportion of Potable Water Supplied to Households (%)	Residential - 40%, Commercial - 15%, Industrial - 22%, Non revenue - 23%		
	Distance from the Coast (km)	Approx 190km South East		
	Climate	Temperate		
	Average Annual Rainfall	946.5 mm		
FACTOR		YES / NO	NOTES / EXPLANATION	
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	YES	Majority of Victoria experiencing drought (or Exceptional Circumstances, whereby farmers can apply for rebates) http://www.daff.gov.au/agriculture-food/drought/ec/victoria
		Single drinking water source	YES	
		Poor quality water source	NO	
		Sewage overflow or disposal into water source	NO	
		Flooding	NO	
		Fauna defecating in supply		
		Fauna destroying water intake structures		
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	NO	
		Un-lined landfills		
		Extensive agriculture		
		Low vegetation cover (dust, sediment runoff)		
		Poor access to supply		
		Unsustainable water extraction		
		Aquifer turning saline due to high extraction	NO	
		Hard water	NO	
	Governance	Aging or inadequate pipe work and associated infrastructure	YES	36 mains failures over the past 3 years. Only single barrier treatment in place.
		Significant water losses due to leaking pipes	YES	Assumed to be an issue as large number of failures.
		High per capita water consumption	NO	
		Inappropriate water quality standards / objectives	NO	
		Lack of infrastructure maintenance	Unknown	
		Poor management or governance	NO	
		Vandalism / sabotage / terrorism		
	Industries	Insufficient trained personnel		
		Inadequate funding for maintenance or upgrades		
		Mining / minerals	NO	
	Population	Irrigation		
		Chemicals / process	NO	
		Seasonal population loadings	NO	
WATER QUALITY OR SECURITY RISK (EFFECT)		Rapid population growth	YES	Growth Rate of 1.69% P.A. (between 2001 and 2006)
		Pathogenic contamination	YES	E.coli detected on a number of occasions, although due to the large number of samples, they were still compliant.
		Algal blooms	NO	
		Heavy metal contamination	NO	
		Poor chlorine residuals	Unknown	
		Pesticide contamination	NO	
		Boil water notices	YES	Boil Water Notice was in place from August 2007 to 1 May 2008.
		Deaths or illness due to water quality	NO	
		Water restrictions (current and historic)	NO	
		Taste and odour issues	NO	
		Other contamination that would affect health	YES	Enterococcus detection in December 2007.
		Notes		October 2009 - Work has begun on the construction of a treated water storage at Myrtleford, the first stage of a \$5 million project to upgrade the town's water supply. The absence of a residual disinfectant is at the request of the local communities.

Town # 53

TOWN	State/Territory	VIC		
	Town Name	Beechworth		
	Town Population	2,645 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility	North East Water		
	Rate (\$/kL)	\$2.00/kL		
	Per Capita Water Consumption (L/day)	Unknown. 313 kL/household/year.		
	Number of Connections	1396		
CATCHMENT AND WATER SUPPLY	Catchment	Ovens		
	Sub-Catchment	Ovens River catchment		
	Catchment Management Authority (CMA)	North East Catchment Management Authority		
	CMA Web-Link	http://www.necma.vic.gov.au/		
	Catchment Protection Status	None. Good to Excellent condition.		
	Potable Water Source(s)	Nine Mile Creek Frenchman's Creek Lake Kerferd		
	Supply Capacity	Surface Water Entitlement - 1,100 ML/annum		
WATER QUALITY	Treatment Plant(s)	Beechworth WTP		
	Level of Treatment	DAFF Plant - Flocculation, Floatation, Filtration, pH correction, Chloramination		
	Drinking Water Guidelines	Australian Drinking Water Guidelines (2004) and Safe Drinking Water Regulations (2005)		
	Results (% compliance for 2008 reporting period)	Suspended Solids	High Turbidity	
	E Coli	100%		
WATER SECURITY	Current Water Restrictions	Yes Stage 1 - Started 21/11/08 For details refer to: http://www.ourwater.vic.gov.au/saving/restrictions		
	Proportion of Potable Water Supplied to Households (%)	Residential - 54%, Commercial - 25%, Non revenue - 21%		
	Distance from the Coast (km)	Approx 200km South East		
	Climate	Temperate		
	Average Annual Rainfall	946.5mm		
FACTOR		YES / NO	NOTES / EXPLANATION	
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	YES	Majority of Victoria experiencing drought (or Exceptional Circumstances, whereby farmers can apply for rebates) http://www.daff.gov.au/agriculture-food/drought/ec/victoria
		Single drinking water source	YES	All water from Lake.
		Poor quality water source	NO	
		Sewage overflow or disposal into water	NO	
		Flooding	NO	
		Fauna defecating in supply		
		Fauna destroying water intake structures		
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	NO	
		Un-lined landfills		
		Extensive agriculture		
		Low vegetation cover (dust, sediment)		
		Poor access to supply		
		Unsustainable water extraction		
		Aquifer turning saline due to high extraction	NO	
		Hard water	NO	
	Governance	Aging or inadequate pipe work and associated infrastructure		
		Significant water losses due to leaking		
		High per capita water consumption	NO	Water use higher than other towns in the region (313kL/house with a regional average of 305kL/house).
		Inappropriate water quality standards / objectives	NO	
		Lack of infrastructure maintenance	Unknown	
		Poor management or governance	NO	
	Industries	Vandalism / sabotage / terrorism		
		Insufficient trained personnel		
		Inadequate funding for maintenance or upgrades		
	Population	Mining / minerals	NO	
		Irrigation		
		Chemicals / process	NO	
WATER QUALITY OR SECURITY RISK (EFFECT)	Seasonal population loadings	NO		
	Rapid population growth	NO	Decline in population between 2001 and 2006	
	Pathogenic contamination	NO		
	Algal blooms	NO		
	Heavy metal contamination	NO		
	Poor chlorine residuals	Unknown		
	Pesticide contamination	NO		
	Boil water notices	NO		
	Deaths or illness due to water quality	NO		
	Water restrictions (current and historic)	YES	Stage 1 - Started 21/11/08, Currently on Stage 2 Restrictions (Water Authority Website)	
Taste and odour issues				
Other contamination that would affect	YES	Elevated aluminium levels.		
Notes				

Town #		54			
TOWN	State/Territory	VIC			
	Town Name	Bright			
	Town Population	2,111 (Census 2006, Urban Centre/Locality)			
WATER UTILITY	Name of Water Utility	North East Water			
	Rate (\$/kL)	\$2.00/kL			
	Per Capita Water Consumption (L/day)	Unknown. Total demand on water supply system - 393ML/annum			
CATCHMENT AND WATER SUPPLY	Number of Connections	1,795			
	Catchment	North East / Ovens			
	Sub-Catchment	Bakers Gully and Ovens River catchments (Ovens River - Proclaimed)			
	Catchment Management Authority (CMA)	North East Catchment Management Authority			
	CMA Web-Link	http://www.necma.vic.gov.au/			
	Catchment Protection Status	None. Good to Excellent condition.			
	Potable Water Source(s)	Ovens River Bakers Gully Creek			
	Supply Capacity	Surface water entitlement - 704ML/annum			
WATER QUALITY	Treatment Plant(s)	Bakers Gully chlorinator and Ovens River chlorinator			
	Level of Treatment	Chlorination			
	Drinking Water Guidelines	Australian Drinking Water Guidelines (2004) and Safe Drinking Water Regulations (2005)			
	Results (% compliance for 2008 reporting period)	Suspended Solids	High Turbidity		
		E Coli	98.10%		
		Colour	Did not meet guidelines		
Iron		Did not meet guidelines			
WATER SECURITY	Current Water Restrictions	No			
	Proportion of Potable Water Supplied to Households (%)	Residential - 42%, Commercial - 20%, Non revenue - 38%			
	Distance from the Coast (km)	Approx 160km South East			
	Climate	Temperate			
	Average Annual Rainfall	1127.2mm			
WATER QUALITY OR SECURITY RISK (CAUSE)		FACTOR	YES / NO	NOTES / EXPLANATION	
		Drought	YES	Majority of Victoria experiencing drought (or Exceptional Circumstances, whereby farmers can apply for rebates) http://www.daff.gov.au/agriculture-food/drought/ec/victoria	
		Single drinking water source	YES		
		Poor quality water source	YES		
		Sewage overflow or disposal into water source	NO		
		Flooding	YES	Storms after a bushfire event caused water quality issues.	
		Fauna defecating in supply			
		Fauna destroying water intake structures			
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	YES	High Iron levels recorded.	
		Un-lined landfills			
		Extensive agriculture			
		Low vegetation cover (dust, sediment runoff)			
		Poor access to supply			
		Unsustainable water extraction			
		Aquifer turning saline due to high extraction	NO		
		Hard water	NO		
		Aging or inadequate pipework and associated infrastructure	YES	Chlorinator was inadequate for incoming raw water. 18 failures in last 3 years in delivery pipework.	
		Significant water losses due to leaking pipes	YES	Assumed to be an issues as large number of failures and significant proportion of non-revenue water.	
		Governance	High per capita water consumption	NO	
			Inappropriate water quality standards / objectives	NO	
			Lack of infrastructure maintenance	Unknown	
			Poor management or governance	NO	
			Vandalism / sabotage / terrorism		
			Insufficient trained personnel		
			Inadequate funding for maintenance or upgrades		
		Industries	Mining / minerals	NO	
			Irrigation		
			Chemicals / process	NO	
		Population	Seasonal population loadings	YES	Can increase to 10,000 in peak periods.
Rapid population growth	NO				
WATER QUALITY OR SECURITY RISK (EFFECT)	Pathogenic contamination	YES	Bacteria detected in October 2007, extra chlorine dosing undertaken and re-test clear.		
	Algal blooms	NO			
	Heavy metal contamination	NO			
	Poor chlorine residuals	Unknown			
	Pesticide contamination	NO			
	Boil water notices	YES	A number of boil water notices issued due to chlorinator failures and bushfires.		
	Deaths or illness due to water quality	NO			
	Water restrictions (current and historic)	NO			
	Taste and odour issues				
	Other contamination that would affect health	YES	Refer to water quality notices.		
Notes		Bright, Wandiligong and Porepunkah experienced and extended period under a Boil Water Notice due to the deterioration of the raw water supply. Previous ushfires in the catchment area followed by rain resulted in elevated turbidity levels, in the Ovens River, that compromised the disinfection system in the nfiltered supply at these localities. A Boil Water Notice was implemented while a temporary filtration unit was transferred from Wangaratta, installed and ommissioned in Bright. On the July 16, water quality had improved and the Boil Water Notice could be lifted.			

Town # 55

TOWN	State/Territory	VIC	
	Town Name	Trafalgar	
	Town Population	2,301 (Census 2006, Urban Centre/Locality)	
WATER UTILITY	Name of Water Utility	Gippsland Water	
	Rate (\$/kL)	\$1.56/kL	
	Per Capita Water Consumption (L/day)	Unknown	
CATCHMENT AND WATER SUPPLY	Number of Connections	Unknown	
	Catchment	Latrobe	
	Sub-Catchment	Not within a designated water supply catchment - Latrobe River Basin	
	Catchment Management Authority (CMA)	West Gippsland Catchment Management Authority	
	CMA Web-Link	http://www.wgcma.vic.gov.au/	
	Catchment Protection Status	None. Variable depending on location - likely to be moderate to poor.	
	Potable Water Source(s)	Tanjil River Narracan Creek	
	Supply Capacity	Unknown	
	Treatment Plant(s)	Moe WTP	
WATER QUALITY	Level of Treatment	Coagulation, Flocculation, Primary Solids Separation - (Clarification), Secondary Solids Separation - (Sand Filters & Dual Media Filters), Primary and Secondary disinfection, pH Correction, Fluoridation.	
	Drinking Water Guidelines	Australian Drinking Water Guidelines (2004) and Safe Drinking Water Regulations (2005)	
	Results (% compliance for 2008 reporting period)	E Coli	100%
		pH	Maximum pH level was just outside guideline.
WATER SECURITY	Current Water Restrictions	No	
	Proportion of Potable Water Supplied to Households (%)	Unknown	
	Distance from the Coast (km)	Approx 70km South	
	Climate	Temperate	
	Average Annual Rainfall	1019.8mm	
FACTOR		YES / NO	NOTES / EXPLANATION
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	YES Majority of Victoria experiencing drought (or Exceptional Circumstances, whereby farmers can apply for rebates) http://www.daff.gov.au/agriculture-food/drought/ec/victoria
		Single drinking water source	NO
		Poor quality water source	
		Sewage overflow or disposal into water source	
		Flooding	
		Fauna defecating in supply	
		Fauna destroying water intake structures	
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	NO
		Un-lined landfills	
		Extensive agriculture	
		Low vegetation cover (dust, sediment runoff)	
		Poor access to supply	
		Unsustainable water extraction	
		Aquifer turning saline due to high extraction	
	Governance	Hard water	NO
		Aging or inadequate pipe work and associated infrastructure	
		Significant water losses due to leaking pipes	
		High per capita water consumption	
		Inappropriate water quality standards / objectives	NO
		Lack of infrastructure maintenance	NO
	Industries	Poor management or governance	NO
		Vandalism / sabotage / terrorism	NO
		Insufficient trained personnel	NO
	Population	Inadequate funding for maintenance or upgrades	
		Mining / minerals	NO
		Irrigation	
		Chemicals / process	NO
WATER QUALITY OR SECURITY RISK (EFFECT)		Seasonal population loadings	
		Rapid population growth	NO
		Pathogenic contamination	NO
		Algal blooms	NO
		Heavy metal contamination	NO
		Poor chlorine residuals	NO
		Pesticide contamination	NO
		Boil water notices	NO
		Deaths or illness due to water quality	NO
		Water restrictions (current and historic)	YES May have previously been on restrictions but these have now been lifted.
		Taste and odour issues	NO
		Other contamination that would affect health	YES High turbidity and aluminium during a high rainfall event.
Notes		Nov 07 - Increase of turbidity and aluminium in water supply due to heavy rainfall event. Malfunction at treatment plant caused by heavy rainfall event. Malfunction rectified and the water treatment plant resumed operation.	

Town # 56

TOWN	State/Territory	VIC		
	Town Name	Wonthaggi		
	Town Population	6,529 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility	South Gippsland Water		
	Rate (\$/kL)	\$1.27/kL		
	Per Capita Water Consumption (L/day)	Unknown		
	Number of Connections	Unknown		
CATCHMENT AND WATER SUPPLY	Catchment	West South Gippsland River Basin		
	Sub-Catchment	-		
	Catchment Management Authority (CMA)	West Gippsland Catchment Management Authority		
	CMA Web-Link	http://www.wgcm.vic.gov.au/		
	Catchment Protection Status	Poor to Moderate		
	Potable Water Source(s)	Lance Creek Powlett River		
	Supply Capacity	Unknown		
WATER QUALITY	Treatment Plant(s)	Lance Creek WTP		
	Level of Treatment	Reservoir Destratification Taste and Odour pH Correction Manganese Oxidation Flocculation/Coagulation Filtration Chlorination/Re-chlorination		
		Drinking Water Guidelines	Australian Drinking Water Guidelines (2004) and Safe Drinking Water Regulations (2005)	
		Results (% compliance for 2008 reporting period)	E Coli	100%
			THM's	Did not comply with standards
WATER SECURITY		Current Water Restrictions	No	
	Proportion of Potable Water Supplied to Households (%)	Unknown		
	Distance from the Coast (km)	Approx 5km South-West		
	Climate	Temperate		
	Average Annual Rainfall	933.6mm		
FACTOR		YES / NO	NOTES / EXPLANATION	
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply		Majority of Victoria experiencing drought (or Exceptional Circumstances, whereby farmers can apply for rebates) http://www.daff.gov.au/agriculture-food/drought/ec/victoria	
		Drought	YES	
		Single drinking water source	NO	
		Poor quality water source	NO	
		source		
		Flooding		
		Fauna defecating in supply		
		Fauna destroying water intake structures		
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	NO	
		Un-lined landfills		
		Extensive agriculture		
		Low vegetation cover (dust, sediment runoff)		
		Poor access to supply		
		Unsustainable water extraction		
		Aquifer turning saline due to high	NO	
		Hard water	NO	
		Aging or inadequate pipe work and associated infrastructure		
		Significant water losses due to leaking pipes		
	Governance	High per capita water consumption		
		Inappropriate water quality standards / objectives	NO	
		Lack of infrastructure maintenance		
		Poor management or governance	NO	
		Vandalism / sabotage / terrorism	NO	
		Insufficient trained personnel	NO	
	Industries	Inadequate funding for maintenance or upgrades		
		Mining / minerals	NO	
		Irrigation		
	Population	Chemicals / process	NO	
		Seasonal population loadings		
	WATER QUALITY OR SECURITY RISK (EFFECT)	Rapid population growth		
Pathogenic contamination		NO		
Algal blooms		YES	A blue-green algal bloom event was reported on the 30th August 2007 for the Lance Creek Reservoir.	
Heavy metal contamination		NO		
Poor chlorine residuals				
Pesticide contamination		NO		
Boil water notices		NO		
Deaths or illness due to water quality		NO		
Water restrictions (current and historic)		NO		
Taste and odour issues		NO		
	Other contamination that would affect	YES	Elevated THM's	

Notes	Introduction of chloramination system to replace present chlorination disinfection and thereby reduce trihalomethane formation - Due for completion in April 2009. Inverloch is another town with the same issues as its water supply comes from the same system.
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Town # 57

TOWN	State/Territory	VIC	
	Town Name	Kerang	
	Town Population	3,780 (Census 2006, Urban Centre/Locality)	
WATER UTILITY	Name of Water Utility	Lower Murray Water	
	Rate (\$/kL)	Tier 1 \$0.33/kL, Tier 2 \$0.59/kL, Tier 3 \$0.76/kL	
	Per Capita Water Consumption (L/day)	Unknown	
CATCHMENT AND WATER SUPPLY	Number of Connections	Unknown	
	Catchment	North Loddon River Basin	
	Sub-Catchment	Not within a designated water supply catchment	
	Catchment Management Authority (CMA)	North Central Catchment Management Authority	
	CMA Web-Link	http://www.nccma.vic.gov.au/	
	Catchment Protection Status	None. Moderate condition.	
	Potable Water Source(s)	Murray River (directly) Goulburn Murray Water Irrigation Channel (water originates from the Murray River) Loddon River	
	Supply Capacity	Murray River (approx 50L/sec)	
	Treatment Plant(s)	Kerang WTP	
WATER QUALITY	Level of Treatment	Coagulation/flocculation, Disinfection, pH correction, Taste & odour removal	
	Drinking Water Guidelines	Australian Drinking Water Guidelines (2004) and Safe Drinking Water Regulations (2005)	
	Results (% compliance for 2008 reporting period)	Aluminium	92% - Did not comply with standards
		E Coli	100%
WATER SECURITY	Current Water Restrictions	Yes Stage 3 - Started 17/01/08 For details refer to: http://www.ourwater.vic.gov.au/saving/restrictions	
	Proportion of Potable Water Supplied to Households (%)	Unknown	
	Distance from the Coast (km)	Approx 290km South	
	Climate	Temperate	
	Average Annual Rainfall	371.9 mm	
FACTOR		YES / NO	NOTES / EXPLANATION
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	YES Majority of Victoria experiencing drought (or Exceptional Circumstances, whereby farmers can apply for rebates) http://www.daff.gov.au/agriculture-food/drought/ec/victoria
		Single drinking water source	
		Poor quality water source	
		Sewage overflow or disposal into water source	
		Flooding	
		Fauna defecating in supply	
		Fauna destroying water intake structures	
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	
		Un-lined landfills	
		Extensive agriculture	
		Low vegetation cover (dust, sediment runoff)	
		Poor access to supply	
		Unsustainable water extraction	
		Aquifer turning saline due to high extraction	
		Hard water	
	Governance	Aging or inadequate pipe work and associated infrastructure	
		Significant water losses due to leaking pipes	
		High per capita water consumption	
		Inappropriate water quality standards / objectives	
		Lack of infrastructure maintenance	
	Industries	Poor management or governance	
		Vandalism / sabotage / terrorism	
		Insufficient trained personnel	
	Population	Inadequate funding for maintenance or upgrades	
		Mining / minerals	
		Irrigation	
		Chemicals / process	
	Population	Seasonal population loadings	
		Rapid population growth	NO
WATER QUALITY OR SECURITY RISK (EFFECT)	Pathogenic contamination		
	Algal blooms		
	Heavy metal contamination		
	Poor chlorine residuals		
	Pesticide contamination		
	Boil water notices	NO	
	Deaths or illness due to water quality	NO	
	Water restrictions (current and historic)	YES	Stage 3 currently in place
	Taste and odour issues	NO	
	Other contamination that would affect health	YES	Elevated levels of aluminium. High aluminium residual was due to a higher than normal pH of the settled water prior to filtration.
Notes		Very little information available on Kerang water supply system.	

Town # 58

TOWN	State/Territory		VIC	
	Town Name		Ararat	
	Town Population		7,169 (Census 2006, Urban Centre/Locality)	
WATER UTILITY	Name of Water Utility		Grampians Wimmera Mallee Water	
	Rate (\$/kL)		\$1.30/kL - fully treated water	
	Per Capita Water Consumption (L/day)		Unknown	
	Number of Connections		Unknown	
CATCHMENT AND WATER SUPPLY	Catchment		Hopkins River Basin	
	Sub-Catchment		Not within a designated Catchment	
	Catchment Management Authority (CMA)		Glenelg Hopkins Catchment Management Authority	
	CMA Web-Link		http://www.ghcma.vic.gov.au/	
	Catchment Protection Status		None. Very Poor to Poor condition.	
	Potable Water Source(s)		Lake Fyans	
			Mt Cole Reservoir	
			Langi Ghiran Reservoir	
Supply Capacity		Unknown		
WATER QUALITY	Treatment Plant(s)		Ararat WTP	
	Level of Treatment		Coagulation, flocculation, dissolved air flotation, filtration, disinfection, pH correction	
	Drinking Water Guidelines		Australian Drinking Water Guidelines (2004) and Safe Drinking Water Regulations (2005)	
	Results (% compliance for 2008 reporting period)		E Coli	100%
			THM's	Did not comply with standards
WATER SECURITY	Current Water Restrictions		Yes Recently revised from Stage 4 to Stage 1	
	Proportion of Potable Water Supplied to Households (%)		Unknown	
	Distance from the Coast (km)		Approx 130km South-West	
	Climate		Temperate	
	Average Annual Rainfall		587.1 mm	
FACTOR			YES / NO	NOTES / EXPLANATION
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	YES	Majority of Victoria experiencing drought (or Exceptional Circumstances, whereby farmers can apply for rebates) http://www.daff.gov.au/agriculture-food/drought/ec/victoria
		Single drinking water source	NO	
		Poor quality water source	NO	
		Sewage overflow or disposal into water source	NO	
		Flooding	NO	
		Fauna defecating in supply		
		Fauna destroying water intake structures		
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)		
		Un-lined landfills	NO	
		Extensive agriculture		
		Low vegetation cover (dust, sediment runoff)		
		Poor access to supply		
		Unsustainable water extraction		
		Aquifer turning saline due to high extraction		
		Hard water	NO	
	Governance	Aging or inadequate pipe work and associated infrastructure		
		Significant water losses due to leaking pipes		
		High per capita water consumption		
		Inappropriate water quality standards / objectives	NO	
		Lack of infrastructure maintenance	??	
	Industries	Poor management or governance	NO	
		Vandalism / sabotage / terrorism	NO	
		Insufficient trained personnel	?	
	Population	Inadequate funding for maintenance or upgrades	NO	
		Mining / minerals	NO	
		Irrigation	NO	
	WATER QUALITY OR SECURITY RISK (EFFECT)	Chemicals / process	NO	
			Seasonal population loadings	
		Rapid population growth	NO	
Pathogenic contamination		NO		
Algal blooms		NO		
Heavy metal contamination		NO		
Poor chlorine residuals		?		
Pesticide contamination		NO		
Boil water notices		NO		
Deaths or illness due to water quality		NO		
Water restrictions (current and historic)	YES	Stage 4 - Started 10/02/09 recently revised to Stage 1.		
Taste and odour issues	NO			
Other contamination that would affect health	YES	Elevated trihalomethanes.		
Notes		WTP operated under a BOOT agreement		

Town Profiles – SA

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Review of Regional Water Quality & Security

Appendices
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Town # 59

TOWN	State/Territory	SA		
	Town Name	Port Augusta		
	Town Population	13,199 (SA Water Data, based on suburbs Pt Augusta, Pt Augusta West and Stirling North)		
WATER UTILITY	Name of Water Utility	SA Water		
	Rate (\$/kL)	Quarterly supply charge of \$34.40		
	Per Capita Water Consumption (ML/day)	360 L/person/day (based on residential use only)		
CATCHMENT AND WATER SUPPLY	Number of Connections	5,860		
	Catchment	Murray River Basin Catchment		
	Sub-Catchment	Lower Murray		
	Catchment Management Authority (CMA)	South Australia Murray Darling Basin (SAMDB), Natural Resources Management Board (NRMB)		
	CMA Web-Link	http://www.mdba.gov.au/ http://www.nrm.sa.gov.au/		
	Catchment Protection Status	Prescribed		
	Potable Water Source(s)	Murray River		
WATER QUALITY	Supply Capacity	Water is delivered via the Morgan – Whyalla pipeline from SA Water's existing Country Allocation from the River Murray. Unrestricted, this allocation is 50 GL/a. However, recent drought conditions have seen the allocations drop to 31 GL/a in 2007-08. Supply capacity to particular town is unknown.		
	Treatment Plant(s)	Morgan Filtration Plant, Morgan (Morgan-Whyalla pipeline)		
	Level of Treatment	Conventional Water Treatment Plant (Coagulation, Flocculation, Sedimentation, Filtration, Disinfection (NHCl2), Fluoridation, Storage and distribution)		
	Drinking Water Guidelines	ADWG 2004		
	Results (% compliance for 2008 reporting period)	Source:	SA Water (email)	
		Faecal Coliforms/100 mL	100%	
		E.Coli/100mL	100%	
		Chlorine Residual-Free [mg/L]	N/A	
		Chlorine Residual- Total [mg/L]	100%	
		TDS [by EC] [mg/L]	100%	
		Colour-True [HU]	100%	
		Turbidity [NTU]	100%	
		pH Units	1%	
		Trihalomethanes-Total [ug/L]	100%	
		Fluoride [mg/L]	100%	
		Iron-Total [mg/L]	100%	
		Total Hardness as CaCO3 [mg/L]	100%	
Manganese	100%			
WATER SECURITY	Current Water Restrictions	Level 3 Enhanced Water Restrictions- Dripper systems and hand-held hoses fitted with a trigger nozzle can be used for a maximum of 3 hours 2 days a week between 6 am - 9 am or 6pm - 9 pm. Watering cans and buckets can be used on any day/time. Sprinklers and other watering systems remain banned.		
	Proportion of Potable Water Supplied to Households (%)	72% residential, 28% non-residential (incl. commercial, industrial, mining, public institution, public utilities & recreation)		
	Distance from the Coast (km)	0		
	Climate	Temperate		
	Average Annual Rainfall	242.8mm		
FACTOR				
YES / NO				
NOTES / EXPLANATION				
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	YES	Yes, Based on the PIRSA EC maps and BOM 3 year rain maps
		Single drinking water source	YES	From the Morgan-Whyalla Pipeline
		Poor quality water source	NO	
		Sewage overflow or disposal into water source	NO	
		Flooding	NO	No historical record for Pt Augusta
		Fauna defecating in supply	Yes	Not an issue due to treatment plant
		Fauna destroying water intake structures	NO	
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	Unknown	
		Un-lined landfills	NO	
		Extensive agriculture	YES	Extensive grazing and cropping. Dryland and irrigated agriculture.
		Low vegetation cover (dust, sediment runoff)	YES	Cleared and modified native vegetation, cropping and grasslands.
		Poor access to supply	NO	
		Unsustainable water extraction	YES	Low flows causing several issues for Murray River Region.
		Aquifer turning saline due to high extraction	NO	
		Hard water	NO	Water quality report shows WTP water to be of good quality.
		Aging or inadequate pipe work and associated infrastructure	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Significant water losses due to leaking pipes	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
	Governance	High per capita water consumption	NO	According to SA WATER
		Inappropriate water quality standards / objectives	NO	
		Lack of infrastructure maintenance	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Poor management or governance	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Vandalism / sabotage / terrorism	NO	
		Insufficient trained personnel	NO	
		Inadequate funding for maintenance or upgrades	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Industrie s	Mining / minerals	NO
	Irrigation		YES	Irrigated cropping occurs in this catchment.
	Chemicals / process		NO	
	Seasonal population loadings		NO	

	Population	Rapid population growth	NO	During the period leading up to 2001 the region was enduring an extended period of population decline, however from 2001 to 2006 this changed with the region experiencing growth of approximately 0.75 % per annum.
WATER QUALITY OR SECURITY RISK (EFFECT)		Pathogenic contamination	NO	100% of all tests are above AWDG guidelines this year
		Algal blooms	YES	A total of 53 blooms were recorded in SA Water Reservoirs between 2002 and 2007, while a further 100 blooms were detected along the Murray River.
		Heavy metal contamination	Unknown	
		Poor chlorine residuals	NO	
		Pesticide contamination	YES	The recent rains may have washed stormwater pollution (such as fertilisers, manure and detergent) into our creeks and rivers. Due to high agriculture it seems likely, although could not find dat.
		Boil water notices	NO	
		Deaths or illness due to water quality	NO	
		Water restrictions (current and historic)	YES	Since 2003.
		Taste and odour issues	YES	
		Other contamination that would affect health	YES	<u>Increasing salinity</u> - (critical issue for the quality of our drinking water in the Murray. Long-term below average rainfall over the past 10 years has reduced river flows and salt has accumulated in the floodplains and disconnected wetlands. While the water quality meets drinking water guidelines at the moment, when river flows are increased, this accumulated salt may reduce water quality). <u>Elevated phosphorus and nitrate readings</u> (fertilisers, manure and detergent washed in from rainfall).
Notes				

Town # 60

TOWN	State/Territory	SA		
	Town Name	Port Pirie		
	Town Population	13,752 (SA Water Data, based on suburbs of Port Pirie, Port Pirie West, Port Pirie South, Risdon Park, Risdon Park South, Solomontown)		
WATER UTILITY	Name of Water Utility	SA Water		
	Rate (\$/kL)	13,752		
	Per Capita Water Consumption (L/day)	290 L/person/day (based on residential use only)		
CATCHMENT AND WATER SUPPLY	Number of Connections	6,538		
	Catchment	Murray River Basin Catchment		
	Sub-Catchment	Southern Basin		
	Catchment Management Authority (CMA)	South Australia Murray Darling Basin (SAMDB) , Natural Resources Management Board (NRMB)		
	CMA Web-Link	http://www.mdba.gov.au/ http://www.nrm.sa.gov.au/		
	Catchment Protection Status	Prescribed		
	Potable Water Source(s)	Murray River		
	Supply Capacity	Water delivered via the Morgan – Whyalla pipeline is from SA Water's existing Country Allocation from the River Murray. Unrestricted, this allocation is 50 GL/a. However, recent drought conditions have seen the allocations drop to 31 GL/a in 2007-08. Supply capacity		
WATER QUALITY	Treatment Plant(s)	Morgan Filtration Plant, Morgan		
	Level of Treatment	Conventional Water Treatment Plant (Coagulation, Flocculation, Sedimentation, Filtration, Disinfection (NHC12), Fluoridation, Storage and distribution)		
	Drinking Water Guidelines	ADWG 2004		
	Results (% compliance for 2008 reporting period)	Source	SA Water (email).	
		Faecal Coliforms/100 mL	100%	
		E.Coli/100mL	100%	
		Chlorine Residual-Free [mg/L]	N/A	
		Chlorine Residual- Total [mg/L]	100%	
		TDS [by EC] [mg/L]	100%	
		Colour-True [HU]	100%	
		Turbidity [NTU]	100%	
		pH Units	1%	
		Trihalomethanes-Total [ug/L]	100%	
		Fluoride [mg/L]	100%	
		Iron-Total [mg/L]	100%	
Total Hardness as CaCO3 [mg/L]		100%		
Manganese		100%		
WATER SECURITY	Current Water Restrictions	Yes, Level 3 Enhanced Water Restrictions- Dripper systems and hand-held hoses fitted with a trigger nozzle can be used for a maximum of 3 hours 2 days a week between 6 am - 9 am or 6pm - 9 pm. Watering cans and buckets can be used on any day/time. Sprinklers and other watering systems remain banned.		
	Proportion of Potable Water Supplied to Households (%)	28% residential, 72% non-residential (incl. commercial, industrial, mining, public institution, public utilities & recreation).		
	Distance from the Coast (km)	0		
	Climate	Temperate		
	Average Annual Rainfall	344.6mm		
FACTOR		YES / NO	NOTES / EXPLANATION	
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	YES	Yes, Based on the PIRSA EC maps and BOM 3 year rain maps.
		Single drinking water source	YES	From the Morgan-Whyalla Pipeline
		Poor quality water source	NO	
		Sewage overflow or disposal into water source	NO	
		Flooding	NO	No historical record for Pt Augusta
		Fauna defecating in supply	Yes	Not an issue due to treatment plant
		Fauna destroying water intake structures	NO	
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	Unknown	
		Un-lined landfills	NO	
		Extensive agriculture	YES	Extensive grazing and cropping. Dryland and irrigated agriculture
		Low vegetation cover (dust, sediment runoff)	YES	Cleared and modified native vegetation, cropping and grasslands
		Poor access to supply	NO	
		Unsustainable water extraction	YES	Low flows causing several issues for Murray River Region
		Aquifer turning saline due to high extraction	NO	
		Hard water	NO	Water quality report shows WTP water to be of good quality
		Aging or inadequate pipe work and associated infrastructure	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Significant water losses due to leaking pipes	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
	High per capita water consumption	NO	According to SA WATER	

WATER QUALITY	Governance	Inappropriate water quality standards / objectives	NO	
		Lack of infrastructure maintenance	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Poor management or governance	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Vandalism / sabotage / terrorism	NO	
		Insufficient trained personnel	NO	
		Inadequate funding for maintenance or upgrades	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
	Industries	Mining / minerals	NO	
		Irrigation	YES	Irrigated cropping occurs in this catchment.
		Chemicals / process	NO	
	Population	Seasonal population loadings	NO	
		Rapid population growth	NO	During the period leading up to 2001 the region was enduring an extended period of population decline, however from 2001 to 2006 this changed with the region experiencing growth of approximately 0.75 % per annum.
WATER QUALITY OR SECURITY RISK (EFFECT)		Pathogenic contamination	NO	100% of all tests are above AWDG guidelines this year.
		Algal blooms	YES	A total of 53 blooms were recorded in SA Water Reservoirs between 2002 and 2007, while a further 100 blooms were detected along the Murray River.
		Heavy metal contamination	Unknown	
		Poor chlorine residuals	NO	
		Pesticide contamination	YES	The recent rains may have washed stormwater pollution (such as fertilisers, manure and detergent) into our creeks and rivers. Due to high agriculture it seems likely, although could not find data
		Boil water notices	NO	
		Deaths or illness due to water quality	NO	
		Water restrictions (current and historic)	YES	Since 2003.
		Taste and odour issues	YES	
		Other contamination that would affect health	YES	Increasing salinity -(critical issue for the quality of our drinking water in the Murray. Long-term below average rainfall over the past 10 years has reduced river flows and salt has accumulated in the floodplains and disconnected wetlands. While the water quality meets drinking water guidelines at the moment, when river flows are increased, this accumulated salt may reduce water quality). Elevated phosphorus and nitrate readings (fertilisers, manure and detergent washed in from rainfall).
Notes				

Town # 61

TOWN	State/Territory	SA
	Town Name	Port Lincoln
WATER UTILITY	Town Population	13,044 (Census 2006, Urban Centre/Locality)
	Name of Water Utility	SA Water
CATCHMENT AND WATER SUPPLY	Rate (\$/kL)	Quarterly supply charge of \$34.40
	Per Capita Water Consumption (L/day)	240 L/person/day (based on residential use only)
WATER QUALITY	Number of Connections	6137
	Catchment	Lincoln Basin/ Uley South/Uley Wanilla
WATER SECURITY	Sub-Catchment	-
	Catchment Management Authority (CMA)	- Department of Water, Land and Biodiversity Conservation (DWLBC) - Eyre Peninsula Natural Resources Management Board (EPNRMB) - EPNRMB Water Resources Advisory Committee (WRAC)
WATER UTILITY	CMA Web-Link	www.epnrmbsa.gov.au
	Catchment Protection Status	Prescribed
CATCHMENT AND WATER SUPPLY	Potable Water Source(s)	Lincoln Basin/ Uley South/Uley Wanilla
	Supply Capacity	Bore Field - allowable extraction Recharge rates are applied to the assessed 'catchment' area of each lens to generate an annual recharge volume for each lens. 60% of this annual recharge is set aside to maintain the integrity of the resource, leaving ~40% available for allocation (a percentage of which is set aside for stock and domestic users). Recharge rates are gazetted in November each year, which set the allocation for the following financial year. Uley Wanilla 230.9 ML/a Uley East 180.9 ML/a Uley South 7224.0 ML/a Lincoln A, B and C 928.6 ML/a
WATER QUALITY	Treatment Plant(s)	N/A
	Level of Treatment	Cl2 Disinfection Only
WATER SECURITY	Drinking Water Guidelines	ADWG 2004
	Results (% compliance for 2008 reporting period)	Lincoln Uley South Uley Wanilla Basin Source: SA Water Drinking Water Quality Report 07-08 Faecal Coliforms/100 mL 100% E.Coli/100mL 100% Chlorine Residual-Free [mg/L] 100% Chlorine Residual- Total [mg/L] N/A TDS [by EC] [mg/L] 0% Colour-True [HU] 100% Turbidity [NTU] 100% pH Units 100% Trihalomethanes-Total [ug/L] 100% Fluoride [mg/L] 100% Iron-Total [mg/L] 100% Total Hardness as CaCO3 [mg/L] 0% Manganese 100%
WATER SECURITY	Current Water Restrictions	Yes, Level 3 Enhanced Water Restrictions since July 2009 (Dripper and trigger nozzle hoses 3 hours a week, buckets and watering cans any time, permits required for swimming pools).
	Proportion of Potable Water Supplied to Households (%)	Commercial-4.5%, Industrial 8.3%, Primary Production, 0.5 %, Public Institution, 4.7 %, Public Utilities 0.9 %, Recreation, 4.3 %, Residential 67.4%, Unclassified 5.6%, Vacant Land 3.8%
WATER SECURITY	Distance from the Coast (km)	0
	Climate	Temperate
WATER SECURITY	Average Annual Rainfall	490.9mm
WATER SECURITY	FACTOR	YES / NO
	NOTES / EXPLANATION	
WATER SECURITY	Drought	YES Yes, Based on the PIRSA EC maps and BOM 3 year rain maps
	Single drinking water source	YES Uley and Lincoln Bores. Tod Reservoir is an integral part of the overall contingency plan for the region and presents a future option to ensure that the water quality in Tod Reservoir is suitable for use as an emergency supply.
WATER SECURITY	Poor quality water source	NO The groundwater is classified as moderate for drinking water due to elevated salinity in some areas. This is largely due to excess irrigation water leaching salts through the soil to the shallow (quaternary aquifer) system. The salinity was between 494mg/L and 1312 mg/L across the region, while the NH&MRC guideline (for taste) has a low value of 500mg/L and an upper value of 1000mg/L.
	Sewage overflow or disposal into water source	NO
WATER SECURITY	Flooding	YES Due to high tides.
	Fauna defecating in supply	NO
WATER SECURITY	Fauna destroying water intake structures	NO
	Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	Unknown
WATER SECURITY	Un-lined landfills	NO
	Extensive agriculture	YES Extensive cropping, although the bore fields are in national parks.
WATER SECURITY	Low vegetation cover (dust, sediment runoff)	NO
	Poor access to supply	NO
WATER SECURITY	Unsustainable water extraction	YES Water levels in Eyre Peninsula groundwater basins have dropped by up to five metres since 1970 due to below average rainfall and unsustainable extraction.
	Aquifer turning saline due to high extraction	YES A lack of recent rainfall and increasing demand on some of the region's smaller groundwater resources has lessened the amount of fresh water within these lenses and increased salinity. Potential for seawater incursion is also becoming a concern.
WATER SECURITY	Hard water	YES Lincoln basin averages 360 mg/L, Uley South averages 270, Uley Wanilla averages 280 CaCO3 for 2004 to 2007 (200-500 mg/L causes increase in scaling problems).
	Aging or inadequate pipe work and associated infrastructure	NO SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.

WATER QUALITY OR SECURITY RISK (EFFECT)	WATER QUALITY	Significant water losses due to leaking pipes	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		High per capita water consumption	NO	According to SA Water
		Inappropriate water quality standards / objectives	NO	
		Lack of infrastructure maintenance	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Poor management or governance	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Vandalism / sabotage / terrorism	NO	
		Insufficient trained personnel	NO	
		Inadequate funding for maintenance or upgrades	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Mining / minerals	NO	
		Irrigation	YES	Agriculture
		Chemicals / process	YES	Fishing industry/potential mine industry
		Seasonal population loadings	YES	Moderate population changes due to fishing industry.
		Rapid population growth	NO	Population increase = 0.51%/annum based on 2006/2001 census (Urban Centre/Locality), which is below the state average (0.76%/annum) for the same period.
		Pathogenic contamination	NO	
WATER QUALITY OR SECURITY RISK (EFFECT)	WATER QUALITY OR SECURITY RISK (EFFECT)	Algal blooms	NO	
		Heavy metal contamination	Unknown	
		Poor chlorine residuals	NO	
		Pesticide contamination	Unknown	
		Boil water notices	NO	
		Deaths or illness due to water quality	NO	
		Water restrictions (current and historic)	NO	Yes has been level 3 in the past and now is enhanced level 3.
		Taste and odour issues	NO	
		Other contamination that would affect health	YES	High salts and hardness.
		Notes	Morgan-Whyalla pipeline will be connected to other rural towns using the groundwater this year. This will reduce the pressure in the groundwater.	

Town # 62

TOWN	State/Territory	SA		
	Town Name	Mt Barker		
	Town Population	10,272 (SA Water Data, based on the suburb of Mount Barker)		
WATER UTILITY	Name of Water Utility	Riverland Water		
	Rate (\$/kL)	Quarterly supply charge of \$34.40 Quarterly water use charges based meter readings taken approximately every 3 months*: For the first 0.3288 kL used per day \$0.97 per kilolitre (kL) For use above 0.3288 kL per day \$1.88 per kL For use above 1.4247kL per day for homes, home units, maisonettes, townhouses, row houses and some shacks \$2.26 per kL.		
	Per Capita Water Consumption (L/day)	180 L/person/day (based on residential use only)		
	Number of Connections	3,873		
CATCHMENT AND WATER SUPPLY	Catchment	Murray River		
	Sub-Catchment	Lower Murray		
	Catchment Management Authority (CMA)	South Australia Murray Darling Basin (SAMDB) , Natural Resources Management Board (NRM)		
	CMA Web-Link	http://www.mdba.gov.au/ http://www.nrm.sa.gov.au/		
	Catchment Protection Status	Prescribed		
	Potable Water Source(s)	Murray River		
WATER QUALITY	Supply Capacity	River - allowable extraction		
	Treatment Plant(s)	Summit WTP, Balhannah		
	Level of Treatment	Conventional Water Treatment Plant (Coagulation, Flocculation, Sedimentation, Filtration, Disinfection (UV and NHC12), Fluoridation, Storage and distribution)		
	Drinking Water Guidelines	ADWG 2004		
	Results (% compliance for 2008 reporting period)	Source	SA Water Drinking Water Quality Report 07-08	
		Faecal Coliforms/100 mL	100%	
		E.Coli/100mL	100%	
		Chlorine Residual-Free [mg/L]	N/A	
		Chlorine Residual- Total [mg/L]	100%	
		TDS [by EC] [mg/L]	86%	
		Colour-True [HU]	100%	
		Turbidity [NTU]	100%	
		pH Units	30%	
		Trihalomethanes-Total [ug/L]	100%	
		Fluoride [mg/L]	100%	
		Iron-Total [mg/L]	100%	
	Total Hardness as CaCO3 [mg/L]	100%		
Manganese as CaCo3 [mg/L]	100%			
WATER SECURITY	Current Water Restrictions	Yes, Level 3 Enhanced Water Restrictions (Dripper and trigger nozzle hoses 3 hours a week, buckets and watering cans any time, permits required for swimming pools). Level 3 water restrictions apply to all properties under a Supply by Measure Agreement connected directly or indirectly to any of the following trunk mains: Mannum Adelaide.		
	Proportion of Potable Water Supplied to Households (%)	70% residential, 30% non-residential.		
	Distance from the Coast (km)	30		
	Climate	Temperate		
	Average Annual Rainfall	764mm		
FACTOR				
WATER QUALITY OR SECURITY RISK (CAUSE)	YES / NO		NOTES / EXPLANATION	
	Drought	YES	Yes, Based on the PIRSA EC maps and BOM 3 year rain maps	
	Single drinking water source	YES	Mannum-Adelaide Pipeline	
	Poor quality water source	NO		
	Sewage overflow or disposal into water source	NO		
	Flooding	YES	Historical floods in Mt Barker and Murray River	
	Fauna defecating in supply	YES	Not a problem due to WTP	
	Fauna destroying water intake structures	NO		
	Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	Unknown		
	Un-lined landfills	NO		
	Extensive agriculture	YES	Extensive grazing and cropping. Dryland and irrigated agriculture.	
	Low vegetation cover (dust, sediment runoff)	YES	Cleared and modified native vegetation, cropping and grasslands.	
	Poor access to supply	NO		
	Unsustainable water extraction	YES	Low flows causing several issues for Murray River Region.	
	Aquifer turning saline due to high extraction	NO		
	Hard water	NO	Water quality report shows WTP water to be of good quality	
	Aging or inadequate pipe work and associated infrastructure	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.	
	Significant water losses due to leaking pipes	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.	
	Governance	High per capita water consumption	NO	According to SA Water
		Inappropriate water quality standards / objectives	NO	
		Lack of infrastructure maintenance	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Poor management or governance	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Vandalism / sabotage / terrorism	NO	
		Insufficient trained personnel	NO	
		Inadequate funding for maintenance or upgrades	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
	Utilities	Mining / minerals	NO	
Irrigation		YES	Irrigated cropping occurs in this catchment.	

WATER QUALITY OR SECURITY RISK (EFFECT)	Indi Population	Chemicals / process	NO	
		Seasonal population loadings	NO	
		Rapid population growth	YES	Above state average (.76%/annum) - 5.28%/annum;. (population increase based on 2006/2001 census (Urban Centre/Locality))
		Pathogenic contamination	NO	100% of all tests meet AWDG guidelines this year
		Algal blooms	YES	A total of 53 blooms were recorded in SA Water Reservoirs between 2002 and 2007, while a further 100 blooms were detected along the Murray River.
		Heavy metal contamination	Unknown	
		Poor chlorine residuals	NO	
		Pesticide contamination	Unknown	
		Boil water notices	NO	
		Deaths or illness due to water quality	NO	
		Water restrictions (current and historic)	YES	Since 2003
		Taste and odour issues	YES	
		Other contamination that would affect health	YES	Increasing salinity -(critical issue for the quality of our drinking water in the Murray. Long-term below average rainfall over the past 10 years has reduced river flows and salt has accumulated in the floodplains and disconnected wetlands. While the water quality meets drinking water guidelines at the moment, when river flows are increased, this accumulated salt may reduce water quality). Elevated phosphorus and nitrate readings (fertilisers, manure and detergent washed in from rainfall)
		Notes		

Town # 63

TOWN	State/Territory	SA	
	Town Name	Victor Harbor	
WATER UTILITY	Town Population	10,794 (SA Water Data, based on the suburbs of Encounter Bay, Victor Harbor, McCracken, Hayborough)	
	Name of Water Utility	SA Water -United Group Infrastructure/United water	
	Rate (\$/kL)	Quarterly supply charge of \$34.40	
	Per Capita Water Consumption (ML/day)	270 L/person/day (based on residential use only)	
CATCHMENT AND WATER SUPPLY	Number of Connections	6412	
	Catchment	River Murray and Myponga River Catchment	
	Sub-Catchment	Lower Murray	
	Catchment Management Authority (CMA)	South Australia Murray Darling Basin (SAMDB)/Adelaide and Mount Lofty Ranges Natural Resources Management Board	
	CMA Web-Link	http://www.mdba.gov.au/ http://www.nrm.sa.gov.au/	
	Catchment Protection Status	Prescribed	
	Potable Water Source(s)	River Murray	
		Myponga reservoir	
	Supply Capacity	Murray River - allowable extraction Myponga Reservoir - 15 000 megalitres per year average, 26 800 megalitres maximum	
WATER QUALITY	Treatment Plant(s)	Myponga WTP	
	Level of Treatment	Conventional Water Treatment Plant (Coagulation, Flocculation, Sedimentation, Filtration, Disinfection (UV and NHC12), Fluoridation, Storage and distribution) for the Reservoir, Membrane plant with CL2 Disinfection for the River Murray.	
	Drinking Water Guidelines	ADWG 2004	
	Results (% compliance for 2008 reporting period)	Faecal Coliforms/100 mL	100%
		E.Coli/100mL	100%
		Chlorine Residual-Free [mg/L]	100%
		Chlorine Residual- Total [mg/L]	N/A
		TDS [by EC] [mg/L]	100%
		Colour-True [HU]	100%
		Turbidity [NTU]	100%
		pH Units	100%
		Trihalomethanes-Total [ug/L]	66%
		Fluoride [mg/L]	100%
		Iron-Total [mg/L]	100%
		Total Hardness as CaCO3 [mg/L]	100%
		Manganese	100%
WATER SECURITY	Current Water Restrictions	Level 3 Enhanced Water Restrictions- Dripper systems and hand-held hoses fitted with a trigger nozzle can be used for a maximum of 3 hours 2 days a week between 6 am - 9 am or 6pm - 9 pm. Watering cans and buckets can be used on any day/time. Sprinklers and other watering systems remain banned.	
	Proportion of Potable Water Supplied to Households (%)	75% residential, 25% non-residential	
	Distance from the Coast (km)	0	
	Climate	Temperate	
	Average Annual Rainfall	535mm Victor Harbor/750mm Myponga Catchment	
FACTOR		YES / NO	NOTES / EXPLANATION
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	YES Yes, Based on the PIRSA EC maps and BOM 3 year rain maps
		Single drinking water source	NO Reservoir and river Murray water.
		Poor quality water source	YES The Myponga River catchment is used intensively for grazing dairy cattle. Water quality is frequently poor in terms of nutrient concentrations, organic carbon levels and protozoan contamination. Oxidised Nitrogen Good Total Nitrogen Good Soluble Phosphorus Poor Total Phosphorus Moderate Turbidity Good
		Sewage overflow or disposal into water source	NO Sewer overflows to the environment have been reduced from 20.7 per 100km of main in 2005-2006 to 0 in 2006-2007.
		Flooding	NO Improvements to flood due to high tide have been made recently.
		Fauna defecating in supply	YES Myponga catchments has intensive livestock land use, but this should not be an issue due to WTP.
		Fauna destroying water intake structures	NO
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	Unknown
		Un-lined landfills	NO There is an unlined landfill in the region. This is no longer in use and can not be located via the internet. It is not mentioned in river health/water quality documents so is unlikely to be an issue.
		Extensive agriculture	YES Myponga catchments has intensive livestock land use.
		Low vegetation cover (dust, sediment runoff)	NO Farming with some remnant forest and woodlands.
		Poor access to supply	NO
		Unsustainable water extraction	YES Available information suggests that the current flow conditions are providing adequate environmental flows to maintain health in the Myponga River. This is not the case with the Murray River.
		Aquifer turning saline due to high extraction	YES Documents suggest allocation greater than sustainable yield. Full use of allocation will increase water level decline and potentially increase salinity. Declining groundwater levels increasing the potential for leakage and contamination between aquifers and loss to stream flow.
		Hard water	NO
		Aging or inadequate pipe work and associated infrastructure	NO SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Significant water losses due to leaking pipes	NO SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		High per capita water consumption	NO According to SA Water

WATER QUALITY OR SECURITY RISK (EFFECT)	Governance	Inappropriate water quality standards / objectives	NO	
		Lack of infrastructure maintenance	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Poor management or governance	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Vandalism / sabotage / terrorism	NO	
		Insufficient trained personnel	NO	
		Inadequate funding for maintenance or upgrades	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
	Industries	Mining / minerals	NO	
		Irrigation	NO	
	Population	Chemicals / process	Yes	Dairy farms
		Seasonal population loadings	YES	Holiday Destination
		Rapid population growth	YES	Above state average (.76%/annum) - 3.27%/annum;. (population increase based on 2006/2001 census (Urban Centre/Locality))
		Pathogenic contamination	YES	Myponga catchments has intensive livestock land use
		Algal blooms	YES	SA Water has identified continuation of cyanobacterial bloom management at Myponga reservoir
	WATER QUALITY OR SECURITY RISK (EFFECT)	Heavy metal contamination	YES	Moderate amounts of total copper and soluble aluminium, poor levels of total iron
		Poor chlorine residuals	NO	
		Pesticide contamination	Unknown	
		Boil water notices	NO	
		Deaths or illness due to water quality	NO	
		Water restrictions (current and historic)	YES	Since 2003
		Taste and odour issues	Unknown	
		Other contamination that would affect health	YES	The nutrient levels in the Myponga River are often elevated in the winter months, coinciding with higher rainfall flushing animal wastes into the river. Nutrient levels in the Myponga catchment are being addressed by the EPA through a Myponga Watercourse Restoration Project.
		Notes		

Town # 64

TOWN	State/Territory	SA	
	Town Name	Goolwa	
WATER UTILITY	Town Population	6,055 (Census 2006, Urban Centre/Locality)	
	Name of Water Utility	SA Water -United Group Infrastructure/United water	
	Rate (\$/kL)	Quarterly supply charge of \$34.40	
	Per Capita Water Consumption (ML/day)	280 L/person/day (based on residential use only)	
	Number of Connections	3923	
CATCHMENT AND WATER SUPPLY	Catchment	River Murray and Myponga River Catchment	
	Sub-Catchment	Lower Murray	
	Catchment Management Authority (CMA)	South Australia Murray Darling Basin (SAMDB)/Adelaide and Mount Lofty Ranges Natural Resources Management Board	
	CMA Web-Link	http://www.mdba.gov.au/ http://www.nrm.sa.gov.au/	
	Catchment Protection Status	Prescribed	
	Potable Water Source(s)	River Murray	
	Supply Capacity	Murray River - allowable extraction Myponga Reservoir - 15 000 megalitres per year average, 26 800 megalitres maximum	
WATER QUALITY	Treatment Plant(s)	Myponga WTP	
	Level of Treatment	Conventional Water Treatment Plant (Coagulation, Flocculation, Sedimentation, Filtration, Disinfection (UV and NHC12), Fluoridation, Storage and distribution) for the Reservoir, Membrane plant with CL2 Disinfection for the River Murray	
	Drinking Water Guidelines	ADWG 2004	
	Results (% compliance for 2008 reporting period)	Faecal Coliforms/100 mL	100%
		E.Coli/100mL	100%
		Chlorine Residual-Free [mg/L]	100%
		Chlorine Residual- Total [mg/L]	N/A
		TDS [by EC] [mg/L]	100%
		Colour-True [HU]	100%
		Turbidity [NTU]	59%
		pH Units	81%
		Trihalomethanes-Total [ug/L]	96%
		Fluoride [mg/L]	100%
		Iron-Total [mg/L]	92%
		Total Hardness as CaCO3 [mg/L]	100%
		Manganese	100%
WATER SECURITY	Current Water Restrictions	Level 3 Enhanced Water Restrictions- Dripper systems and hand-held hoses fitted with a trigger nozzle can be used for a maximum of 3 hours 2 days a week between 6 am - 9 am or 6pm - 9 pm. Watering cans and buckets can be used on any day/time. Sprinklers and other watering systems remain banned.	
	Proportion of Potable Water Supplied to Households (%)	85% residential, 15% non-residential	
	Distance from the Coast (km)	0	
	Climate	temperate	
	Average Annual Rainfall	535mm Victor Harbor/750mm Myponga Catchment	
WATER QUALITY OR SECURITY RISK (CAUSE)		FACTOR	YES / NO
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	YES
		Single drinking water source	NO
		Poor quality water source	YES
		Sewage overflow or disposal into water source	NO
		Flooding	NO
		Fauna defecating in supply	YES
		Fauna destroying water intake structures	NO
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	
		Un-lined landfills	NO
		Extensive agriculture	YES
		Low vegetation cover (dust, sediment runoff)	NO
		Poor access to supply	NO
		Unsustainable water extraction	YES
		Aquifer turning saline due to high extraction	YES
		Hard water	NO
		Aging or inadequate pipe work and associated infrastructure	NO
		Significant water losses due to leaking pipes	NO
		High per capita water consumption	NO
		Inappropriate water quality standards / objectives	NO
		NOTES / EXPLANATION	
		Yes, Based on the PIRSA EC maps and BOM 3 year rain maps	
		reservoir and river Murray water	
		The Myponga River catchment is used intensively for grazing dairy cattle. Water quality is frequently poor in terms of nutrient concentrations, organic carbon levels and protozoan contamination. Oxidised Nitrogen Good Total Nitrogen Good Soluble Phosphorus Poor Total Phosphorus Moderate Turbidity Good	
		Sewer overflows to the environment have been reduced from 20.7 per 100km of main in 2005-2006 to 0 in 2006-2007.	
		Improvements to flood due to high tide have been made recently	
		Myponga catchments has intensive livestock land use, but this should not be an issue due to WTP.	
		There is an unlined landfill in the region. This is no longer in use and can not be located via the internet. It is not mentioned in river health/water quality documents so is unlikely to be an issue.	
		Myponga catchments has intensive livestock land use	
		Farming with some remnant forest and woodlands	
		Available information suggests that the current flow conditions are providing adequate environmental flows to maintain health in the Myponga River. Thos is not the case with the Murray River	
		Documents suggest allocation greater than sustainable yield. Full use of allocation will increase water level decline and potentially increase salinity. Declining groundwater levels increasing the potential for leakage and contamination between aquifers and loss to stream flow.	
		SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.	
		SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.	
		According to SA Water	

WATER QUALITY OR SECURITY RISK (EFFECT)	Governance	Lack of infrastructure maintenance	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Poor management or governance	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Vandalism / sabotage / terrorism	NO	
		Insufficient trained personnel	NO	
		Inadequate funding for maintenance or upgrades	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
	Industries	Mining / minerals	NO	
		Irrigation	NO	
		Chemicals / process	Yes	Dairy farms
	Population	Seasonal population loadings	YES	Holiday Destination
		Rapid population growth	YES	Above state average (.76%/annum) - 7.18%/annum;. (population increase based on 2006/2001 census (Urban Centre/Locality))
		Pathogenic contamination	YES	Myponga catchments has intensive livestock land use
	WATER QUALITY OR SECURITY RISK (EFFECT)	Algal blooms	YES	SA Water has identified continuation of cyanobacterial bloom management at Myponga reservoir
		Heavy metal contamination	YES	Moderate amounts of total copper and soluble aluminium, poor levels of total iron.
		Poor chlorine residuals	NO	
		Pesticide contamination	Unknown	
		Boil water notices	NO	
		Deaths or illness due to water quality	NO	
		Water restrictions (current and historic)	YES	Since 2003
		Taste and odour issues	Unknown	
		Other contamination that would affect health	YES	The nutrient levels in the Myponga River are often elevated in the winter months, coinciding with higher rainfall flushing animal wastes into the river. Nutrient levels in the Myponga catchment are being addressed by the EPA through a Myponga Watercourse Restoration Project.
		Notes		

Town # 65

TOWN	State/Territory	SA			
	Town Name	Naracoorte			
	Town Population	4,888 (Census 2006, Urban Centre/Locality)			
WATER UTILITY	Name of Water Utility	SA Water			
	Rate (\$/kL)	Quarterly supply charge of \$34.40			
	Per Capita Water Consumption (ML/day)	260 L/person/day (based on residential use only)			
	Number of Connections	2,227			
CATCHMENT AND WATER SUPPLY	Catchment	Limestone Aquifer			
	Sub-Catchment	Naracoorte Ranges Unconfined Aquifer			
	Catchment Management Authority (CMA)	EPA-South Australia, South East Natural Resources Management Board. The EPA focuses its water quality monitoring on the unconfined aquifer in the area			
	CMA Web-Link	http://www.senrm.sa.gov.au/			
	Catchment Protection Status	None			
	Potable Water Source(s)	Limestone Aquifer			
WATER QUALITY	Supply Capacity	Groundwater bore - allowable extraction/sustainable yield is 4,500 ML/yr			
	Treatment Plant(s)	N/A			
	Level of Treatment	Cl2 Disinfection Only			
	Drinking Water Guidelines	ADWG 2004			
	Results (% compliance for 2008 reporting period)	Faecal Coliforms/100 mL	100%		
		E.Coli/100mL	100%		
		Chlorine Residual-Free [mg/L]	100%		
		Chlorine Residual- Total [mg/L]	N/A		
		TDS [by EC] [mg/L]	0%		
		Colour-True [HU]	100%		
		Turbidity [NTU]	100%		
		pH Units	100%		
		Trialomethanes-Total [ug/L]	100%		
		Fluoride [mg/L]	100%		
		Iron-Total [mg/L]	67%		
		Total Hardness as CaCO3 [mg/L]	0%		
	Manganese	100%			
WATER SECURITY	Current Water Restrictions	Permanent Water Conservation Measures- 1. Watering gardens, grounds and nurseries Public or private gardens, recreational areas, sports grounds or nurseries can be watered: By hand, Through a drip-feed irrigation system , through a sprinkler - after 5pm and before 10am on any day (including public or private gardens, recreation areas, sports grounds and nurseries. 2. Water must not be used to clean a motor vehicle or boat unless the water is applied from a bucket, high-pressure low volume water cleaner, trigger nozzle hose or a commercial car wash. 3. Construction sites: Water must not be used to control dust or other pollutants resulting from building works unless the water is applied from a hand-held hose fitted with a trigger nozzle, or directly from a motor vehicle designed to carry and deposit water.			
	Proportion of Potable Water Supplied to Households (%)	83% residential, 17% non-residential			
	Distance from the Coast (km)	80			
	Climate	Temperate			
	Average Annual Rainfall	577.9mm			
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	FACTOR	YES / NO	NOTES / EXPLANATION	
		Drought	YES	Yes, Based on the PIRSA EC maps and BOM 3 year rain maps	
		Single drinking water source	YES	Bore field.	
		Poor quality water source	YES	In terms of drinking water quality, the groundwater in the South East is	
		Severe overflow or disposal into water source	NO		
		Flooding	NO	No records found	
		Fauna defecating in supply	NO		
		Fauna destroying water intake structures	NO		
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	YES	testing of WQ in the south east region shows high levels of nitrates	
		Un-lined landfills	NO		
		Extensive agriculture	YES	Australian Intensive Agriculture Zone	
		Low vegetation cover (dust, sediment runoff)	NO		
		Poor access to supply	NO		
		Unsustainable water extraction	NO	Low level of extraction (0-29%).	
		Aquifer turning saline due to high extraction	NO	Turning saline due to land practices.	
		Hard water	YES	Refer to WQ compliance stats.	
		Aging or inadequate pipe work and associated infrastructure	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.	
		Significant water losses due to leaking pipes	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.	
	Governance	High per capita water consumption	NO	According to SA Water.	
		Inappropriate water quality standards / objectives	NO		
		Lack of infrastructure maintenance	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.	
		Poor management or governance	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.	
		Vandalism / sabotage / terrorism	NO		
		Insufficient trained personnel	NO		
		Inadequate funding for maintenance or upgrades	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.	
		Industries	Mining / minerals	NO	
			Irrigation	YES	Cropping

	Ind	Chemicals / process	NO	
	Population	Seasonal population loadings	NO	
		Rapid population growth	NO	Below state average (.76%/annum) - 0.5%/annum;. (population increase based on 2006/2001 census (Urban Centre/Locality)))
WATER QUALITY OR SECURITY RISK (EFFECT)		Pathogenic contamination	Unknown	
		Algal blooms	NO	
		Heavy metal contamination	Unknown	
		Poor chlorine residuals	Unknown	
		Pesticide contamination	Unknown	
		Boil water notices	NO	
		Deaths or illness due to water quality	NO	
		Water restrictions (current and historic)	YES	Permanent water conservation measures since 2002.
		Taste and odour issues	Unknown	
		Other contamination that would affect health	Unknown	High nitrates
		Notes		

Town # 66

TOWN	State/Territory	SA		
	Town Name	Millicent		
	Town Population	4,771 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility	SA Water		
	Rate (\$/kL)	Quarterly supply charge of \$34.40		
	Per Capita Water Consumption (ML/day)	160 L/person/day (based on residential use only)		
	Number of Connections	2000		
CATCHMENT AND WATER SUPPLY	Catchment	Limestone Aquifer		
	Sub-Catchment	There are two aquifers in the area - an upper unconfined aquifer and a lower confined aquifer.		
	Catchment Management Authority (CMA)	EPA-South Australia, South East Natural Resources Management Board. The EPA focuses its water quality monitoring on the unconfined aquifer in the area		
	CMA Web-Link	http://www.senrm.sa.gov.au/		
	Catchment Protection Status	Prescribed		
	Potable Water Source(s)	Limestone Aquifer		
	Supply Capacity	Groundwater bore - allowable extraction		
WATER QUALITY	Treatment Plant(s)	N/A		
	Level of Treatment	Cl2 Disinfection Only		
	Drinking Water Guidelines	2004 AWDG		
	Results (% compliance for 2008 reporting period)	Faecal Coliforms/100 mL	99%	
		E.Coli/100mL	100%	
		Chlorine Residual-Free [mg/L]	100%	
		Chlorine Residual- Total [mg/L]	N/A	
		TDS [by EC] [mg/L]	0%	
		Colour-True [HU]	100%	
		Turbidity [NTU]	83%	
		pH Units	100%	
		Trihalomethanes-Total [ug/L]	100%	
		Fluoride [mg/L]	100%	
		Iron-Total [mg/L]	100%	
		Total Hardness as CaCO3 [mg/L]	0%	
		Manganese	100%	
		WATER SECURITY	Current Water Restrictions	Permanent Water Conservation Measures- 1. Watering gardens, grounds and nurseries Public or private gardens, recreational areas, sports grounds or nurseries can be watered: By hand, Through a drip-feed irrigation system , through a sprinkler - after 5pm and before 10am on any day (including public or private gardens, recreation areas, sports grounds and nurseries. 2. Water must not be used to clean a motor vehicle or boat unless the water is applied from a bucket, high-pressure low volume water cleaner , trigger nozzle hose or a commercial car wash. 3. Construction sites: Water must not be used to control dust or other pollutants resulting from building works unless the water is applied from a hand-held hose fitted with a trigger nozzle, or directly from a motor vehicle designed to carry and deposit water.
Proportion of Potable Water Supplied to Households (%)			78% residential, 22% non-residential	
Distance from the Coast (km)	15			
Climate	Temperate			
Average Annual Rainfall	786.5mm			
WATER QUALITY OR SECURITY RISK (CAUSE)				
CATCHMENT AND WATER SUPPLY	FACTOR	YES / NO	NOTES / EXPLANATION	
	Drought	No	Not in a declared area of EC	
	Single drinking water source	YES	Bores	
	Poor quality water source	YES	In terms of drinking water quality, the groundwater in the South East is poor because of elevated nitrate agricultural practices. Elevated salinity in groundwater across the South East means that drinking water quality is poor because of the effect on taste. Drinking water quality is also considered poor because of elevated metal concentrations. This is mostly due to iron.	
	Sewage overflow or disposal into water source	NO		
	Flooding	NO	No records found	
	Fauna defecating in supply	NO		
	Fauna destroying water intake structures	NO		
	Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	YES	Drinking water shows poor levels of nitrates and metals	
	Un-lined landfills	NO		
	Extensive agriculture	YES	Intensive cropping-cereals/grain legumes/oil seeds	
	Low vegetation cover (dust, sediment runoff)	NO		
	Poor access to supply	NO		
	Unsustainable water extraction	NO	Low level of extraction (0-29% of total aquifer water is extracted for stock/human/irrigation use)	
	Aquifer turning saline due to high extraction	NO	Turning Saline due to land use practices (i.e.. Removal of native trees and planting high rotation crops. Extraction levels are not contributing to salinity)	
	Hard water	Yes	0% tests passed	
	Aging or inadequate pipe work and associated infrastructure	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.	
	Significant water losses due to leaking pipes	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.	
	GOVERNANCE	High per capita water consumption	NO	
		Inappropriate water quality standards / objectives	NO	
		Lack of infrastructure maintenance	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Poor management or governance	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
Vandalism / sabotage / terrorism		NO		

WATER QUALITY OR SECURITY RISK (EFFECT)		Insufficient trained personnel	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Inadequate funding for maintenance or upgrades	NO	
	Industries	Mining / minerals	NO	
		Irrigation	YES	Cropping
		Chemicals / process	NO	
	Population	Seasonal population loadings	NO	
		Rapid population growth	YES	Above state average (.76%/annum) - 1.5%/annum;. (population increase based on 2006/2001 census (Urban Centre/Locality))
		Pathogenic contamination	YES	There was not 100% tests above AWDG
		Algal blooms	NO	
		Heavy metal contamination	YES	Water quality classification has labelled it poor for drinking water quality. Drinking water quality is also considered poor because of elevated metal concentrations. This is mostly due to iron, which can discolour water.
		Poor chlorine residuals	NO	
		Pesticide contamination	NO	No results of pesticide contamination in the Millicent area form 1998-2005.
		Boil water notices	NO	
		Deaths or illness due to water quality	NO	
		Water restrictions (current and historic)	YES	
		Taste and odour issues	NO	
		Other contamination that would affect health	YES	Nitrites - concerns regarding the extensive grazing and dairying on the Limestone aquifers in the south-east of South Australia. A groundwater quality management plan is being implemented.
Notes				

Town # 67

TOWN	State/Territory	SA		
	Town Name	Nuriootpa		
	Town Population	5,114 (SA Water Data, based on suburb of Nuriootpa)		
WATER UTILITY	Name of Water Utility	SA Water -Riverland Water		
	Rate (\$/kL)	Quarterly supply charge of \$34.40		
	Per Capita Water Consumption (ML/day)	240 L/person/day (based on residential use only)		
	Number of Connections	2057		
CATCHMENT AND WATER SUPPLY	Catchment	Murray River Catchment		
	Sub-Catchment	Lower Murray		
	Catchment Management Authority (CMA)	South Australia Murray Darling Basin (SAMDB) , Natural Resources Management Board (NRMB)		
	CMA Web-Link	http://www.mdba.gov.au/ http://www.nrm.sa.gov.au/		
	Catchment Protection Status	Prescribed		
	Potable Water Source(s)	Murray River		
WATER QUALITY	Supply Capacity	Murray River - allowable extraction unknown		
	Treatment Plant(s)	Swan Reach WTP		
	Level of Treatment	Conventional Water Treatment Plant (Coagulation, Flocculation, Sedimentation, Filtration, Disinfection (UV and NHCl2), Fluoridation, Storage and distribution)		
	Drinking Water Guidelines	ADWG 2004		
	Results (% compliance for 2008 reporting period)	Overall		
		Faecal Coliforms/100 mL	100%	
		E.Coli/100mL	100%	
		Chlorine Residual-Free [mg/L]	N/A	
		Chlorine Residual- Total [mg/L]	100%	
		TDS [by EC] [mg/L]	100%	
		Colour-True [HU]	100%	
		Turbidity [NTU]	100%	
		pH Units	0%	
		Trialomethanes-Total [ug/L]	100%	
		Fluoride [mg/L]	100%	
		Iron-Total [mg/L]	100%	
Total Hardness as CaCO3 [mg/L]		100%		
Manganese		100%		
WATER SECURITY	Current Water Restrictions	Level 3 Enhanced Water Restrictions- Dripper systems and hand-held hoses fitted with a trigger nozzle can be used for a maximum of 3 hours 2 days a week between 6 am - 9 am or 6pm - 9 pm. Watering cans and buckets can be used on any day/time. Sprinklers and other watering systems remain banned.		
	Proportion of Potable Water Supplied to Households (%)	52% residential, 48% non-residential		
	Distance from the Coast (km)	50		
	Climate	Temperate		
	Average Annual Rainfall	500.5		
FACTOR		YES / NO	NOTES / EXPLANATION	
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	YES	Yes, Based on the PIRSA EC maps and BOM 3 year rain maps
		Single drinking water source	YES	From the Morgan-Whyalla Pipeline
		Poor quality water source	NO	
		Sewage overflow or disposal into water source	NO	
		Flooding	NO	No historical record for Pt Augusta
		Fauna defecating in supply	YES	Not a problem due to WTP
		Fauna destroying water intake structures	NO	
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	Unknown	
		Un-lined landfills	NO	
		Extensive agriculture	YES	fruit industry/vineyards and cropping
		Low vegetation cover (dust, sediment runoff)	YES	cleared and modified native vegetation, cropping and grasslands
		Poor access to supply	NO	
		Unsustainable water extraction	YES	low flows causing several issues for Murray River Region
		Aquifer turning saline due to high extraction	NO	from high river extraction
		Hard water	NO	Water quality report shows WTP water to be of good quality
	Governance	Aging or inadequate pipe work and associated infrastructure	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Significant water losses due to leaking pipes	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		High per capita water consumption	NO	According to SA Water
		Inappropriate water quality standards / objectives	NO	
		Lack of infrastructure maintenance	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Poor management or governance	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Vandalism / sabotage / terrorism	NO	
		Insufficient trained personnel	NO	
	Industri es	Inadequate funding for maintenance or upgrades	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Mining / minerals	NO	
		Irrigation	YES	irrigated cropping occurs in this catchment
		Chemicals / process	NO	
		Seasonal population loadings	NO	

	Populatio	Rapid population growth	YES	Above state average (.76%/annum) - 2.9 %/annum;. (population increase based on 2006/2001 census (Urban Centre/Locality)). Barossa is identified in the SA Government 30 year growth plan as an area to experience growth.
WATER QUALITY OR SECURITY RISK (EFFECT)		Pathogenic contamination	NO	100% of all tests are above AWDG guidelines this year
		Algal blooms	YES	A total of 53 blooms were recorded in SA Water Reservoirs between 2002 and 2007, while a further 100 blooms were detected along the Murray River.
		Heavy metal contamination	Unknown	
		Poor chlorine residuals	NO	
		Pesticide contamination	Unknown	
		Boil water notices	NO	
		Deaths or illness due to water quality	NO	
		Water restrictions (current and historic)	YES	since 2003
		Taste and odour issues	YES	
		Other contamination that would affect health	YES	Increasing salinity -(critical issue for the quality of our drinking water in the Murray. Long-term below average rainfall over the past 10 years has reduced river flows and salt has accumulated in the floodplains and disconnected wetlands. While the water quality meets drinking water guidelines at the moment, when river flows are increased, this accumulated salt may reduce water quality). Elevated phosphorus and nitrate readings (fertilisers, manure and detergent washed in from rainfall).
Notes				

Town # 68

TOWN	State/Territory	SA		
	Town Name	Renmark		
	Town Population	4,339 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility	SA Water -River Water		
	Rate (\$/kL)	Quarterly supply charge of \$34.40		
	Per Capita Water Consumption (ML/day)	410 L/person/day (based on residential use only)		
	Number of Connections	1983		
CATCHMENT AND WATER SUPPLY	Catchment	Murray River		
	Sub-Catchment	Lower Murray		
	Catchment Management Authority (CMA)	South Australia Murray Darling Basin (SAMDB) , Natural Resources Management Board (NRMB)		
	CMA Web-Link	http://www.mdba.gov.au/ http://www.nrm.sa.gov.au/		
	Catchment Protection Status	Prescribed		
	Potable Water Source(s)	Murray River		
WATER QUALITY	Supply Capacity	River - allowable extraction unknown		
	Treatment Plant(s)	Renmark WTP, Renmark		
	Level of Treatment	Conventional Water Treatment Plant (Coagulation, Flocculation, Sedimentation, Filtration, Disinfection (UV and Cl2), Fluoridation, Storage and distribution)		
	Drinking Water Guidelines	ADWG 2004		
	Results (% compliance for 2008 reporting period)	Faecal Coliforms/100 mL	100%	
		E.Coli/100mL	100%	
		Chlorine Residual-Free [mg/L]	100%	
		Chlorine Residual- Total [mg/L]	N/A	
		TDS [by EC] [mg/L]	100%	
		Colour-True [HU]	100%	
		Turbidity [NTU]	100%	
		pH Units	100%	
		Trihalomethanes-Total [ug/L]	100%	
		Fluoride [mg/L]	100%	
Iron-Total [mg/L]		100%		
Total Hardness as CaCO3 [mg/L]		100%		
Manganese		100%		
WATER SECURITY	Current Water Restrictions	Level 3 Water Restrictions- Dripper systems and hand-held hoses fitted with a trigger nozzle can be used for a maximum of 3 hours 2 days a week between 6 am - 9 am or 6pm - 9 pm. Watering cans and buckets can be used on any day/time. Sprinklers and other watering systems remain banned.		
	Proportion of Potable Water Supplied to Households (%)	81% residential, 19% non-residential		
	Distance from the Coast (km)	218		
	Climate	Temperate		
	Average Annual Rainfall	260.5mm		
WATER QUALITY OR SECURITY RISK (CAUSE)				
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	FACTOR	YES / NO	NOTES / EXPLANATION
		Drought	YES	Yes, Based on the PIRSA EC maps and BOM 3 year rain maps
		Single drinking water source	YES	From the Morgan-Whyalla Pipeline
		Poor quality water source	NO	
		Sewage overflow or disposal into water source	NO	
		Flooding	NO	No historical record for Pt Augusta
		Fauna defecating in supply	YES	Not an issue due to WTP
		Fauna destroying water intake structures	NO	
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	Unknown	
		Un-lined landfills	NO	
		Extensive agriculture	YES	fruit industry/vineyards and cropping
		Low vegetation cover (dust, sediment runoff)	YES	cleared and modified native vegetation, cropping and grasslands
		Poor access to supply	NO	
		Unsustainable water extraction	YES	low flows causing several issues for Murray River Region
		Aquifer turning saline due to high extraction	N/A	from high river extraction
		Hard water	NO	Water quality report shows WTP water to be of good quality
		Aging or inadequate pipe work and associated infrastructure	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Significant water losses due to leaking pipes	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
	Governance	High per capita water consumption	NO	
		Inappropriate water quality standards / objectives	NO	
		Lack of infrastructure maintenance	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Poor management or governance	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Vandalism / sabotage / terrorism	NO	
		Insufficient trained personnel	NO	
		Inadequate funding for maintenance or upgrades	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
	Industries	Mining / minerals	NO	
		Irrigation	YES	irrigated cropping occurs in this catchment
		Chemicals / process	NO	
	Populations	Seasonal population loadings	NO	
Rapid population growth		NO	population decreasing	
Pathogenic contamination		NO	100% of all tests are above ADWG guidelines this year	

WATER QUALITY OR SECURITY RISK (EFFECT)	Algal blooms	YES	A total of 53 blooms were recorded in SA Water Reservoirs between 2002 and 2007, while a further 100 blooms were detected along the Murray River.
	Heavy metal contamination	YES	
	Poor chlorine residuals	NO	
	Pesticide contamination	Unknown	
	Boil water notices	NO	
	Deaths or illness due to water quality	NO	
	Water restrictions (current and historic)	YES	Since 2002
	Taste and odour issues	YES	
	Other contamination that would affect health	YES	Increasing salinity -(critical issue for the quality of our drinking water in the Murray. Long-term below average rainfall over the past 10 years has reduced river flows and salt has accumulated in the floodplains and disconnected wetlands. While the water quality meets drinking water guidelines at the moment, when river flows are increased, this accumulated salt may reduce water quality).Elevated phosphorus and nitrate readings (fertilisers, manure and detergent washed in from rainfall).
Notes			

Town # 69

TOWN	State/Territory	SA			
	Town Name	Tanunda			
	Town Population	4,500 (SA Water Data, based on suburb of Tanunda)			
WATER UTILITY	Name of Water Utility	SA Water -Riverland Water			
	Rate (\$/kL)	Quarterly supply charge of \$34.40			
	Per Capita Water Consumption (ML/day)	280 L/person/day (based on residential use only)			
	Number of Connections	1956			
CATCHMENT AND WATER SUPPLY	Catchment	Murray River			
	Sub-Catchment	Lower Murray			
	Catchment Management Authority (CMA)	South Australia Murray Darling Basin (SAMDB) , Natural Resources Management Board (NRMB)			
	CMA Web-Link	http://www.mdba.gov.au/ http://www.nrm.sa.gov.au/			
	Catchment Protection Status	Prescribed			
	Potable Water Source(s)	Murray River			
WATER QUALITY	Supply Capacity	River - allowable extraction unknown			
	Treatment Plant(s)	Swan Reach WTP			
	Level of Treatment	Conventional Water Treatment Plant (Coagulation, Flocculation, Sedimentation, Filtration, Disinfection (UV and NHC12), Fluoridation, Storage and distribution)			
	Drinking Water Guidelines	ADWG 2004			
	Results (% compliance for 2008 reporting period)	Overall	100%		
		Faecal Coliforms/100 mL	100%		
		E.Coli/100mL	100%		
		Chlorine Residual-Free [mg/L]	100%		
		Chlorine Residual- Total [mg/L]	N/A		
		TDS [by EC] [mg/L]	100%		
		Colour-True [HU]	100%		
		Turbidity [NTU]	100%		
		pH Units	100%		
		Trihalomethanes-Total [ug/L]	100%		
Fluoride [mg/L]		100%			
Iron-Total [mg/L]		100%			
Total Hardness as CaCO3 [mg/L]		100%			
Manganese	100%				
WATER SECURITY	Current Water Restrictions	Level 3 Enhanced Water Restrictions- Dripper systems and hand-held hoses fitted with a trigger nozzle can be used for a maximum of 3 hours 2 days a week between 6 am - 9 am or 6pm - 9 pm. Watering cans and buckets can be used on any day/time. Sprinklers and other watering systems remain banned.			
	Proportion of Potable Water Supplied to Households (%)	59% residential, 41% non-residential			
	Distance from the Coast (km)	46			
	Climate	Temperate			
	Average Annual Rainfall	493.4mm			
FACTOR		YES / NO	NOTES / EXPLANATION		
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	YES	Yes, Based on the PIRSA EC maps and BOM 3 year rain maps	
		Single drinking water source	YES	From the Swan Reach-Stockwell Pipeline	
		Poor quality water source	NO		
		Sewage overflow or disposal into water source	NO		
		Flooding	NO		
		Fauna defecating in supply	YES	Not an issue due to WTP	
		Fauna destroying water intake structures	NO		
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	Unknown		
		Un-lined landfills	NO		
		Extensive agriculture	YES	fruit industry/vineyards and cropping	
		Low vegetation cover (dust, sediment runoff)	YES	cleared and modified native vegetation, cropping and grasslands	
		Poor access to supply	NO		
		Unsustainable water extraction	YES	low flows causing several issues for Murray River Region	
	Governance	Aquifer turning saline due to high extraction	YES	from high river extraction	
		Hard water	NO	Water quality report shows WTP water to be of good quality	
		Aging or inadequate pipe work and associated infrastructure	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.	
		Significant water losses due to leaking pipes	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.	
		High per capita water consumption	NO	According to SA Water	
		Inappropriate water quality standards / objectives	NO		
		Lack of infrastructure maintenance	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.	
		Poor management or governance	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.	
		Vandalism / sabotage / terrorism	NO		
		Insufficient trained personnel	NO		
		Inadequate funding for maintenance or upgrades	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.	
		Industries	Mining / minerals	NO	
			Irrigation	YES	irrigated cropping occurs in this catchment
	Chemicals / process		NO		

WATER QUALITY OR SECURITY RISK (EFFECT)	Population	Seasonal population loadings	NO	
		Rapid population growth	YES	Above state average (.76%/annum) - 1.65%/annum; (population increase based on 2006/2001 census (Urban Centre/Locality))
		Pathogenic contamination	NO	100% of all tests are above AWDG guidelines this year
		Algal blooms	YES	A total of 53 blooms were recorded in SA Water Reservoirs between 2002 and 2007, while a further 100 blooms were detected along the Murray River.
		Heavy metal contamination	Unknown	
		Poor chlorine residuals	Unknown	
		Pesticide contamination	Unknown	
		Boil water notices	NO	
		Deaths or illness due to water quality	NO	
		Water restrictions (current and historic)	YES	Since 2002
		Taste and odour issues	YES	
		Other contamination that would affect health	YES	Increasing salinity -(critical issue for the quality of our drinking water in the Murray. Long-term below average rainfall over the past 10 years has reduced river flows and salt has accumulated in the floodplains and disconnected wetlands. While the water quality meets drinking water guidelines at the moment, when river flows are increased, this accumulated salt may reduce water quality). Elevated phosphorus and nitrate readings (fertilisers, manure and detergent washed in from rainfall).
		Notes		

Town # 70

TOWN	State/Territory	SA		
	Town Name	Berri		
	Town Population	4,008 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility	SA Water (Riverland Water)		
	Rate (\$/kL)	Quarterly supply charge of \$34.40		
	Per Capita Water Consumption (ML/day)	360 L/person/day (based on residential use only)		
	Number of Connections	1756		
CATCHMENT AND WATER SUPPLY	Catchment	Murray River		
	Sub-Catchment	Lower Murray		
	Catchment Management Authority (CMA)	South Australia Murray Darling Basin (SAMDB) , Natural Resources Management Board (NRMB)		
	CMA Web-Link	http://www.mdba.gov.au/ http://www.nrm.sa.gov.au/		
	Catchment Protection Status	Prescribed		
	Potable Water Source(s)	River Murray		
WATER QUALITY	Supply Capacity	River - allowable extraction unknown		
	Treatment Plant(s)	Berri WTP, Berri		
	Level of Treatment	Conventional Water Treatment Plant (Coagulation, Flocculation, Sedimentation, Filtration, Disinfection (UV and Cl2), Fluoridation, Storage and distribution)		
	Drinking Water Guidelines	ADWG 2004		
	Results (% compliance for 2008 reporting period)	Overall	100%	
		Faecal Coliforms/100 mL	100%	
		E.Coli/100mL	100%	
		Chlorine Residual-Free [mg/L]	100%	
		Chlorine Residual- Total [mg/L]	N/A	
		TDS [by EC] [mg/L]	100%	
		Colour-True [HU]	100%	
		Turbidity [NTU]	100%	
		pH Units	100%	
		Trihalomethanes-Total [ug/L]	100%	
		Fluoride [mg/L]	100%	
		Iron-Total [mg/L]	100%	
		Total Hardness as CaCO3 [mg/L]	100%	
Manganese		100%		
WATER SECURITY	Current Water Restrictions	Level 3 Enhanced Water Restrictions- Dripper systems and hand-held hoses fitted with a trigger nozzle can be used for a maximum of 3 hours 2 days a week between 6 am - 9 am or 6pm - 9 pm. Watering cans and buckets can be used on any day/time. Sprinklers and other watering systems remain banned.		
	Proportion of Potable Water Supplied to Households (%)	73% residential, 27% non-residential		
	Distance from the Coast (km)	202		
	Climate	Temperate		
	Average Annual Rainfall	261.3mm		
FACTOR		YES / NO	NOTES / EXPLANATION	
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	YES	Yes, Based on the PIRSA EC maps and BOM 3 year rain maps
		Single drinking water source	YES	From the Morgan-Whyalla Pipeline
		Poor quality water source	NO	
		Sewage overflow or disposal into water source	NO	
		Flooding	NO	No historical record for Pt Augusta
		Fauna defecating in supply	YES	Not an issue due to the WTP
		Fauna destroying water intake structures	NO	
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	Unknown	
		Un-lined landfills	NO	
		Extensive agriculture	YES	fruit industry/vineyards and cropping
		Low vegetation cover (dust, sediment runoff)	YES	cleared and modified native vegetation, cropping and grasslands
		Poor access to supply	NO	
		Unsustainable water extraction	YES	low flows causing several issues for Murray River Region
		Aquifer turning saline due to high extraction	YES	from high river extraction
		Hard water	NO	Water quality report shows WTP water to be of good quality
		Aging or inadequate pipe work and associated infrastructure	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Significant water losses due to leaking pipes	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Governance	High per capita water consumption	NO
	Inappropriate water quality standards / objectives		NO	
	Lack of infrastructure maintenance		NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
	Poor management or governance		NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
	Vandalism / sabotage / terrorism		NO	
	Insufficient trained personnel		NO	
	Inadequate funding for maintenance or upgrades		NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
	Industries	Mining / minerals	NO	
		Irrigation	YES	irrigated cropping occurs in this catchment
		Chemicals / process	NO	
	Population	Seasonal population loadings	NO	

	Popu	Rapid population growth	NO	Population is decreasing
WATER QUALITY OR SECURITY RISK (EFFECT)		Pathogenic contamination	NO	100% of all tests are above AWDG guidelines this year
		Algal blooms	YES	A total of 53 blooms were recorded in SA Water Reservoirs between 2002 and 2007, while a further 100 blooms were detected along the Murray River.
		Heavy metal contamination	YES	
		Poor chlorine residuals	NO	
		Pesticide contamination	YES	
		Boil water notices	NO	
		Deaths or illness due to water quality	NO	
		Water restrictions (current and historic)	YES	Since 2002
		Taste and odour issues	YES	
		Other contamination that would affect health	YES	Increasing salinity -(critical issue for the quality of our drinking water in the Murray. Long-term below average rainfall over the past 10 years has reduced river flows and salt has accumulated in the floodplains and disconnected wetlands. While the water quality meets drinking water guidelines at the moment, when river flows are increased, this accumulated salt may reduce water quality). Elevated phosphorus and nitrate readings (fertilisers, manure and detergent washed in from rainfall).
Notes				

Town # 71

TOWN	State/Territory	SA	
	Town Name	Strathalbyn	
	Town Population	4,861 (SA Water Data, based on suburb of Strathalbyn)	
WATER UTILITY	Name of Water Utility	SA Water	
	Rate (\$/kL)	Quarterly supply charge of \$34.40	
	Per Capita Water Consumption (ML/day)	240 L/person/day (based on residential use only)	
CATCHMENT AND WATER SUPPLY	Number of Connections	1889	
	Catchment	River Murray	
	Sub-Catchment	Lower Murray	
	Catchment Management Authority (CMA)	South Australia Murray Darling Basin (SAMDB)/Adelaide and Mount Lofty Ranges Natural Resources Management Board	
	CMA Web-Link	http://www.mdba.gov.au/ http://www.nrm.sa.gov.au/	
	Catchment Protection Status	Prescribed	
	Potable Water Source(s)	River Murray Myponga reservoir	
	Supply Capacity	Murray River - allowable extraction unknown Myponga Reservoir - 15 000 megalitres per year average, 26 800 megalitres maximum	
	Treatment Plant(s)	Summit WTP, Balhanna	
	Level of Treatment	Conventional Water Treatment Plant (Coagulation, Flocculation, Sedimentation, Filtration, Disinfection (UV and	
WATER QUALITY	Drinking Water Guidelines	2004 ADWG	
	Results (% compliance for 2008 reporting period)	Overall	
		Faecal Coliforms/100 mL	100%
		E.Coli/100mL	100%
		Chlorine Residual-Free [mg/L]	N/A
		Chlorine Residual- Total [mg/L]	100%
		TDS [by EC] [mg/L]	100%
		Colour-True [HU]	100%
		Turbidity [NTU]	86%
		pH Units	30%
		Trialomethanes-Total [ug/L]	100%
		Flouride [mg/L]	100%
		Iron-Total [mg/L]	91%
		Total Hardness as CaCO3 [mg/L]	100%
		Manganese as CaCo3 [mg/L]	100%
WATER SECURITY	Current Water Restrictions	Level 3 Enhanced Water Restrictions- Dripper systems and hand-held hoses fitted with a trigger nozzle can be used for a maximum of 3 hours 2 days a week between 6 am - 9 am or 6pm - 9 pm. Watering cans and buckets can be used on any day/time. Sprinklers and other watering systems remain banned.	
	Proportion of Potable Water Supplied to Households (%)	77% residential, 23% non- residential	
	Distance from the Coast (km)	0	
	Climate	Temperate	
	Average Annual Rainfall	535mm Victor Harbor/750mm Myponga Catchment	
FACTOR		YES / NO	NOTES / EXPLANATION
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	YES Yes, Based on the PIRSA EC maps and BOM 3 year rain maps
		Single drinking water source	YES Mannum-Adelaide Pipeline
		Poor quality water source	NO
		Sewage overflow or disposal into water source	NO
		Flooding	YES Historical floods in Mt Barker and Murrya River
		Fauna defecating in supply	YES Not a problem due to WTP
		Fauna destroying water intake structures	NO
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	Unknown
		Un-lined landfills	NO
		Extensive agriculture	YES extensive grazing and cropping. Dryland and irrigated agriculture
		Low vegetation cover (dust, sediment runoff)	YES cleared and modified native vegetation, cropping and grasslands
		Poor access to supply	NO
		Unsustainable water extraction	YES low flows causing several issues for Murray River Region
		Aquifer turning saline due to high extraction	NO from high river extraction
		Hard water	NO Water quality report shows WTP water to be of good quality
	Governance	Aging or inadequate pipework and associated infrastructure	NO SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Significant water losses due to leaking pipes	NO SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		High per capita water consumption	NO According to SA Water
		Inappropriate water quality standards / objectives	NO
		Lack of infrastructure maintenance	NO SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Poor management or governance	NO SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Vandalism / sabotage / terrorism	NO
		Insufficient trained personnel	NO
		Inadequate funding for maintenance or upgrades	NO SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
	Industrial	Mining / minerals	NO
		Irrigation	YES irrigated cropping occurs in this catchment
		Chemicals / process	NO
Other	Seasonal population loadings		

WATER QUALITY OR SECURITY RISK (EFFECT)	Rapid population growth	YES	
	Pathogenic contamination	NO	100% of all tests are above AWDG guidelines this year
	Algal blooms	YES	At the beginning of 2007, the predictions for low Murray River flows into South Australia were a cause for concern. The potential water quality issues from these low flows included elevated cyanobacterial blooms and buildup of cyanobacteria in connected wetlands. SA Water, with support from MDBC, undertook a pilot project to investigate the use of high-definition aerial photography for the early detection of potential water quality issues. This monitoring has proven to be invaluable. Algal blooms were detected early in the river channel and water treatment was enhanced at the local treatment plant. Blooms in connected wetlands were detected, as well as numerous issues in both the main channel of the Murray and in backwaters and wetlands. The aerial imagery enabled improved management of these issues and has established a benchmark for Murray River floodplain management. Cyanobacteria or blue-green algae are naturally occurring organisms that can increase in numbers to produce a freshwater algal bloom, under certain conditions. Some human activities, such as farming with lots of fertilisers, produce high levels of nutrients in water, which can lead to algal blooms. These occur when
	Heavy metal contamination	Unknown	
	Poor chlorine residuals	NO	
	Pesticide contamination	Unknown	
	Boil water notices	NO	
	Deaths or illness due to water quality	NO	
	Water restrictions (current and historic)	YES	Since 2003
	Taste and odour issues	YES	
	Other contamination that would affect health	YES	Increasing salinity in the Murray River is a critical issue for the quality of our drinking water. Long-term below average rainfall over the past 10 years has reduced river. was a number of elevated phosphorus and nitrate readings. The recent rains may have washed stormwater pollution (such as fertilisers, manure and detergent) into our creeks and rivers. Ten sites recorded phosphorous levels higher than 0.1mg/L. 0.4mg/L of phosphorous were taken at Angas River (ANG300), Wellington (MUR410) and Byethorne Park (BYE010) which could lead to algal blooms flows and salt has accumulated in the floodplains and disconnected wetlands. While the water quality meets drinking water guidelines at the moment, when river flows are increased, this accumulated salt may reduce water quality.
Notes			

Town # 72

TOWN	State/Territory	SA		
	Town Name	Roxby Downs		
	Town Population	5,160 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility	Roxby Water		
	Rate (\$/kL)	\$2.83		
	Per Capita Water Consumption (ML/day)	2.0		
	Number of Connections	10800		
CATCHMENT AND WATER SUPPLY	Catchment	Great Artesian Basin		
	Sub-Catchment	Eromanga Basin near the southern and eastern areas of lake Eyre		
	Catchment Management Authority (CMA)	Arid Areas Catchment Water Management Board		
	CMA Web-Link	http://www.saa/nrm.sa.gov.au/About_Us/What_we_do.aspx		
	Catchment Protection Status	Water Resources Act 1997 on 27 March 2003		
	Potable Water Source(s)	Eromanga Basin		
WATER QUALITY	Supply Capacity	Groundwater Bores- 40ML/d (this includes water to Olympic dam)		
	Treatment Plant(s)	BHP desal and WTP Plant		
	Level of Treatment	Desalination Plant and "treatment" by The Western Mining Corporation, Chlorine injection by Roxby Council		
	Drinking Water Guidelines	Guidelines created based on AWDG 2004		
	Results (% compliance for 2008 reporting period)	Overall	Statement found indicates that Water quality is above or on par with that of SA WATER results.	
WATER SECURITY	Current Water Restrictions	No- not to any federal or state requirements		
	Proportion of Potable Water Supplied to Households (%)	Unknown		
	Distance from the Coast (km)	210		
	Climate	Temperate		
	Average Annual Rainfall	211mm		
FACTOR			YES / NO	NOTES / EXPLANATION
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	YES	EC and BOM
		Single drinking water source	YES	Total water is sourced from surface water
		Poor quality water source	YES	Water is very soft, of high quality, has a small amount of natural fluoride and is low in dissolved solids. Water has been tested and compared against a range of other urban water supplies and bottled water with favourable results.
		Sewage overflow or disposal into water source	NO	
		Flooding	NO	No historical data
		Fauna defecating in supply	NO	
		Fauna destroying water intake structures	NO	
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	YES	Seems likely due to proximity of Olympic dam
		Un-lined landfills	NO	
		Extensive agriculture	NO	
		Low vegetation cover (dust, sediment runoff)	YES	Native grasslands and minimally modified pastures
		Poor access to supply	NO	
		Unsustainable water extraction	Unknown	
		Aquifer turning saline due to high extraction	Unknown	
		Hard water	NO	Council report states that Water is very soft
		Aging or inadequate pipe work and associated infrastructure	NO	
		Significant water losses due to leaking pipes	NO	
	Governance	High per capita water consumption	Unknown	
		Inappropriate water quality standards / objectives	NO	Council Report indicates the standards on par with AWDG 2004
		Lack of infrastructure maintenance	NO	
		Poor management or governance	NO	Run by BHP
		Vandalism / sabotage / terrorism	NO	
		Insufficient trained personnel	NO	
	Industries	Inadequate funding for maintenance or upgrades	NO	
		Mining / minerals	YES	Olympic Dam
		Irrigation	NO	
	Population	Chemicals / process	YES	Olympic Dam
		Seasonal population loadings	NO	
		Rapid population growth	YES	Above state average (.76%/annum) - 1.3%/annum; (population increase based on 2006/2001 census (Urban Centre/Locality))
WATER QUALITY OR SECURITY RISK (EFFECT)	Pathogenic contamination			
	Algal blooms			
	Heavy metal contamination			
	Poor chlorine residuals			
	Pesticide contamination			
	Boil water notices			
	Deaths or illness due to water quality	NO		
	Water restrictions (current and historic)			
	Taste and odour issues			
	Other contamination that would affect health			
Notes				

Town # 73

TOWN	State/Territory	SA	
	Town Name	Loxton	
	Town Population	4,419 (SA Water Data, based on suburb of Loxton)	
WATER UTILITY	Name of Water Utility	SA Water -Riverland Water	
	Rate (\$/kL)	Quarterly supply charge of \$34.40	
	Per Capita Water Consumption (ML/day)	350 L/person/day (based on residential use only)	
	Number of Connections	1644	
CATCHMENT AND WATER SUPPLY	Catchment	Murray Darling Basin	
	Sub-Catchment	Southern Basin	
	Catchment Management Authority (CMA)	South Australia Murray Darling Basin (SAMDB) , Natural Resources Management Board (NRMB)	
	CMA Web-Link	http://www.mdba.gov.au/ http://www.nrm.sa.gov.au/	
	Catchment Protection Status	prescribed	
	Potable Water Source(s)	River Murray	
	Supply Capacity	Unknown	
WATER QUALITY	Treatment Plant(s)	Loxton WTP, Loxton	
	Level of Treatment	Conventional Water Treatment Plant (Coagulation, Flocculation, Sedimentation, Filtration, Disinfection (UV and NHCl2), Fluoridation, Storage and distribution)	
	Drinking Water Guidelines	ADWG 2004	
	Results (% compliance for 2008 reporting period)	Faecal Coliforms/100 mL	100%
		E.Coli/100mL	100%
		Chlorine Residual-Free [mg/L]	N/A
		Chlorine Residual- Total [mg/L]	100%
		TDS [by EC] [mg/L]	100%
		Colour-True [HU]	100%
		Turbidity [NTU]	100%
		pH Units	4%
		Trialomethanes-Total [ug/L]	100%
		Fluoride [mg/L]	100%
		Iron-Total [mg/L]	100%
		Total Hardness as CaCO3 [mg/L]	100%
		Manganese	100%
	Current Water Restrictions	Level 3 Enhanced Water Restrictions- Dripper systems and hand-held hoses fitted with a trigger nozzle can be used for a maximum of 3 hours 2 days a week between 6 am - 9 am or 6pm - 9 pm. Watering cans and buckets can be used on any day/time. Sprinklers and other watering systems remain banned.	
	Proportion of Potable Water Supplied to Households (%)	84% residential, 16% non-residential	
	Distance from the Coast (km)	117	
	Climate	Temperate	
	Average Annual Rainfall	272.3mm	
FACTOR		YES / NO	NOTES / EXPLANATION
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	YES, Based on the PIRSA EC maps and BOM 3 year rain maps
		Single drinking water source	From the Morgan-Whyalla Pipeline
		Poor quality water source	
		Sewage overflow or disposal into water source	
		Flooding	No historical record for Pt Augusta
		Fauna defecating in supply	Not an issue due to WTP
		Fauna destroying water intake structures	
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	
		Un-lined landfills	
		Extensive agriculture	extensive grazing and cropping. Dryland and irrigated agriculture
		Low vegetation cover (dust, sediment runoff)	cleared and modified native vegetation, cropping and grasslands
		Poor access to supply	
		Unsustainable water extraction	low flows causing several issues for Murray River Region
		Aquifer turning saline due to high extraction	from high river extraction
		Hard water	Water quality report shows WTP water to be of good quality
		Aging or inadequate pipe work and associated infrastructure	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Significant water losses due to leaking pipes	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
	Governance	High per capita water consumption	According to SA Water
		Inappropriate water quality standards / objectives	
		Lack of infrastructure maintenance	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Poor management or governance	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Vandalism / sabotage / terrorism	
		Insufficient trained personnel	
		Inadequate funding for maintenance or upgrades	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
	Industries	Mining / minerals	
		Irrigation	irrigated cropping occurs in this catchment
		Chemicals / process	
	Population	Seasonal population loadings	
		Rapid population growth	Below state average (.76%/annum) - .47%/annum; (population decrease based on 2006/2001 census (Urban Centre/Locality))
		Pathogenic contamination	100% of all tests are above AWDG guidelines this year

WATER QUALITY OR SECURITY RISK (EFFECT)	Algal blooms	YES	A total of 53 blooms were recorded in SA Water Reservoirs between 2002 and 2007, while a further 100 blooms were detected along the Murray River.
	Heavy metal contamination	Unknown	
	Poor chlorine residuals	NO	
	Pesticide contamination	Unknown	
	Boil water notices	NO	
	Deaths or illness due to water quality	NO	
	Water restrictions (current and historic)	YES	
	Taste and odour issues	YES	
	Other contamination that would affect health	YES	Increasing salinity -critical issue for the quality of our drinking water in the Murray. Long-term below average rainfall over the past 10 years has reduced river flows and salt has accumulated in the floodplains and disconnected wetlands. While the water quality meets drinking water guidelines at the moment, when river flows are increased, this accumulated salt may reduce water quality). Elevated phosphorus and nitrate readings (fertilisers, manure and detergent washed in from rainfall).
Notes			

Town # 74

TOWN	State/Territory	SA		
	Town Name	Moonta		
	Town Population	3,404 (SA Water Data, based on suburbs cross roads, kooroona, moonta, moonta bay, moonta mines, north moonta, north yelta, port hughes)		
WATER UTILITY	Name of Water Utility	SA Water		
	Rate (\$/kL)	Quarterly supply charge of \$34.40 Quarterly water use charges based meter readings taken approximately every 3 months*: For the first 0.3288 kL used per day \$0.97 per kilolitre (kL) For use above 0.3288 kL per day \$1.88 per kL For use above 1.4247kL per day for homes, home units, maisonettes, townhouses, row houses and some shacks \$2.26 per kL		
	Per Capita Water Consumption (ML/day)	340 L/person/day (based on residential use only)		
	Number of Connections	2419		
CATCHMENT AND WATER SUPPLY	Catchment	Murray Darling Basin		
	Sub-Catchment	Southern Basin		
	Catchment Management Authority (CMA)	Murray-Darling Basin Authority		
	CMA Web-Link	http://www.mdba.gov.au/		
	Catchment Protection Status	Prescribed		
	Potable Water Source(s)	River Murray		
	Supply Capacity	River - allowable extraction unknown		
WATER QUALITY	Treatment Plant(s)	Morgan-Swan Reach WTP		
	Level of Treatment	Conventional Water Treatment Plant (Coagulation, Flocculation, Sedimentation, Filtration, Disinfection (UV and NHCl2), Fluoridation, Storage and distribution)		
	Drinking Water Guidelines	ADWG 2004		
	Results (% compliance for 2008 reporting period)	Overall	Source: SA Water Drinking Water Quality Report 07-08	
		Faecal Coliforms/100 mL	100%	
		E.Coli/100mL	100%	
		Chlorine Residual-Free [mg/L]	N/A	
		Chlorine Residual- Total [mg/L]	100%	
		TDS [by EC] [mg/L]	100%	
		Colour-True [HU]	100%	
		Turbidity [NTU]	100%	
		pH Units	1%	
		Trihalomethanes-Total [ug/L]	100%	
		Fluoride [mg/L]	100%	
Iron-Total [mg/L]		100%		
Total Hardness as CaCO3 [mg/L]		100%		
WATER SECURITY	Current Water Restrictions	Level 3 Enhanced Water Restrictions- Drripper systems and hand-held hoses fitted with a trigger nozzle can be used for a maximum of 3 hours 2 days a week between 6 am - 9 am or 6pm - 9 pm. Watering cans and buckets can be used on any day/time. Sprinklers and other watering systems remain banned.		
	Proportion of Potable Water Supplied to Households (%)	82% residential, 18% non-residential		
	Distance from the Coast (km)	0		
	Climate	Temperate		
	Average Annual Rainfall	388.6mm		
WATER QUALITY OR SECURITY RISK (CAUSE)				
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	FACTOR	YES / NO	NOTES / EXPLANATION
		Drought	YES	Yes, Based on the PIRSA EC maps and BOM 3 year rain maps
		Single drinking water source	YES	From the Morgan-Whyalla Pipeline
		Poor quality water source	NO	
		Sewage overflow or disposal into water source	NO	
		Flooding	NO	No historical record for Pt Augusta
		Fauna defecating in supply	YES	Not an issue because of WTP
		Fauna destroying water intake structures	NO	
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	Unknown	
		Un-lined landfills	NO	
		Extensive agriculture	YES	extensive grazing and cropping. Dryland and irrigated agriculture
		Low vegetation cover (dust, sediment runoff)	YES	cleared and modified native vegetation, cropping and grasslands
		Poor access to supply	NO	
		Unsustainable water extraction	YES	low flows causing several issues for Murray River Region
		Aquifer turning saline due to high extraction	YES	from high river extraction
		Hard water	NO	Water quality report shows WTP water to be of good quality
		Aging or inadequate pipe work and associated infrastructure	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
	Significant water losses due to leaking pipes	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.	
	Governance	High per capita water consumption	NO	According to SA Water
		Inappropriate water quality standards / objectives	NO	
		Lack of infrastructure maintenance	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Poor management or governance	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Vandalism / sabotage / terrorism	NO	
Insufficient trained personnel		NO		

WATER QUALITY OR SECURITY RISK (EFFECT)	Industries	Inadequate funding for maintenance or upgrades	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Mining / minerals	NO	
		Irrigation	YES	irrigated cropping occurs in this catchment
		Chemicals / process	NO	
	Population	Seasonal population loadings	Yes	According to SA Water Data
		Rapid population growth	Yes	Above state average (.76%/annum) - 1.8%/annum; (population increase based on 2006/2001 census (Urban Centre/Locality))
		Pathogenic contamination	NO	100% of all tests are above AWDG guidelines this year
	Algal blooms	YES	A total of 53 blooms were recorded in SA Water Reservoirs between 2002 and 2007, while a further 100 blooms were detected along the Murray River.	
	Heavy metal contamination	Unknown		
	Poor chlorine residuals	Unknown		
	Pesticide contamination	Unknown		
	Boil water notices	NO		
	Deaths or illness due to water quality	NO		
	Water restrictions (current and historic)	YES		
	Taste and odour issues	YES		
	Other contamination that would affect health	YES	Increasing salinity -(critical issue for the quality of our drinking water in the Murray. Long-term below average rainfall over the past 10 years has reduced river flows and salt has accumulated in the floodplains and disconnected wetlands. While the water quality meets drinking water guidelines at the moment, when river flows are increased, this accumulated salt may reduce water quality). Elevated phosphorus and nitrate readings (fertilisers, manure and detergent washed in from rainfall).	
Notes				

Town # 75

TOWN	State/Territory	SA	
	Town Name	Clare	
	Town Population	3,063 (Census 2006, Urban Centre/Locality)	
WATER UTILITY	Name of Water Utility	SA Water	
	Rate (\$/kL)	Quarterly supply charge of \$34.40	
	Per Capita Water Consumption (ML/day)	320 L/person/day (based on residential use only)	
CATCHMENT AND WATER SUPPLY	Number of Connections	1457	
	Catchment	Murray Darling Basin	
	Sub-Catchment	Southern Basin	
	Catchment Management Authority (CMA)	-	
	CMA Web-Link	http://www.mdba.gov.au/	
	Catchment Protection Status	Prescribed	
	Potable Water Source(s)	Murray River	
	Supply Capacity	Water delivered via the Morgan – Whyalla pipeline is from SA Water's existing Country Allocation from the River Murray. Unrestricted, this allocation is 50 GL/a. However, recent drought conditions have seen the allocations drop to 31 GL/a in 2007-08. Supply capacity to particular town is unknown.	
WATER QUALITY	Treatment Plant(s)	Morgan Filtration Plant, Morgan	
	Level of Treatment	Conventional Water Treatment Plant (Coagulation, Flocculation, Sedimentation, Filtration, Disinfection (NHCl2),	
	Drinking Water Guidelines	ADWG 2004	
	Results (% compliance for 2008 reporting period)	Faecal Coliforms/100 mL	100%
		E.Coli/100mL	100%
		Chlorine Residual-Free [mg/L]	N/A
		Chlorine Residual- Total [mg/L]	100%
		TDS [by EC] [mg/L]	96%
		Colour-True [HU]	100%
		Turbidity [NTU]	99%
		pH Units	52%
		Trihalomethanes-Total [ug/L]	96%
		Fluoride [mg/L]	100%
		Iron-Total [mg/L]	100%
		Total Hardness as CaCO3 [mg/L]	100%
WATER SECURITY	Current Water Restrictions	Level 3 Enhanced Water Restrictions- Dripper systems and hand-held hoses fitted with a trigger nozzle can be used for a maximum of 3 hours 2 days a week between 6 am - 9 am or 6pm - 9 pm. Watering cans and buckets can be used on any day/time. Sprinklers and other watering systems remain banned.	
	Proportion of Potable Water Supplied to Households (%)	75% residential, 25% non-residential	
	Distance from the Coast (km)	37	
	Climate	Temperate	
	Average Annual Rainfall	530.5	
FACTOR		YES / NO	NOTES / EXPLANATION
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	YES, Based on the PIRSA EC maps and BOM 3 year rain maps
		Single drinking water source	From the Morgan-Whyalla Pipeline
		Poor quality water source	
		Sewage overflow or disposal into water source	
		Flooding	No historical record for Pt Augusta
		Fauna defecating in supply	Not an issue due to WTP
		Fauna destroying water intake structures	
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	Unknown
		Un-lined landfills	
		Extensive agriculture	extensive grazing and cropping. Dryland and irrigated agriculture
		Low vegetation cover (dust, sediment runoff)	cleared and modified native vegetation, cropping and grasslands
		Poor access to supply	
		Unsustainable water extraction	low flows causing several issues for Murray River Region
		Aquifer turning saline due to high extraction	from high river extraction
		Hard water	Water quality report shows WTP water to be of good quality
	Governance	Aging or inadequate pipe work and associated infrastructure	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Significant water losses due to leaking pipes	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		High per capita water consumption	According to SA Water Data
		Inappropriate water quality standards / objectives	
		Lack of infrastructure maintenance	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Poor management or governance	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Vandalism / sabotage / terrorism	
		Insufficient trained personnel	
	Industries	Inadequate funding for maintenance or upgrades	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Mining / minerals	
		Irrigation	irrigated cropping occurs in this catchment
		Chemicals / process	
	Population	Seasonal population loadings	
		Rapid population growth	Above state average (.76%/annum) - 1%/annum;. (population increase based on 2006/2001 census (Urban Centre/Locality))
		Pathogenic contamination	100% of all tests meet AW DG guidelines this year

WATER QUALITY OR SECURITY RISK (EFFECT)	Algal blooms	YES	A total of 53 blooms were recorded in SA Water Reservoirs between 2002 and 2007, while a further 100 blooms were detected along the Murray River.
	Heavy metal contamination	Unknown	
	Poor chlorine residuals	NO	
	Pesticide contamination	Unknown	
	Boil water notices	NO	
	Deaths or illness due to water quality	NO	
	Water restrictions (current and historic)	YES	
	Taste and odour issues	YES	
	Other contamination that would affect health	YES	Increasing salinity -(critical issue for the quality of our drinking water in the Murray. Long-term below average rainfall over the past 10 years has reduced river flows and salt has accumulated in the floodplains and disconnected wetlands. While the water quality meets drinking water guidelines at the moment, when river flows are increased, this accumulated salt may reduce water quality). Elevated phosphorus and nitrate readings (fertilisers, manure and detergent washed in from rainfall).
Notes			

Town # 76

TOWN	State/Territory	SA		
	Town Name	Wallaroo		
	Town Population	3,144 (SA Water Data, based on suburbs North Beach and Wallaroo)		
WATER UTILITY	Name of Water Utility	SA Water		
	Rate (\$/kL)	Quarterly supply charge of \$34.40		
	Per Capita Water Consumption (ML/day)	280 L/person/day (based on residential use only)		
	Number of Connections	2132		
CATCHMENT AND WATER SUPPLY	Catchment	Murray River		
	Sub-Catchment	Lower Murray		
	Catchment Management Authority (CMA)	Murray-Darling Basin Authority		
	CMA Web-Link	http://www.mdba.gov.au/		
	Catchment Protection Status	Prescribed		
	Potable Water Source(s)	Murray River		
WATER QUALITY	Supply Capacity	River - allowable extraction		
	Treatment Plant(s)	Swan Reach WTP		
	Level of Treatment	Conventional Water Treatment Plant (Coagulation, Flocculation, Sedimentation, Filtration, Disinfection (NHCl2))		
	Drinking Water Guidelines	ADWG 2004		
	Results (% compliance for 2008 reporting period)	Faecal Coliforms/100 mL	100%	
		E.Coli/100mL	100%	
		Chlorine Residual-Free [mg/L]	100%	
		Chlorine Residual- Total [mg/L]	N/A	
		TDS [by EC] [mg/L]	100%	
		Colour-True [HU]	100%	
		Turbidity [NTU]	100%	
		pH Units	0%	
		Trialomethanes-Total [ug/L]	100%	
		Fluoride [mg/L]	100%	
		Iron-Total [mg/L]	100%	
		Total Hardness as CaCO3 [mg/L]	100%	
		Manganese	100%	
WATER SECURITY	Current Water Restrictions	Level 3 Enhanced Water Restrictions- Dripper systems and hand-held hoses fitted with a trigger nozzle can be used for a maximum of 3 hours 2 days a week between 6 am - 9 am or 6pm - 9 pm. Watering cans and buckets can be used on any day/time. Sprinklers and other watering systems remain banned.		
	Proportion of Potable Water Supplied to Households (%)	70% residential, 30% non-residential		
	Distance from the Coast (km)	0		
	Climate	Temperate		
	Average Annual Rainfall	388.6		
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	FACTOR	YES / NO	NOTES / EXPLANATION
		Drought	YES	Yes, Based on the PIRSA EC maps and BOM 3 year rain maps
		Single drinking water source	YES	From the Morgan-Whyalla Pipeline
		Poor quality water source	NO	
		Sewage overflow or disposal into water source	NO	
		Flooding	NO	No historical record for Pt Augusta
		Fauna defecating in supply	YES	
		Fauna destroying water intake structures	NO	
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	Unknown	
		Un-lined landfills	NO	
		Extensive agriculture	YES	extensive grazing and cropping. Dryland and irrigated agriculture
		Low vegetation cover (dust, sediment runoff)	YES	cleared and modified native vegetation, cropping and grasslands
		Poor access to supply	NO	
		Unsustainable water extraction	YES	low flows causing several issues for Murray River Region
		Aquifer turning saline due to high extraction	YES	from high river extraction
	Hard water	NO	Water quality report shows WTP water to be of good quality	
	Governance	Aging or inadequate pipe work and associated infrastructure	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Significant water losses due to leaking pipes	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		High per capita water consumption	NO	According to SA Water
		Inappropriate water quality standards / objectives	NO	
		Lack of infrastructure maintenance	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Poor management or governance	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
	Industries	Vandalism / sabotage / terrorism	NO	
		Insufficient trained personnel	NO	
		Inadequate funding for maintenance or upgrades	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
	Population	Mining / minerals	NO	
Irrigation		YES	irrigated cropping occurs in this catchment	
Chemicals / process		NO		
RISK (EFFECT)	Seasonal population loadings	YES	Holiday retirement destination	
	Rapid population growth	YES	Above state average (.76%/annum) - 2.5%/annum:; (population increase based on 2006/2001 census (Urban Centre/Locality))	
	Pathogenic contamination	NO	100% of all tests are above AWDG guidelines this year	
	Algal blooms	YES	A total of 53 blooms were recorded in SA Water Reservoirs between 2002 and 2007, while a further 100 blooms were detected along the Murray River.	
	Heaw metal contamination	Unknown		

WATER QUALITY OR SECURITY RISK	Poor chlorine residuals	NO	
	Pesticide contamination	Unknown	
	Boil water notices	NO	
	Deaths or illness due to water quality	NO	
	Water restrictions (current and historic)	YES	since 2002 and level 3 enhanced currently
	Taste and odour issues	YES	
	Other contamination that would affect health	YES	Increasing salinity -(critical issue for the quality of our drinking water in the Murray. Long-term below average rainfall over the past 10 years has reduced river flows and salt has accumulated in the floodplains and disconnected wetlands. While the water quality meets drinking water guidelines at the moment, when river flows are increased, this accumulated salt may reduce water quality). Elevated phosphorus and nitrate readings (fertilisers, manure and detergent washed in from rainfall).
	Notes		

Town # 77

TOWN	State/Territory	SA		
	Town Name	Bordertown		
	Town Population	2,581 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility	SA Water		
	Rate (\$/kL)	Quarterly supply charge of \$34.40		
	Per Capita Water Consumption (ML/day)	310 L/person/day (based on residential use only)		
	Number of Connections	1330		
CATCHMENT AND WATER SUPPLY	Catchment	Limestone Aquifer		
	Sub-Catchment	unconfined aquifer in the Keith-Willalooka-Bordertown area		
	Catchment Management Authority (CMA)	EPA-South Australia, South East Natural Resources Management Board. The EPA focuses its water quality monitoring on the unconfined aquifer in the area		
	CMA Web-Link	http://www.senrm.sa.gov.au/		
	Catchment Protection Status	prescribed		
	Potable Water Source(s)	unconfined aquifer in the Keith-Willalooka-Bordertown area		
	Supply Capacity	Groundwater bore - allowable extraction		
WATER QUALITY	Treatment Plant(s)	N/A		
	Level of Treatment	Cl2 Disinfection Only		
	Drinking Water Guidelines	ADWG 2004		
	Results (% compliance for 2008 reporting period)	Overall		
		Faecal Coliforms/100 mL	98%	
		E.Coli/100mL	100%	
		Chlorine Residual-Free [mg/L]	100%	
		Chlorine Residual- Total [mg/L]	N/A	
		TDS [by EC] [mg/L]	25%	
		Colour-True [HU]	100%	
		Turbidity [NTU]	100%	
		pH Units	100%	
		Trihalomethanes-Total [ug/L]	100%	
		Fluoride [mg/L]	100%	
		Iron-Total [mg/L]	100%	
Total Hardness as CaCO3 [mg/L]		0%		
Manganese		100%		
WATER SECURITY	Current Water Restrictions	Permanent Water Conservation Measures- 1. Watering gardens, grounds and nurseries Public or private gardens, recreational areas, sports grounds or nurseries can be watered: By hand, Through a drip-feed irrigation system , through a sprinkler - after 5pm and before 10am on any day (including public or private gardens, recreation areas, sports grounds and nurseries. 2. Water must not be used to clean a motor vehicle or boat unless the water is applied from a bucket, high-pressure low volume water cleaner, trigger nozzle hose or a commercial car wash. 3. Construction sites: Water must not be used to control dust or other pollutants resulting from building works unless the water is applied from a hand-held hose fitted with a trigger nozzle, or directly from a motor vehicle designed to carry and deposit water.		
	Proportion of Potable Water Supplied to Households (%)	75% residential, 25% non-residential		
	Distance from the Coast (km)	56		
	Climate	Temperate		
	Average Annual Rainfall	462.4mm		
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	FACTOR	YES / NO	NOTES / EXPLANATION
		Drought	YES	Yes, Based on the PIRSA EC maps and BOM 3 year rain maps
		Single drinking water source	YES	Bores
		Poor quality water source	YES	In terms of drinking water quality, the groundwater in the South East is poor because of elevated nitrate agricultural practices. Elevated salinity in groundwater across the South East means that drinking water quality is poor because of its effect on taste. Drinking water quality is also considered poor because of elevated metal concentrations. This is mostly due to iron, which can discolour water.
		Sewage overflow or disposal into water source	NO	
		Flooding	NO	No historical flooding
		Fauna defecating in supply	NO	
		Fauna destroying water intake structures	NO	
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	YES	South east area has high nitrate levels
		Un-lined landfills	NO	
		Extensive agriculture	YES	Intensive Cropping-Cereals/Grain Legumes/Oil Seeds (Black Soils)
		Low vegetation cover (dust, sediment runoff)	NO	
		Poor access to supply	NO	
		Unsustainable water extraction	YES	High level of extraction (70-100%). The groundwater extractions have been compared to the sustainable yield and categorised in each groundwater management unit by percentage. The volumes of extraction and sustainable yield are for 2004/05. In many areas, management actions since 2005 have led to reduced levels of extraction.
		Aquifer turning saline due to high extraction	NO	turning saline due to land use
		Hard water	YES	Does not meet AWDG guidelines
		Aging or inadequate pipe work and associated infrastructure	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
	Significant water losses due to leaking pipes	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.	
	Infrastructure	High per capita water consumption	NO	According to SA Water
		Inappropriate water quality standards / objectives	NO	
Lack of infrastructure maintenance		NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.	

WATER QUALITY OR SECURITY RISK (EFFECT)	Govern	Poor management or governance	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Vandalism / sabotage / terrorism	NO	
		Insufficient trained personnel	NO	
		Inadequate funding for maintenance or upgrades	NO	
	Industries	Mining / minerals	NO	
		Irrigation	YES	
		Chemicals / process	NO	
	Population	Seasonal population loadings	NO	
		Rapid population growth	NO	Above state average (.76%/annum) - 1.2%/annum;. (population increase based on 2006/2001 census (Urban Centre/Locality))
		Pathogenic contamination	Yes	At test site has not had 100% compliance.
		Algal blooms	NO	
		Heavy metal contamination	Unknown	
		Poor chlorine residuals	NO	
		Pesticide contamination	Unknown	
		Boil water notices	NO	
		Deaths or illness due to water quality	NO	
		Water restrictions (current and historic)	Yes	
		Taste and odour issues	NO	
		Other contamination that would affect health	Unknown	
	Notes			

Town # 78

TOWN	State/Territory	SA		
	Town Name	Ceduna		
	Town Population	2,304 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility	SA Water		
	Rate (\$/kL)	Quarterly supply charge of \$34.40		
	Per Capita Water Consumption (ML/day)	200 L/person/day (based on residential use only)		
	Number of Connections	852		
CATCHMENT AND WATER SUPPLY	Catchment	Uley Basin/Lincoln Basin		
	Sub-Catchment	N/A		
	Catchment Management Authority (CMA)	– Department of Water, Land and Biodiversity Conservation (DWLBC) – Eyre Peninsula Natural Resources Management Board (EPNRMB) – EPNRMB Water Resources Advisory Committee (WRAC)		
	CMA Web-Link	www.epnrm.sa.gov.au		
	Catchment Protection Status	Prescribed		
	Potable Water Source(s)	Uley Basin South/Uley Wanilla/Lincoln Basin		
	Supply Capacity	Bore Field - allowable extraction. Recharge rates are applied to the assessed 'catchment' area of each lens to generate an annual recharge volume for each lens. 60% of this annual recharge is set aside to maintain the integrity of the resource, leaving ~40% available for allocation (a percentage of which is set aside for stock and domestic users). Recharge rates are gazetted in November each year, which set the allocation for the following financial year. Uley Wanilla 230.9 ML/a Uley East 180.9 ML/a Uley South 7224.0 ML/a Lincoln A, B and C 928.6 ML/a		
	WATER QUALITY	Treatment Plant(s)	N/A	
Level of Treatment		C12 Disinfection Only		
Drinking Water Guidelines		ADWG 2004		
Results (% compliance for 2008 reporting period)		Faecal Coliforms/100 mL	100%	
		E.Coli/100mL	100%	
		Chlorine Residual-Free [mg/L]	100%	
		Chlorine Residual- Total [mg/L]	N/A	
		TDS [by EC] [mg/L]	0%	
		Colour-True [HU]	100%	
		Turbidity [NTU]	100%	
		pH Units	100%	
		Trialomethanes-Total [ug/L]	100%	
		Fluoride [mg/L]	100%	
Iron-Total [mg/L]		100%		
Total Hardness as CaCO3 [mg/L]	0%			
WATER SECURITY	Current Water Restrictions	Yes, Level 3 Enhanced Water Restrictions since July 2009- Dripper systems and hand-held hoses fitted with a trigger nozzle can be used for a maximum of 3 hours 2 days a week between 6 am - 9 am or 6pm - 9 pm. Watering cans and buckets can be used on any day/time. Sprinklers and other watering systems remain banned.		
	Proportion of Potable Water Supplied to Households (%)	commercial 6.5%, Industrial 0.3%, Primary Production 0.0%, Public Institution 7.5%, Public Utilities 0.2%, Recreation 7.4%, Residential 63.9%, Unclassified 7.4%, Vacant Land 6.8%		
	Distance from the Coast (km)	0		
	Climate	Temperate		
	Average Annual Rainfall	297.2mm		
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	FACTOR	YES / NO	NOTES / EXPLANATION
		Drought	YES	Yes, Based on the PIRSA EC maps and BOM 3 year rain maps
		Single drinking water source	NO	Uley and Lincoln groundwater
		Poor quality water source	NO	
		Sewage overflow or disposal into water source	NO	
		Flooding	NO	
		Fauna defecating in supply	NO	
		Fauna destroying water intake structures	NO	
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	Unknown	
		Un-lined landfills	NO	
		Extensive agriculture	YES	Yes surrounding the Pt Lincoln Area, bores are in national park
		Low vegetation cover (dust, sediment runoff)	NO	
		Poor access to supply	NO	
		Unsustainable water extraction	YES	WATER levels in Eyre Peninsula groundwater basins have dropped by up to five metres since 1970 due to below average rainfall and unsustainable extraction
	Aquifer turning saline due to high extraction	YES	due to low levels. Potential for seawater incursion is also becoming a concern	
	Hard water	YES	Lincoln basin averages 360 mg/L, Uley South averages 270, Uley Wanilla averages 280 CaCO3 for 2004 to 2007 (200-500 mg/L causes increasing scaling problems)	
	Aging or inadequate pipe work and associated infrastructure	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.	
	Significant water losses due to leaking pipes	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.	
	Governance	High per capita water consumption	No	
		Inappropriate water quality standards / objectives	NO	
		Lack of infrastructure maintenance	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Poor management or governance	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
Vandalism / sabotage / terrorism		NO		

WATER QUALITY OR SECURITY RISK (EFFECT)		Insufficient trained personnel	NO	SA Water undertakes integrated asset management covering all of its water infrastructure across South Australia, that ensures ongoing satisfactory operation of the assets and reliable service to customers.
		Inadequate funding for maintenance or upgrades	NO	
	Industries	Mining / minerals	YES	Iluka Resources Limited plans to begin mining and shipping heavy mineral concentrate mine by the end of the first quarter in 2010
		Irrigation	NO	
		Chemicals / process	YES	Fishing/aquaculture
	Population	Seasonal population loadings	NO	
		Rapid population growth	NO	Population is decreasing however it is expected to increase in the near future due to mining
		Pathogenic contamination	NO	
		Algal blooms	NO	
		Heavy metal contamination	Unknown	
		Poor chlorine residuals	NO	
		Pesticide contamination	Unknown	
		Boil water notices	NO	
		Deaths or illness due to water quality	NO	
		Water restrictions (current and historic)	YES	it has been level 2 since 2003 and now is level 3 enhanced
		Taste and odour issues	NO	
		Other contamination that would affect health	NO	
	Notes		Ceduna will be connected to the Morgan-Whyalla pipeline this year to reduce the pressure on the groundwater resources	

Town Profiles – WA



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Town # 79

TOWN	State/Territory	WA			
	Town Name	Bridgetown			
	Town Population	2,322 (Census 2006, Urban Centre/Locality)			
WATER UTILITY	Name of Water Utility	Water Corporation of WA			
	Rate (\$/kL)	\$0.72 to \$7.69 per kL			
	Per Capita Water Consumption (ML/day)	Unknown			
CATCHMENT AND WATER SUPPLY	Number of Connections	Unknown			
	Catchment	South West Region			
	Sub-Catchment	Boyup Brook			
WATER QUALITY	Catchment Protection Status	Unknown			
	Potable Water Source(s)	Boyup Brook			
	Supply Capacity	Unknown			
	Treatment Plant(s)	Yes			
	Level of Treatment	Unknown			
	Drinking Water Guidelines	ADWG 1987			
	Results (% compliance for 2008 reporting period)	Overall	100% compliance		
		Thermotolerant Coliforms	Samples taken 51; 100% compliance		
		Thermophilic Naegleria	Samples taken 26; 100% compliance		
		Fluoride (mean)	Samples taken 2 (<0.10mg/L);		
		Hydrocarbons	Samples taken 0		
		Metals	Samples taken 2; 100% compliance		
		Nitrate (mean)	Samples taken 4 (<0.05mg/L); 100% compliance		
Pesticides		Samples taken 2; 100% compliance			
Radiological		Samples taken 0;			
Trihalomethanes (mean)		Samples taken 2 (0.098mg/L); 100% compliance			
WATER SECURITY	Current Water Restrictions	Yes			
	Proportion of Potable Water Supplied to Households (%)	Unknown			
	Distance from the Coast (km)	100km			
	Climate	Temperate; Max mean temperature 22.3; Min mean temperature 8.4			
	Average Annual Rainfall	829.9 mm			
WATER QUALITY OR SECURITY RISK (CAUSE)					
Catchment and Water Supply	FACTOR		YES / NO	NOTES / EXPLANATION	
	Drought	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues		
	Single drinking water source	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues		
	Poor quality water source	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues		
	Sewage overflow or disposal into water source	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues		
	Flooding	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues		
	Fauna defecating in supply	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues		
	Fauna destroying water intake structures	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues		
	Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues		
	Un-lined landfills		Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues		
	Extensive agriculture	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues		
	Low vegetation cover (dust, sediment runoff)	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues		
	Poor access to supply	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues		
	Unsustainable water extraction	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues		
	Aquifer turning saline due to high extraction	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues		
	Hard water	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues		
	Aging or inadequate pipe work and associated infrastructure	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues		
	Significant water losses due to leaking pipes	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues		
	Governance	High per capita water consumption	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues	
		Inappropriate water quality standards / objectives	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues	
		Lack of infrastructure maintenance	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues	
		Poor management or governance	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues	
		Vandalism / sabotage / terrorism	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues	
		Insufficient trained personnel	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues	
		Inadequate funding for maintenance or upgrades	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues	
	Industries	Mining / minerals	No	Unconfirmed Local Knowledge.	
		Irrigation	No	Unconfirmed Local Knowledge.	
		Chemicals / process	No	Unconfirmed Local Knowledge.	
	Population	Seasonal population loadings	Yes	Holiday town	
Rapid population growth		No	Unconfirmed Local Knowledge.		

WATER QUALITY OR SECURITY RISK (EFFECT)	Pathogenic contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Algal blooms	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Heavy metal contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Poor chlorine residuals	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Pesticide contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Boil water notices	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Deaths or illness due to water quality	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Water restrictions (current and historic)	Yes	Unconfirmed Local Knowledge.
	Taste and odour issues	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Other contamination that would affect health	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
Notes			

Town # 80

TOWN	State/Territory	WA		
	Town Name	Broome		
	Town Population	11,548 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility	Water Corporation of WA		
	Rate (\$/kL)	\$0.72 to \$2.76 per kL		
	Per Capita Water Consumption (ML/day)	Unknown		
	Number of Connections	Unknown		
CATCHMENT AND WATER SUPPLY	Catchment	NorthWest Region		
	Sub-Catchment	Unknown		
	Catchment Protection Status	Unknown		
	Potable Water Source(s)	Ground Water		
	Supply Capacity	Unknown		
WATER QUALITY	Treatment Plant(s)	Yes		
	Level of Treatment	Unknown		
	Drinking Water Guidelines	ADWG 1987		
	Results (% compliance for 2008 reporting period)	Overall	100% compliance	
		Thermotolerant Coliforms	Samples taken 72; 100% compliance	
		Thermophilic Naegleria	Samples taken 72; 100% compliance	
		Fluoride (mean)	Samples taken 52 (0.61mg/L);	
		Hydrocarbons	Samples taken 0	
		Metals	Samples taken 4; 100% compliance	
		Nitrate (mean)	Samples taken 4 (4.4mg/L); 100% compliance	
		Pesticides	Samples taken 2; 100% compliance	
		Radiological	Samples taken 0;	
Trihalomethanes (mean)		Samples taken 4 (<0.004mg/L); 100% compliance		
WATER SECURITY	Current Water Restrictions	Yes		
	Proportion of Potable Water Supplied to Households (%)	Unknown		
	Distance from the Coast (km)	0 km		
	Climate	Grassland; Max mean temperature 32.1; Min mean temperature 21.1		
	Average Annual Rainfall	574.9 mm		
FACTOR		YES / NO	NOTES / EXPLANATION	
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Single drinking water source	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Poor quality water source	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Sewage overflow or disposal into water source	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Flooding	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Fauna defecating in supply	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Fauna destroying water intake structures	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Un-lined landfills	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Extensive agriculture	No	Unconfirmed Local Knowledge.
		Low vegetation cover (dust, sediment runoff)	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Poor access to supply	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Unsustainable water extraction	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Aquifer turning saline due to high extraction	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Hard water	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Aging or inadequate pipe work and associated infrastructure	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Significant water losses due to leaking pipes	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Governance	High per capita water consumption	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Inappropriate water quality standards / objectives	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Lack of infrastructure maintenance	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Poor management or governance	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Vandalism / sabotage / terrorism	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Insufficient trained personnel	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Inadequate funding for maintenance or upgrades	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Industries	Mining / minerals	No	Unconfirmed Local Knowledge.
		Irrigation	No	Unconfirmed Local Knowledge.
		Chemicals / process	Not known	Unconfirmed Local Knowledge.
	Population	Seasonal population loadings	Yes	Holiday town
		Rapid population growth	Yes	5% per year - Shire of Broome- Local Housing Development Strategy 2009

WATER QUALITY OR SECURITY RISK (EFFECT)	Pathogenic contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Algal blooms	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Heavy metal contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Poor chlorine residuals	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Pesticide contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Boil water notices	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Deaths or illness due to water quality	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Water restrictions (current and historic)	Yes	Unconfirmed Local Knowledge.
	Taste and odour issues	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Other contamination that would affect health	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Notes		

Town # 81

TOWN	State/Territory	WA		
	Town Name	Carnarvon		
	Town Population	5,284 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility	Water Corporation of WA		
	Rate (\$/kL)	\$0.72 to \$6.54 per kL		
	Per Capita Water Consumption (L/day)	Unknown		
	Number of Connections	Unknown		
CATCHMENT AND WATER SUPPLY	Catchment	Mid West Region		
	Sub-Catchment	Not known		
	Catchment Protection Status	Not known		
	Potable Water Source(s)	Not known		
	Supply Capacity	Not known		
	Treatment Plant(s)	Yes		
WATER QUALITY	Level of Treatment	Not known		
	Drinking Water Guidelines	ADWG 1987		
	Results (% compliance for 2008 reporting period)	Overall	100% compliance	
		Thermotolerant Coliforms	Samples taken 65; 100% compliance	
		Thermophilic Naegleria	Samples taken 40; 100% compliance	
		Fluoride (mean)	Samples taken 4 (0.49mg/L);	
		Hydrocarbons	Samples taken 0	
		Metals	Samples taken 8; 100% compliance	
		Nitrate (mean)	Samples taken 2 (0.8mg/L); 100% compliance	
		Pesticides	Samples taken 4; 100% compliance	
		Radiological	Samples taken 1; 100% compliance	
		Trihalomethanes (mean)	Samples taken 2 (0.006mg/L); 100% compliance	
WATER SECURITY	Current Water Restrictions	Yes		
	Proportion of Potable Water Supplied to Households (%)	Unknown		
	Distance from the Coast (km)	0 km		
	Climate	Desert; Max mean temperature 27.2; Min mean temperature 16.6		
	Average Annual Rainfall	230.8 mm		
FACTOR		YES / NO	NOTES / EXPLANATION	
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Single drinking water source	Yes	Unconfirmed Local Knowledge.
		Poor quality water source	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Sewage overflow or disposal into water source	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Flooding	Yes	Unconfirmed Local Knowledge: Gascoyne River basin
		Fauna defecating in supply	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Fauna destroying water intake structures	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Un-lined landfills	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Extensive agriculture	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Low vegetation cover (dust, sediment runoff)	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Poor access to supply	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Unsustainable water extraction	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Aquifer turning saline due to high extraction	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Hard water	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Governance	Aging or inadequate pipe work and associated infrastructure	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Significant water losses due to leaking pipes	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		High per capita water consumption	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Inappropriate water quality standards / objectives	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Lack of infrastructure maintenance	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Poor management or governance	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Industries	Vandalism / sabotage / terrorism	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Insufficient trained personnel	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Inadequate funding for maintenance or upgrades	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Population	Mining / minerals	No	Unconfirmed Local Knowledge.
		Irrigation	No	Unconfirmed Local Knowledge.
		Chemicals / process	No	Unconfirmed Local Knowledge.
EFFECT	Population	Seasonal population loadings	No	
		Rapid population growth	No	Unconfirmed Local Knowledge.
EFFECT	Pathogenic contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues	

WATER QUALITY OR SECURITY RISK (EFF)	Algal blooms	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Heavy metal contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Poor chlorine residuals	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Pesticide contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Boil water notices	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Deaths or illness due to water quality	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Water restrictions (current and historic)	Yes	Unconfirmed Local Knowledge.
	Taste and odour issues	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Other contamination that would affect health	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
Notes			

Town # 82

TOWN	State/Territory	WA		
	Town Name	Collie		
	Town Population	7,083 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility	Water Corporation of WA		
	Rate (\$/kL)	\$0.72 to \$4.42 per kL		
	Per Capita Water Consumption (ML/day)	Unknown		
	Number of Connections	Unknown		
CATCHMENT AND WATER SUPPLY	Catchment	South West Region		
	Sub-Catchment	-		
	Catchment Protection Status	Good		
	Potable Water Source(s)	Harris Dam		
	Supply Capacity	Unknown		
WATER QUALITY	Treatment Plant(s)	Yes		
	Level of Treatment	Not known		
	Drinking Water Guidelines	ADWG 1987		
	Results (% compliance for 2008 reporting period)	Overall	100% compliance	
		Thermotolerant Coliforms	Samples taken 69; 100% compliance	
		Thermophilic Naegleria	Samples taken 33; 100% compliance	
		Fluoride (mean)	Samples taken 52 (0.74mg/L);	
		Hydrocarbons	Samples taken 0	
		Metals	Samples taken 4; 100% compliance	
		Nitrate (mean)	Samples taken 8 (<0.05mg/L); 100% compliance	
		Pesticides	Samples taken 2; 100% compliance	
		Radiological	Samples taken 0;	
Trihalomethanes (mean)	Samples taken 6 (0.076mg/L); 100% compliance			
WATER SECURITY	Current Water Restrictions	Yes		
	Proportion of Potable Water Supplied to Households (%)	Unknown		
	Distance from the Coast (km)	60km		
	Climate	Temperate; Max mean temperature 22.5; Min mean temperature 8.4		
	Average Annual Rainfall	938.8 mm		
FACTOR		YES / NO	NOTES / EXPLANATION	
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Single drinking water source	Yes	Unconfirmed Local Knowledge.
		Poor quality water source	No	Wellington Dam source has Salinity Issues. Harris Dam Option is used.
		Sewage overflow or disposal into water source	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Flooding	No	Unconfirmed Local Knowledge
		Fauna defecating in supply	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Fauna destroying water intake structures	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Un-lined landfills	Yes	Plans for lining in future - Source Shire Engineer
		Extensive agriculture	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Low vegetation cover (dust, sediment runoff)	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Poor access to supply	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Unsustainable water extraction	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Aquifer turning saline due to high extraction	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Hard water	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Aging or inadequate pipe work and associated infrastructure	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Significant water losses due to leaking pipes	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Governance	High per capita water consumption	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Inappropriate water quality standards / objectives	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Lack of infrastructure maintenance	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Poor management or governance	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Vandalism / sabotage / terrorism	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Insufficient trained personnel	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Inadequate funding for maintenance or upgrades	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Industries	Mining / minerals	Yes	Coal Mining Operations in the area
		Irrigation	Yes	Unconfirmed Local Knowledge.
		Chemicals / process	No	Unconfirmed Local Knowledge.
	Population	Seasonal population loadings	No	
		Rapid population growth	No	Unconfirmed Local Knowledge.
(EFFECT)	Pathogenic contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues	
	Algal blooms	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues	

WATER QUALITY OR SECURITY RISK	Heavy metal contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Poor chlorine residuals	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Pesticide contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Boil water notices	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Deaths or illness due to water quality	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Water restrictions (current and historic)	Yes	Unconfirmed Local Knowledge. Drought related.
	Taste and odour issues	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Other contamination that would affect health	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
Notes			

Town # 83

TOWN	State/Territory	WA		
	Town Name	Esperance		
	Town Population	9,535 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility	Water Corporation of WA		
	Rate (\$/kL)	\$0.72 to \$4.42 per kL		
	Per Capita Water Consumption (ML/day)	Not known		
CATCHMENT AND WATER SUPPLY	Number of Connections	Not known		
	Catchment	Gold Fields and Agricultural Region		
	Sub-Catchment	Not known		
WATER QUALITY	Catchment Protection Status	Not known		
	Potable Water Source(s)	Ground and Surface		
	Supply Capacity	Not known		
	Treatment Plant(s)	Yes		
	Level of Treatment	None		
	Drinking Water Guidelines	ADWG 1987		
	Results (% compliance for 2008 reporting period)	Overall	100% compliance	
		Thermotolerant Coliforms	Samples taken 91; 100% compliance	
		Thermophilic Naegleria	Samples taken 61; 100% compliance	
		Fluoride (mean)	Samples taken 54 (0.83mg/L);	
Hydrocarbons		Samples taken 0		
Metals		Samples taken 2; 100% compliance		
Nitrate (mean)		Samples taken 5 (4.2mg/L); 100% compliance		
Pesticides		Samples taken 5; 100% compliance		
WATER SECURITY	Radiological	Samples taken 0;		
	Trihalomethanes (mean)	Samples taken 2 (0.044mg/L); 100% compliance		
	Current Water Restrictions	Yes		
	Proportion of Potable Water Supplied to Households (%)	Unknown		
	Distance from the Coast (km)	0 km		
WATER SECURITY	Climate	Temperate; Max mean temperature 21.8; Min mean temperature 12.0		
	Average Annual Rainfall	623.2 mm		
FACTOR		YES / NO	NOTES / EXPLANATION	
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Single drinking water source	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Poor quality water source	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Sewage overflow or disposal into water source	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Flooding	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Fauna defecating in supply	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Fauna destroying water intake structures	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Un-lined landfills	Yes	Shire Engineer
		Extensive agriculture	No	Unconfirmed Local Knowledge.
		Low vegetation cover (dust, sediment runoff)	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Poor access to supply	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Unsustainable water extraction	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Aquifer turning saline due to high extraction	Yes	Coastal town
		Hard water	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Governance	Aging or inadequate pipe work and associated infrastructure	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Significant water losses due to leaking pipes	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		High per capita water consumption	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Inappropriate water quality standards / objectives	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Lack of infrastructure maintenance	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Poor management or governance	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Vandalism / sabotage / terrorism	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Industries	Insufficient trained personnel	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Inadequate funding for maintenance or upgrades	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Mining / minerals	No	Unconfirmed Local Knowledge.
	Population	Irrigation	No	Unconfirmed Local Knowledge.
		Chemicals / process	No	Unconfirmed Local Knowledge.
		Seasonal population loadings	Yes	Holiday town
	Population	Rapid population growth	No	Unconfirmed Local Knowledge.

WATER QUALITY OR SECURITY RISK (EFFECT)	Pathogenic contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Algal blooms	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Heavy metal contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Poor chlorine residuals	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Pesticide contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Boil water notices	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Deaths or illness due to water quality	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Water restrictions (current and historic)	Yes	Unconfirmed Local Knowledge.
	Taste and odour issues	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Other contamination that would affect health	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
Notes			

Town # 84

TOWN	State/Territory	WA		
	Town Name	Exmouth		
	Town Population	1,843 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility	Water Corporation of WA		
	Rate (\$/kL)	\$0.72 to \$5.33 per kL		
	Per Capita Water Consumption (ML/day)	Not known		
	Number of Connections	Not known		
CATCHMENT AND WATER SUPPLY	Catchment	Mid West Region		
	Sub-Catchment	Not known		
	Catchment Protection Status	Not known		
	Potable Water Source(s)	Ground		
	Supply Capacity	Not known		
WATER QUALITY	Treatment Plant(s)	Yes		
	Level of Treatment	None		
	Drinking Water Guidelines	ADWG 1987		
	Results (% compliance for 2008 reporting period)	Overall	100% compliance	
		Thermotolerant Coliforms	Samples taken 65; 100% compliance	
		Thermophilic Naegleria	Samples taken 40; 100% compliance	
		Fluoride (mean)	Samples taken 53 (0.68mg/L);	
		Hydrocarbons	Samples taken 0	
		Metals	Samples taken 2; 100% compliance	
		Nitrate (mean)	Samples taken 3 (1.9mg/L); 100% compliance	
		Pesticides	Samples taken 1; 100% compliance	
		Radiological	Samples taken 1; 100% compliance	
Trihalomethanes (mean)		Samples taken 2 (0.003mg/L); 100% compliance		
WATER SECURITY		Current Water Restrictions	Yes	
	Proportion of Potable Water Supplied to Households (%)	Unknown		
	Distance from the Coast (km)	0 km		
	Climate	Grassland; Max mean temperature 28.8; Min mean temperature 19.1 (Vlamingh Head)		
	Average Annual Rainfall	296.1 mm (Vlamingh Head)		
FACTOR		YES / NO	NOTES / EXPLANATION	
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Single drinking water source	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Poor quality water source	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Sewage overflow or disposal into water source	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Flooding	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Fauna defecating in supply	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Fauna destroying water intake structures	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Un-lined landfills	Yes	Shire Engineering section
		Extensive agriculture	No	Unconfirmed Local Knowledge.
		Low vegetation cover (dust, sediment runoff)	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Poor access to supply	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Unsustainable water extraction	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Aquifer turning saline due to high extraction	Yes	Coastal town
		Hard water	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Governance	Aging or inadequate pipe work and associated infrastructure	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Significant water losses due to leaking pipes	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		High per capita water consumption	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Inappropriate water quality standards / objectives	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Lack of infrastructure maintenance	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Poor management or governance	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Vandalism / sabotage / terrorism	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Insufficient trained personnel	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Industries	Inadequate funding for maintenance or upgrades	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Mining / minerals	No	Unconfirmed Local Knowledge.
		Irrigation	No	Unconfirmed Local Knowledge.
	Population	Chemicals / process	No	Unconfirmed Local Knowledge.
		Seasonal population loadings	Yes	Holiday town
		Rapid population growth	No	Unconfirmed Local Knowledge.

WATER QUALITY OR SECURITY RISK (EFFECT)	Pathogenic contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Algal blooms	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Heavy metal contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Poor chlorine residuals	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Pesticide contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Boil water notices	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Deaths or illness due to water quality	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Water restrictions (current and historic)	Yes	Unconfirmed Local Knowledge.
	Taste and odour issues	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Other contamination that would affect health	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Notes		

Town # 85

TOWN	State/Territory	WA		
	Town Name	Kalbarri		
	Town Population	1,328 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility	Water Corporation of WA		
	Rate (\$/kL)	\$0.72 to \$2.76 per kL		
	Per Capita Water Consumption (L/day)	Not known		
	Number of Connections	Not known		
CATCHMENT AND WATER SUPPLY	Catchment	Mid West Region		
	Sub-Catchment	Not known		
	Catchment Protection Status	Not known		
	Potable Water Source(s)	Ground Water		
	Supply Capacity	Not known		
WATER QUALITY	Treatment Plant(s)	Yes		
	Level of Treatment	Not known		
	Drinking Water Guidelines	ADWG 1987		
	Results (% compliance for 2008 reporting period)	Overall	100% compliance	
		Thermotolerant Coliforms	Samples taken 52; 100% compliance	
		Thermophilic Naegleria	Samples taken 27; 100% compliance	
		Fluoride (mean)	Samples taken 2 (<0.10mg/L);	
		Hydrocarbons	Samples taken 0	
		Metals	Samples taken 2; 100% compliance	
		Nitrate (mean)	Samples taken 2 (0.7mg/L); 100% compliance	
		Pesticides	Samples taken 1; 100% compliance	
Radiological		Samples taken 0		
Trihalomethanes (mean)	Samples taken 2 (0.004mg/L); 100% compliance			
WATER SECURITY	Current Water Restrictions	Yes		
	Proportion of Potable Water Supplied to Households (%)	Unknown		
	Distance from the Coast (km)	0 km		
	Climate	Grassland; Max mean temperature 27.5; Min mean temperature 14.5		
	Average Annual Rainfall	353.8 mm		
FACTOR		YES / NO	NOTES / EXPLANATION	
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Single drinking water source	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Poor quality water source	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Sewage overflow or disposal into water source	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Flooding	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Fauna defecating in supply	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Fauna destroying water intake structures	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Un-lined landfills	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Extensive agriculture	No	Unconfirmed Local Knowledge.
		Low vegetation cover (dust, sediment runoff)	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Poor access to supply	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Unsustainable water extraction	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Aquifer turning saline due to high extraction	Yes	Coastal town
		Hard water	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Aging or inadequate pipe work and associated infrastructure	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Significant water losses due to leaking pipes	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Governance	High per capita water consumption	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Inappropriate water quality standards / objectives	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Lack of infrastructure maintenance	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Poor management or governance	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Vandalism / sabotage / terrorism	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Insufficient trained personnel	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Inadequate funding for maintenance or upgrades	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Industries	Mining / minerals	No	Unconfirmed Local Knowledge.
		Irrigation	No	Unconfirmed Local Knowledge.
		Chemicals / process	No	Unconfirmed Local Knowledge.
	Population	Seasonal population loadings	Yes	Holiday town
		Rapid population growth	No	Unconfirmed Local Knowledge.

WATER QUALITY OR SECURITY RISK (EFFECT)	Pathogenic contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Algal blooms	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Heavy metal contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Poor chlorine residuals	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Pesticide contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Boil water notices	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Deaths or illness due to water quality	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Water restrictions (current and historic)	Yes	Unconfirmed Local Knowledge.
	Taste and odour issues	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Other contamination that would affect health	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
Notes			

Town # 86

TOWN	State/Territory	WA		
	Town Name	Karratha		
	Town Population	11,727 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility	Water Corporation of WA		
	Rate (\$/kL)	\$0.76 to \$5.33 per kL		
	Per Capita Water Consumption (ML/day)	Not known		
CATCHMENT AND WATER SUPPLY	Number of Connections	Not known		
	Catchment	North West Region		
	Sub-Catchment	Not known		
WATER QUALITY	Catchment Protection Status	Not known		
	Potable Water Source(s)	Ground and Surface Water		
	Supply Capacity	Not known		
WATER SECURITY	Treatment Plant(s)	Yes		
	Level of Treatment	Not known		
	Drinking Water Guidelines	ADWG 1987		
	Results (% compliance for 2008 reporting period)	Overall	100% compliance	
		Thermotolerant Coliforms	Samples taken 72: 100% compliance	
		Thermophilic Naegleria	Samples taken 72: 100% compliance	
		Fluoride (mean)	Samples taken 54 (0.66mg/L);	
		Hydrocarbons	Samples taken 0	
		Metals	Samples taken 1; 100% compliance	
		Nitrate (mean)	Samples taken 4 (<0.05mg/L); 100% compliance	
Pesticides		Samples taken 1; 100% compliance		
Radiological		Samples taken 0		
Trihalomethanes (mean)	Samples taken 4 (0.158mg/L); 100% compliance			
WATER SECURITY	Current Water Restrictions	Yes		
	Proportion of Potable Water Supplied to Households (%)	Unknown		
	Distance from the Coast (km)	0 km		
	Climate	Desert; Max mean temperature 32.3; Min mean temperature 20.7		
	Average Annual Rainfall	281.6 mm		
FACTOR		YES / NO	NOTES / EXPLANATION	
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Single drinking water source	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Poor quality water source	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Sewage overflow or disposal into water source	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Flooding	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Fauna defecating in supply	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Fauna destroying water intake structures	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Un-lined landfills	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Extensive agriculture	No	Unconfirmed Local Knowledge.
		Low vegetation cover (dust, sediment runoff)	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Poor access to supply	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Unsustainable water extraction	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Aquifer turning saline due to high extraction	Yes	Coastal town
		Hard water	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Aging or inadequate pipe work and associated infrastructure	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Significant water losses due to leaking pipes	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Governance	High per capita water consumption	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Inappropriate water quality standards / objectives	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Lack of infrastructure maintenance	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Poor management or governance	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Vandalism / sabotage / terrorism	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Insufficient trained personnel	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Industries	Inadequate funding for maintenance or upgrades	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Mining / minerals	Yes	Mineral Export Port Facility
		Irrigation	No	Unconfirmed Local Knowledge.
	Population	Chemicals / process	No	Unconfirmed Local Knowledge.
		Seasonal population loadings	No	Large proportion of non resident (FIFO) workforce
		Rapid population growth	Yes	"Karratha Vision 2020" - Shire of Karratha
ECT)	Pathogenic contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues	

WATER QUALITY OR SECURITY RISK (EFF)	Algal blooms	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Heavy metal contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Poor chlorine residuals	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Pesticide contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Boil water notices	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Deaths or illness due to water quality	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Water restrictions (current and historic)	Yes	Unconfirmed Local Knowledge.
	Taste and odour issues	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Other contamination that would affect health	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Notes		

Town # 87

TOWN	State/Territory	WA		
	Town Name	Manjimup		
	Town Population	4,239 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility	Water Corporation of WA		
	Rate (\$/kL)	\$0.76 to \$6.54 per kL		
	Per Capita Water Consumption (ML/day)	Not known		
	Number of Connections	Not known		
CATCHMENT AND WATER SUPPLY	Catchment	South West Region		
	Sub-Catchment	Not known		
	Catchment Protection Status	Not known		
	Potable Water Source(s)	Not known		
	Supply Capacity	Not known		
WATER QUALITY	Treatment Plant(s)	Yes		
	Level of Treatment	Not known		
	Drinking Water Guidelines	ADWG 1987		
	Results (% compliance for 2008 reporting period)	Overall	100% compliance	
		Thermotolerant Coliforms	Samples taken 65; 100% compliance	
		Thermophilic Naegleria	Samples taken 32; 100% compliance	
		Fluoride (mean)	Samples taken 56 (0.73mg/L);	
		Hydrocarbons	Samples taken 0	
		Metals	Samples taken 2; 100% compliance	
		Nitrate (mean)	Samples taken 4 (<0.05mg/L); 100% compliance	
		Pesticides	Samples taken 4; 100% compliance	
Radiological		Samples taken 0		
Trihalomethanes (mean)	Samples taken 2 (0.045mg/L); 100% compliance			
WATER SECURITY	Current Water Restrictions	Yes		
	Proportion of Potable Water Supplied to Households (%)	Not known		
	Distance from the Coast (km)	100km		
	Climate	Temperate; Max mean temperature 20.3; Min mean temperature 9.6		
	Average Annual Rainfall	1013.7mm		
FACTOR		YES / NO	NOTES / EXPLANATION	
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Single drinking water source	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Poor quality water source	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Sewage overflow or disposal into water source	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Flooding	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Fauna defecating in supply	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Fauna destroying water intake structures	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Un-lined landfills	Yes	
		Extensive agriculture	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Low vegetation cover (dust, sediment runoff)	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Poor access to supply	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Unsustainable water extraction	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Aquifer turning saline due to high extraction	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Hard water	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Aging or inadequate pipe work and associated infrastructure	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Significant water losses due to leaking pipes	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Governance	High per capita water consumption	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Inappropriate water quality standards / objectives	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Lack of infrastructure maintenance	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Poor management or governance	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Vandalism / sabotage / terrorism	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Insufficient trained personnel	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Inadequate funding for maintenance or upgrades	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Industries	Mining / minerals	No	Unconfirmed Local Knowledge.
		Irrigation	No	Unconfirmed Local Knowledge.
		Chemicals / process	No	Unconfirmed Local Knowledge.
	Population	Seasonal population loadings	Yes	Holiday town
		Rapid population growth	No	Unconfirmed Local Knowledge.

WATER QUALITY OR SECURITY RISK (EFFECT)	Pathogenic contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Algal blooms	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Heavy metal contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Poor chlorine residuals	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Pesticide contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Boil water notices	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Deaths or illness due to water quality	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Water restrictions (current and historic)	Yes	Unconfirmed Local Knowledge
	Taste and odour issues	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Other contamination that would affect health	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Notes		

Town # 88

TOWN	State/Territory	WA		
	Town Name	Margaret River		
	Town Population	4,414 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility	Water Corporation of WA		
	Rate (\$/kL)	\$0.76 to \$2.76 per kL		
	Per Capita Water Consumption (ML/day)	Not known		
CATCHMENT AND WATER SUPPLY	Number of Connections	Not known		
	Catchment	South West Region		
	Sub-Catchment	Not known		
WATER QUALITY	Catchment Protection Status	Not known		
	Potable Water Source(s)	Not known		
	Supply Capacity	Not known		
	Treatment Plant(s)	Yes		
	Level of Treatment	Not known		
	Drinking Water Guidelines	ADWG 1987		
	Results (% compliance for 2008 reporting period)	Overall	100% compliance	
		Thermotolerant Coliforms	Samples taken 65; 100% compliance	
		Thermophilic Naegleria	Samples taken 32; 100% compliance	
		Fluoride (mean)	Samples taken 2 (<0.10mg/L);	
		Hydrocarbons	Samples taken 0	
		Metals	Samples taken 5; 100% compliance	
Nitrate (mean)		Samples taken 5 (0.1mg/L); 100% compliance		
Pesticides		Samples taken 4; 100% compliance		
Radiological	Samples taken 0			
Trihalomethanes (mean)	Samples taken 4 (0.096mg/L); 100% compliance			
WATER SECURITY	Current Water Restrictions	Yes		
	Proportion of Potable Water Supplied to Households (%)	Not known		
	Distance from the Coast (km)	20km		
	Climate	Temperate; Max mean temperature 20.3; Min mean temperature 9.6		
	Average Annual Rainfall	1013.7mm		
FACTOR		YES / NO	NOTES / EXPLANATION	
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Single drinking water source	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Poor quality water source	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Sewage overflow or disposal into water source	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Flooding	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Fauna defecating in supply	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Fauna destroying water intake structures	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Un-lined landfills	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Extensive agriculture	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Low vegetation cover (dust, sediment runoff)	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Poor access to supply	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Unsustainable water extraction	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Aquifer turning saline due to high extraction	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Hard water	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Aging or inadequate pipe work and associated infrastructure	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Significant water losses due to leaking pipes	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Governance	High per capita water consumption	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Inappropriate water quality standards / objectives	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Lack of infrastructure maintenance	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Poor management or governance	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Vandalism / sabotage / terrorism	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Insufficient trained personnel	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Inadequate funding for maintenance or upgrades	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Industries	Mining / minerals	No	Unconfirmed Local Knowledge.
		Irrigation	No	Unconfirmed Local Knowledge.
		Chemicals / process	No	Unconfirmed Local Knowledge.
	Population	Seasonal population loadings	Yes	Holiday town
		Rapid population growth	No	Unconfirmed Local Knowledge.

WATER QUALITY OR SECURITY RISK (EFFECT)	Pathogenic contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Algal blooms	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Heavy metal contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Poor chlorine residuals	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Pesticide contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Boil water notices	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Deaths or illness due to water quality	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Water restrictions (current and historic)	Yes	Unconfirmed Local Knowledge.
	Taste and odour issues	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Other contamination that would affect health	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
Notes			

Town # 89

TOWN	State/Territory	WA		
	Town Name	Narrogin		
	Town Population	4,238 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility	Water Corporation of WA		
	Rate (\$/kL)	\$0.76 to \$6.54 per kL		
	Per Capita Water Consumption (ML/day)	Not known		
	Number of Connections	Not known		
CATCHMENT AND WATER SUPPLY	Catchment	Harris Dam Supply		
	Sub-Catchment	Harris dam		
	Catchment Protection Status	Good		
	Potable Water Source(s)	Not known		
	Supply Capacity	Not known		
WATER QUALITY	Treatment Plant(s)	Yes, at Harris Dam and re-chlorination on site		
	Level of Treatment	Not known		
	Drinking Water Guidelines	ADWG 1987		
	Results (% compliance for 2008 reporting period)	Overall	100% compliance	
		Thermotolerant Coliforms	Samples taken 60; 100% compliance	
		Thermophilic Naegleria	Samples taken 60; 100% compliance	
		Fluoride (mean)	Samples taken 50 (0.73mg/L);	
		Hydrocarbons	Samples taken 0	
		Metals	Samples taken 2; 100% compliance	
		Nitrate (mean)	Samples taken 2 (0.1mg/L); 100% compliance	
Pesticides		Samples taken 1; 100% compliance		
Radiological		Samples taken 1; 100% compliance		
Trihalomethanes (mean)	Samples taken 2 (0.136mg/L); 100% compliance			
WATER SECURITY	Current Water Restrictions	Yes		
	Proportion of Potable Water Supplied to Households (%)	Unknown		
	Distance from the Coast (km)	100km		
	Climate	Temperate; Max mean temperature 22.3; Min mean temperature 9.3		
	Average Annual Rainfall	495.9 mm		
FACTOR		YES / NO	NOTES / EXPLANATION	
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Single drinking water source	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Poor quality water source	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Sewage overflow or disposal into water source	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Flooding	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Fauna defecating in supply	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Fauna destroying water intake structures	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Un-lined landfills	Yes	
		Extensive agriculture	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Low vegetation cover (dust, sediment runoff)	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Poor access to supply	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Unsustainable water extraction	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Aquifer turning saline due to high extraction	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Hard water	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Aging or inadequate pipe work and associated infrastructure	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Significant water losses due to leaking pipes	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Governance	High per capita water consumption	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Inappropriate water quality standards / objectives	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Lack of infrastructure maintenance	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Poor management or governance	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Vandalism / sabotage / terrorism	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Insufficient trained personnel	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Inadequate funding for maintenance or upgrades	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Mining / minerals	No	Unconfirmed Local Knowledge.	

WATER QUALITY OR SECURITY RISK (EFFECT)	Indus es	Irrigation	No	Unconfirmed Local Knowledge.
		Chemicals / process	No	Unconfirmed Local Knowledge.
	Populat ion	Seasonal population loadings	No	
		Rapid population growth	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Pathogenic contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Algal blooms	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Heavy metal contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Poor chlorine residuals	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Pesticide contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Boil water notices	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Deaths or illness due to water quality	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Water restrictions (current and historic)	Yes	Unconfirmed Local Knowledge.
		Taste and odour issues	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Other contamination that would affect health	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Notes			

Town #		90		
TOWN	State/Territory	WA		
	Town Name	Newman		
	Town Population	4,248 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility	Water Corporation of WA		
	Rate (\$/kL)	\$0.76 to \$2.76 per kL		
	Per Capita Water Consumption (ML/day)	Not known		
	Number of Connections	Not known		
CATCHMENT AND WATER SUPPLY	Catchment	North West Region		
	Sub-Catchment	Not known		
	Catchment Protection Status	Not known		
	Potable Water Source(s)	Ground water		
WATER QUALITY	Supply Capacity	Not known		
	Treatment Plant(s)	yes		
	Level of Treatment	Not known		
	Drinking Water Guidelines	ADWG 1987		
	Results (% compliance for 2008 reporting period)	Overall	100% compliance	
		Thermotolerant Coliforms	Samples taken 62; 100% compliance	
		Thermophilic Naegleria	Samples taken 48; 100% compliance	
		Fluoride (mean)	Samples taken 1 (0.55mg/L);	
		Hydrocarbons	Samples taken 0	
		Metals	Samples taken 2; 100% compliance	
		Nitrate (mean)	Samples taken 2 (1.2mg/L); 100% compliance	
		Pesticides	Samples taken 1; 100% compliance	
		Radiological	Samples taken 1; 100% compliance	
		Trihalomethanes (mean)	Samples taken 2 (0.009mg/L); 100% compliance	
	WATER SECURITY	Current Water Restrictions	Yes	
Proportion of Potable Water Supplied to Households (%)		Not known		
Distance from the Coast (km)		350km		
Climate		Desert; Max mean temperature 31.4; Min mean temperature 17.3		
Average Annual Rainfall		310.2 mm		
FACTOR		YES / NO	NOTES / EXPLANATION	
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Single drinking water source	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Poor quality water source	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Sewage overflow or disposal into water source	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Flooding	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Fauna defecating in supply	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Fauna destroying water intake structures	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Un-tined landfills	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Extensive agriculture	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Low vegetation cover (dust, sediment runoff)	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Poor access to supply	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Unsustainable water extraction	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Aquifer turning saline due to high extraction	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Hard water	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Aging or inadequate pipe work and associated infrastructure	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Significant water losses due to leaking pipes	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Governance	High per capita water consumption	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Inappropriate water quality standards / objectives	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Lack of infrastructure maintenance	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Poor management or governance	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Vandalism / sabotage / terrorism	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Insufficient trained personnel	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Inadequate funding for maintenance or upgrades	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Industries	Mining / minerals	Yes	Iron Ore mining Town
		Irrigation	No	Unconfirmed Local Knowledge.
		Chemicals / process	No	Unconfirmed Local Knowledge.
	ation	Seasonal population loadings	No	

	Popl	Rapid population growth	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
WATER QUALITY OR SECURITY RISK (EFFECT)		Pathogenic contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Algal blooms	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Heavy metal contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Poor chlorine residuals	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Pesticide contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Boil water notices	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Deaths or illness due to water quality	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Water restrictions (current and historic)	Yes	Unconfirmed Local Knowledge.
		Taste and odour issues	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Other contamination that would affect health	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
Notes				

Town # 91

TOWN	State/Territory	WA		
	Town Name	Northam		
	Town Population	6,006 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility	Water Corporation of WA		
	Rate (\$/kL)	\$0.76 to \$5.33 per kL		
	Per Capita Water Consumption (ML/day)	Not known		
	Number of Connections	Not known		
CATCHMENT AND WATER SUPPLY	Catchment	Gold Fields and Agricultural Region		
	Sub-Catchment	Not known		
	Catchment Protection Status	Not known		
	Potable Water Source(s)	Not known		
	Supply Capacity	Not known		
WATER QUALITY	Treatment Plant(s)	Not known		
	Level of Treatment	Not known		
	Drinking Water Guidelines	ADWG 1987		
	Results (% compliance for 2008 reporting period)	Overall	100% compliance	
		Thermotolerant Coliforms	Samples taken 66; 100% compliance	
		Thermophilic Naegleria	Samples taken 66; 100% compliance	
		Fluoride (mean)	Samples taken 53 (0.84mg/L);	
		Hydrocarbons	Samples taken 0	
		Metals	Samples taken 2; 100% compliance	
		Nitrate (mean)	Samples taken 2 (0.6mg/L); 100% compliance	
		Pesticides	Samples taken 1; 100% compliance	
		Radiological	Samples taken 0	
Trihalomethanes (mean)		Samples taken 2 (0.033mg/L); 100% compliance		
WATER SECURITY	Current Water Restrictions	Yes		
	Proportion of Potable Water Supplied to Households (%)	Not known		
	Distance from the Coast (km)	100km		
	Climate	Temperate; Max mean temperature 25.3; Min mean temperature 10.9		
	Average Annual Rainfall	429.5 mm		
FACTOR		YES / NO	NOTES / EXPLANATION	
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Single drinking water source	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Poor quality water source	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Sewage overflow or disposal into water source	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Flooding	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Fauna defecating in supply	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Fauna destroying water intake structures	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Un-lined landfills	Not known	
		Extensive agriculture	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Low vegetation cover (dust, sediment runoff)	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Poor access to supply	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Unsustainable water extraction	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Aquifer turning saline due to high extraction	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Hard water	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Aging or inadequate pipe work and associated infrastructure	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Significant water losses due to leaking pipes	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Governance	High per capita water consumption	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Inappropriate water quality standards / objectives	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Lack of infrastructure maintenance	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Poor management or governance	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Vandalism / sabotage / terrorism	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Insufficient trained personnel	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Inadequate funding for maintenance or upgrades	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Industries	Mining / minerals	Yes	Iron Ore mining Town
		Irrigation	No	Unconfirmed Local Knowledge.
		Chemicals / process	No	Unconfirmed Local Knowledge.
	Population	Seasonal population loadings	No	
		Rapid population growth	No	Unconfirmed Local Knowledge.

WATER QUALITY OR SECURITY RISK (EFFECT)	Pathogenic contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Algal blooms	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Heavy metal contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Poor chlorine residuals	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Pesticide contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Boil water notices	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Deaths or illness due to water quality	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Water restrictions (current and historic)	Yes	Unconfirmed Local Knowledge
	Taste and odour issues	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Other contamination that would affect health	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
Notes			

Town # 92

TOWN	State/Territory	WA		
	Town Name	Port Hedland		
	Town Population	11,557 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility	Water Corporation of WA		
	Rate (\$/kL)	\$0.76 to \$4.42 per kL		
	Per Capita Water Consumption (ML/day)	Not known		
	Number of Connections	Not known		
CATCHMENT AND WATER SUPPLY	Catchment	North West Region		
	Sub-Catchment	Not known		
	Catchment Protection Status	Not known		
	Potable Water Source(s)	Ground Water		
WATER QUALITY	Supply Capacity	Not known		
	Treatment Plant(s)	Yes		
	Level of Treatment	Not known		
	Drinking Water Guidelines	ADWG 1987		
	Results (% compliance for 2008 reporting period)	Overall	100% compliance	
		Thermotolerant Coliforms	Samples taken 72; 100% compliance	
		Thermophilic Naegleria	Samples taken 72; 100% compliance	
		Fluoride (mean)	Samples taken 52 (0.43mg/L);	
		Hydrocarbons	Samples taken 2; 100% compliance	
		Metals	Samples taken 10; 100% compliance	
		Nitrate (mean)	Samples taken 8 (0.9mg/L); 100% compliance	
		Pesticides	Samples taken 2; 100% compliance	
		Radiological	Samples taken 2; 100% compliance	
Trihalomethanes (mean)		Samples taken 4 (<0.004mg/L); 100% compliance		
WATER SECURITY	Current Water Restrictions	Yes		
	Proportion of Potable Water Supplied to Households (%)	Not known		
	Distance from the Coast (km)	0 km		
	Climate	Desert; Max mean temperature 31.8; Min mean temperature 20.4		
	Average Annual Rainfall	329.5 mm		
FACTOR		YES / NO	NOTES / EXPLANATION	
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Single drinking water source	Yes	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Poor quality water source	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Sewage overflow or disposal into water source	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Flooding	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Fauna defecating in supply	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Fauna destroying water intake structures	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Un-lined landfills	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Extensive agriculture	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Low vegetation cover (dust, sediment runoff)	yes	Unconfirmed Local Knowledge.
		Poor access to supply	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Unsustainable water extraction	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Aquifer turning saline due to high extraction	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Hard water	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Aging or inadequate pipe work and associated infrastructure	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Significant water losses due to leaking pipes	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Governance	High per capita water consumption	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Inappropriate water quality standards / objectives	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Lack of infrastructure maintenance	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Poor management or governance	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Vandalism / sabotage / terrorism	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Insufficient trained personnel	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Industries	Inadequate funding for maintenance or upgrades	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
		Mining / minerals	Yes	Minerals Export - Port Facility
		Irrigation	No	Unconfirmed Local Knowledge.
	Population	Chemicals / process	No	Unconfirmed Local Knowledge.
		Seasonal population loadings	No	
		Rapid population growth	Yes	Growth in Minerals Industry
ECT)	Pathogenic contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues	

WATER QUALITY OR SECURITY RISK (EFF)	Algal blooms	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Heavy metal contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Poor chlorine residuals	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Pesticide contamination	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Boil water notices	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Deaths or illness due to water quality	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Water restrictions (current and historic)	Yes	Unconfirmed Local Knowledge.
	Taste and odour issues	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
	Other contamination that would affect health	No	Unconfirmed Local Knowledge: based on Water Corporation advice that there are no issues
Notes			

Town Profiles – NT



Review of Regional Water Quality & Security

Appendices **Volume 2**

Town # 93

TOWN	State/Territory	NT
	Town Name	Alice Springs
	Town Population	27,481 (ABS ERP SLA for 2008 Reference 3218.0)
WATER UTILITY	Name of Water Utility	Power and Water Corporation
	Rate (\$/kL)	89.90 cents/kL for domestic and commercial; 95.36 cents/kL for government
	Per Capita Water Consumption (ML/day)	1212kL/connection/annum
CATCHMENT AND WATER SUPPLY	Number of Connections	7,612
	Catchment	Amadeus Basin (Groundwater)
	Sub-Catchment	Mereenie Rock Aquifer System
	Catchment Management Authority (CMA)	Dept of Natural Resources, Environment, The Arts and Sport
	CMA Web-Link	www.nt.gov.au/nreta/water
	Catchment Protection Status	None
	Potable Water Source(s)	Roe Creek Borefield - multiple aquifers
	Supply Capacity	10,757 ML/yr (under 2006-2015 water allocation plan)
	Level of Treatment	Disinfection
WATER QUALITY	Treatment Plant(s)	Temple Bar
	Drinking Water Guidelines	ADWG 2004, TDS guideline value set by the Department of Environmental Health.
	<i>Health Parameters - 95th Percentile Values (mg/L)</i>	
	Antimony	<0.0002
	Arsenic	0.0010
	Barium	0.10
	Boron	0.14
	Cadmium	<0.0002
	Chlorine (free)	DNA
	Chromium	<0.005
	Copper	0.22
	Fluoride	0.5
	Iodide	0.15
	Lead	0.006
	Manganese	0.023
	Mercury	<0.0001
	Molybdenum	<0.005
	Nickel	0.006
	Nitrate	7
	Radiological mSv/yr	DNA
	Selenium	0.004
	Silver	<0.01
	Sulfate	68
	THM's	<0.004
	Uranium	0.00956
	<i>Aesthetic Parameters - Mean Values (mg/L)</i>	
	Aluminium	<0.02
	Chloride	73
	Chlorine (free)	DNA
	Copper	0.10
	Hardness (mg/L)	
	CaCO3	219
	Iron	0.03
	Manganese	0.007
	pH	7.7
	Sodium	77
	Sulfate	60
	TDS	463
	Zinc	0.05
	<i>Other Parameters - Mean Values (mg/L)</i>	
	Alkalinity	256
	Beryllium	<0.001
	Bromide	0.42
	Calcium	47
	(µS/cm)	816
	Magnesium	25
	Potassium	6.6
	Silica	18
	Tin	<0.01
	* Radiological value reported is an average annual dose	
	* Values in bold exceed ADWG values	
	* DNA - Data Not Available	
	<i>Bacteriological Parameters (% compliance 2007-08)</i>	
	E. coli	100%
	Total Coliforms	100%
WATER SECURITY	Current Water Restrictions	No
	Proportion of Potable Water Supplied to Households (%)	59%
	Distance from the Coast (km)	Approximately 1500 km
	Climate	Desert/Arid
	Average Annual Rainfall	278.2mm (Alice Springs Airport)

FACTOR		YES / NO	NOTES / EXPLANATION
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	No
		Single drinking water source	Yes
		Poor quality water source	No
		Sewage overflow or disposal into water source	No
		Flooding	Yes
		Fauna defecating in supply	No
		Fauna destroying water intake structures	No
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	Yes
		Un-lined landfills	No
		Extensive agriculture	No
		Low vegetation cover (dust, sediment runoff)	No
		Poor access to supply	Yes?
		Unsustainable water extraction	Yes
		Aquifer turning saline due to high extraction	No
		Hard water	Yes
		Aging or inadequate pipe work and associated infrastructure	No
		Significant water losses due to leaking pipes	No
	Governance	High per capita water consumption	Yes
		Inappropriate water quality standards / objectives	N/A
		Lack of infrastructure maintenance	No
		Poor management or governance	No
		Vandalism / sabotage / terrorism	No
		Insufficient trained personnel	No
		Inadequate funding for maintenance or upgrades	No
	Industries	Mining / minerals	No
		Irrigation	No
		Chemicals / process	No
	Population	Seasonal population loadings	Yes
		Rapid population growth	No
WATER QUALITY OR SECURITY RISK (EFFECT)	Pathogenic contamination		No
	Algal blooms		No
	Heavy metal contamination		No
	Poor chlorine residuals		No
	Pesticide contamination		No
	Boil water notices		No
	Deaths or illness due to water quality		No reported deaths
	Water restrictions (current and historic)		No
	Taste and odour issues		No
	Other contamination that would affect health		No
	Notes		

Town # 94

TOWN	State/Territory	NT	
	Town Name	Katherine	
	Town Population	9,912 (ABS ERP SLA for 2008 Reference 3218.0)	
WATER UTILITY	Name of Water Utility	Power and Water Corporation	
	Rate (\$/kL)	89.90 cents/kL for domestic and commercial; 95.36 cents/kL for government	
	Per Capita Water Consumption (L/day)	1565kL/connection/annum	
CATCHMENT AND WATER SUPPLY	Number of Connections	2031	
	Catchment	Daly	
	Sub-Catchment	Katherine River	
	Catchment Management Authority (CMA)	Regulator - NT Dept of Natural Resources, Environment, The Arts and Sport	
	CMA Web-Link	www.nt.gov.au/nreta/water	
	Catchment Protection Status	Surface Water - part of catchment zoned Water Management under NT Planning Scheme	
	Potable Water Source(s)	Surface Water - Katherine River	
		Groundwater - Tindal Aquifer	
	Supply Capacity	Surface Water - 4500 ML/yr (under review)	
WATER QUALITY		Groundwater - 1876 ML/yr at Total Security (plus an additional 2200 ML/yr subject to allocations)	
	Level of Treatment	River water:- Coagulation/flocculation, filtration, disinfection and fluoridation	
		Groundwater:-Disinfection and fluoridation	
	Treatment Plant(s)	Katherine Water Treatment Plant, Morris Road Katherine NT 0850	
	Drinking Water Guidelines	ADWG 2004, TDS guideline value set by the Department of Environmental Health.	
		<i>Health Parameters - 95th Percentile Values (mg/L)</i>	
		Antimony	0.0005
		Arsenic	<0.0005
		Barium	<0.05
		Boron	<0.02
		Cadmium	<0.0002
		Chlorine (free)	0.81
		Chromium	<0.005
		Copper	0.03
		Fluoride	0.5
		Iodide	<0.01
		Lead	<0.001
		Manganese	0.005
		Mercury	<0.0001
		Molybdenum	<0.005
		Nickel	<0.002
		Nitrate	1
		Radiological mSv/yr	DNA
		Selenium	<0.001
		Silver	<0.01
		Sulfate	15
		THM's	0.040
		Uranium	0.00017
		<i>Aesthetic Parameters - Mean Values (mg/L)</i>	
		Aluminium	0.03
		Chloride	5
		Chlorine (free)	0.58
		Copper	0.01
		Hardness (mg/L) CaCO ₃	109
		Iron	0.02
		Manganese	<0.005
		pH	7.7
		Sodium	6
		Sulfate	5
		TDS	129
		Zinc	0.12
		<i>Other Parameters - Mean Values (mg/L)</i>	
		Alkalinity	107
		Beryllium	<0.001
		Bromide	0.02
		Calcium	25
		Electrical conductivity (µS/cm)	222
		Magnesium	11
		Potassium	1.0
		Silica	10
		Tin	<0.01
		* Radiological value reported is an average annual dose	
		* Values in bold exceed ADWG values	
		* DNA - Data not available	
		<i>Bacteriological Parameters (% compliance 2007-08)</i>	
		E. coli	100%
		Total Coliforms	99%
WATER SECURITY	Current Water Restrictions	No	
	Proportion of Potable Water Supplied to Households (%)	41%	
	Distance from the Coast (km)	Approximately 270 km	
	Climate	Wet/Dry Tropics	
	Average Annual Rainfall	989.8mm (Katherine Council)	
	FACTOR	YES / NO	NOTES / EXPLANATION
	Drought	No	
	Single drinking water source	No	

WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Poor quality water source	Yes	Conventional treatment of surface water required. Groundwater has high hardness and aquifer at risk of contamination.
		Sewage overflow or disposal into water source	Yes	Rural residential properties with septic tanks located along Katherine River. On-site sewage treatment plant at Katherine Gorge park and tourist boats operating on Katherine River.
		Flooding	Yes	Large portion of town is located on flood plain.
		Fauna defecating in supply	Yes	
		Fauna destroying water intake structures	No	
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	No	
		Un-lined landfills	No	
		Extensive agriculture	Yes	Small-scale horticulture plus pastoral in catchments.
		Low vegetation cover (dust, sediment runoff)	Yes	Sediment runoff is a consideration during first flush wet season events.
		Poor access to supply	No	
		Unsustainable water extraction	No	
		Aquifer turning saline due to high extraction	No	
		Hard water	Yes	Ground water source hardness approx 400 mg/L CaCo3. Blended supply can reach 150+mg/L CaCo3.
		Aging or inadequate pipe work and associated infrastructure	No	
		Significant water losses due to leaking pipes	No	
	Governance	High per capita water consumption	Yes	
		Inappropriate water quality standards / objectives	N/A	
		Lack of infrastructure maintenance	No	
		Poor management or governance	No	
		Vandalism / sabotage / terrorism	Yes	Previous vandalism and intrusions to service storage tanks detected.
		Insufficient trained personnel	No	
		Inadequate funding for maintenance or upgrades	No	
	Industries	Mining / minerals	Yes	Proposed significant mine within catchment.
		Irrigation	Yes	Groundwater component shared with irrigators.
		Chemicals / process	No	
	Population	Seasonal population loadings	Yes	Popular tourist destination.
		Rapid population growth	No	
WATER QUALITY OR SECURITY RISK (EFFECT)		Pathogenic contamination	No	No E. coli detected or Naegleria fowleri detected in 2007-08.
		Algal blooms	No	
		Heavy metal contamination	No	
		Poor chlorine residuals	No	
		Pesticide contamination	No	
		Boil water notices	No	None in 2007-08 but may potentially be issued during flooding.
		Deaths or illness due to water quality	No reported deaths	Risk of potential illness if boil water alert instructions not adhered to.
		Water restrictions (current and historic)	No	
		Taste and odour issues	No	
		Other contamination that would affect health	No	
		Notes		

Town # 95

TOWN	State/Territory	NT		
	Town Name	Maningrida		
	Town Population	2,746 (Census 2006, Urban Centre/Locality)		
WATER UTILITY	Name of Water Utility	Power and Water Corporation		
	Rate (\$/kL)	89.90 cents/kL for domestic and commercial; 95.36 cents/kL for government		
	Per Capita Water Consumption (L/day)	500L/day		
CATCHMENT AND WATER SUPPLY	Number of Connections	Could not be obtained		
	Catchment	Marchinbar Sandstone		
	Sub-Catchment	Upper Section		
	Catchment Management Authority (CMA)	Regulator - NT Dept of Natural Resources, Entertainment, the Arts and Sports		
	CMA Web-Link	www.nt.gov.au/nreta/water		
	Catchment Protection Status	State wide Policy		
	Potable Water Source(s)	Groundwater - Upper section of the Marchinbar Sandstone		
	Supply Capacity	Sustainable yield of the Marchinbar Sandstone is 15000 ML/year, however the sustainable yield of the lower aquifer used for current extraction is 1497 ML/year		
WATER QUALITY	Level of Treatment	Groundwater:-Disinfection		
	Treatment Plant(s)	In-line Sodium Hypochlorite dosing		
	Drinking Water Guidelines	ADWG 2004, TDS guideline value set by the Department of Environmental Health.		
	Results (% compliance for 2008 reporting period)	Health Parameters - 95th Percentile Values (mg/L)		
		Antimony	0.0001	
		Arsenic	0.00025	
		Barium	0.025	
		Boron	0.04	
		Cadmium	0.0001	
		Chromium	0.0025	
		Fluoride	0.05	
		Lead	0.001925	
		Mercury	0.00005	
		Molybdenum	0.0025	
		Nickel	0.001	
		Nitrate	0.5	
		Nitrite	DNA	
		Radiological (mSv/yr)	Gross α,β < 0.5 Bq/L	
		Selenium	0.0005	
		Silver	0.005	
		Uranium	0.00003	
		Aesthetic Parameters - Mean Values (mg/L)		
		Aluminium	0.01	
		Chloride	8.35	
		Copper	0.025	
		Hardness	7.9	
		Iodine	0.01	
		Iron Fe T	0.01	
		Manganese	0.035	
		pH (pH Units)	6.65	
		Sodium	4.65	
		Sulfate	0.645	
		Total Dissolved Solids	49.5	
		True Colour (CU)	1.55	
		Turbidity (NTU)	0.165	
		Zinc	0.02	
		Other Parameters - Mean Values (mg/L)		
		Alkalinity	8.55	
		Beryllium	0.0005	
		Bromide	0.141	
		Calcium	1.98	
		Electrical conductivity (µS/cm)	46	
		Magnesium	0.785	
		Potassium	0.82	
		Silica	14	
		Tin	0.005	
	* Radiological value reported is an average annual dose			
	* Values in bold exceed ADWG values			
	* DNA - Data not available			
	Bacteriological Parameters (% compliance 2008-09)			
	E. coli	100%		
	Total Coliforms	100%		
WATER SECURITY	Current Water Restrictions	A cap has been placed on the abstraction of groundwater		
	Proportion of Potable Water Supplied to Households (%)	Could not be obtained		
	Distance from the Coast (km)	On the coast line (<500 m)		
	Climate	Wet/Dry Tropics		
	Average Annual Rainfall	1284.4 mm (45 years historical data - BOM)		
	FACTOR	YES / NO	NOTES / EXPLANATION	
	Drought	No		

WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Single drinking water source	Yes	
		Poor quality water source	No	
		Sewage overflow or disposal into water source	No	Arafura Sea 180m North Pond
		Flooding	Yes	
		Fauna defecating in supply	No	
		Fauna destroying water intake structures	No	
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	No	
		Un-lined landfills		
		Extensive agriculture	No	
		Low vegetation cover (dust, sediment runoff)	No	
		Poor access to supply	No	
		Unsustainable water extraction	No	
		Aquifer turning saline due to high extraction	No	
		Hard water	No	
		Aging or inadequate pipe work and associated infrastructure	No	
		Significant water losses due to leaking pipes	No	
	Governance	High per capita water consumption	Yes	
		Inappropriate water quality standards / objectives	No	
		Lack of infrastructure maintenance	No	
		Poor management or governance	No	
		Vandalism / sabotage / terrorism	No	
		Insufficient trained personnel	No	
	Industries	Inadequate funding for maintenance or upgrades	No	
		Mining / minerals	No	
		Irrigation	No	
	Population	Chemicals / process	No	
		Seasonal population loadings	No	
		Rapid population growth	No	2%pa (from ABS Census 2001-2006)
WATER QUALITY OR SECURITY RISK (EFFECT)		Pathogenic contamination	No	
		Algal blooms	No	
		Heavy metal contamination	No	
		Poor chlorine residuals	No	
		Pesticide contamination	No	
		Boil water notices	No	
		Deaths or illness due to water quality	No	
		Water restrictions (current and historic)	No	
		Taste and odour issues	No	
		Other contamination that would affect health	No	
		Notes		

Town # 96

TOWN	State/Territory	NT
	Town Name	Tennant Creek
	Town Population	3,494 (ABS ERP SLA for 2008 Reference 3218.0)
WATER UTILITY	Name of Water Utility	Power and Water Corporation
	Rate (\$/kL)	89.90 cents/kL for domestic and commercial; 95.36 cents/kL for government
	Per Capita Water Consumption (ML/day)	1346kL/connection/annum
CATCHMENT AND WATER SUPPLY	Number of Connections	1138
	Catchment	Western Plateau
	Sub-Catchment	Wiso Basin
CATCHMENT AND WATER SUPPLY	Catchment Management Authority (CMA)	Dept of Natural Resources, Environment, The Arts and Sport
	CMA Web-Link	www.nt.gov.au/nreta/water
	Catchment Protection Status	None
CATCHMENT AND WATER SUPPLY	Potable Water Source(s)	Kelly Well and Cabbage Gum bore fields
	Supply Capacity	Kelly Well Bore field - 2000 ML/yr Cabbage Gum Bore field - 200 ML/yr
WATER QUALITY	Level of Treatment	None
	Treatment Plant(s)	N/A
	Drinking Water Guidelines	ADWG 2004, TDS guideline value set by the Department of Environmental Health.
WATER QUALITY	Results (% compliance for 2008 reporting period)	<i>Health Parameters - 95th Percentile Values (mg/L)</i>
		Antimony <0.0002
		Arsenic 0.0030
WATER QUALITY	Results (% compliance for 2008 reporting period)	Barium <0.05
		Boron 0.52
		Cadmium 0.0008
WATER QUALITY	Results (% compliance for 2008 reporting period)	Chlorine (free) DNA
		Chromium <0.005
		Copper 0.10
WATER QUALITY	Results (% compliance for 2008 reporting period)	Fluoride 1.7
		Iodide 0.39
		Lead <0.001
WATER QUALITY	Results (% compliance for 2008 reporting period)	Manganese 0.005
		Mercury <0.0001
		Molybdenum <0.005
WATER QUALITY	Results (% compliance for 2008 reporting period)	Nickel <0.002
		Nitrate 44
		Radiological mSv/yr DNA
WATER QUALITY	Results (% compliance for 2008 reporting period)	Selenium 0.006
		Silver <0.01
		Sulfate 88
WATER QUALITY	Results (% compliance for 2008 reporting period)	THM's <0.004
		Uranium 0.00916
WATER QUALITY	Results (% compliance for 2008 reporting period)	<i>Aesthetic Parameters - Mean Values (mg/L)</i>
		Aluminium <0.02
		Chloride 90
WATER QUALITY	Results (% compliance for 2008 reporting period)	Chlorine (free) DNA
		Copper 0.02
WATER QUALITY	Results (% compliance for 2008 reporting period)	Hardness (mg/L) CaCO3 172
		Iron 0.07
		Manganese <0.005
WATER QUALITY	Results (% compliance for 2008 reporting period)	pH 7.8
		Sodium 111
		Sulfate 50
WATER QUALITY	Results (% compliance for 2008 reporting period)	TDS 608
		Zinc 0.01
WATER QUALITY	Results (% compliance for 2008 reporting period)	<i>Other Parameters - Mean Values (mg/L)</i>
		Alkalinity 271
		Beryllium <0.001
WATER QUALITY	Results (% compliance for 2008 reporting period)	Bromide 0.77
		Calcium 27
		Electrical conductivity (µS/cm) 944
WATER QUALITY	Results (% compliance for 2008 reporting period)	Magnesium 25
		Potassium 29.4
		Silica 42
WATER QUALITY	Results (% compliance for 2008 reporting period)	Tin <0.01
		* Radiological value reported is an average annual dose
		* Values in bold exceed ADWG values
WATER QUALITY	Results (% compliance for 2008 reporting period)	* DNA - Data Not Available
		<i>Bacteriological Parameters (% compliance 2007-08)</i>
		E. coli 99%
		Total Coliforms 85%
WATER SECURITY	Current Water Restrictions	No
	Proportion of Potable Water Supplied to Households (%)	39%
	Distance from the Coast (km)	Approximately 1000 km
WATER SECURITY	Climate	Desert/Arid
	Average Annual Rainfall	452.1mm (Tennant Creek Airport)
WATER SECURITY	FACTOR	YES / NO
	Drought	No
	Single drinking water source	Yes
WATER SECURITY	Poor quality water source	No
	Sewage overflow or disposal into water source	No
	NOTES / EXPLANATION	

WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Flooding	No	
		Fauna defecating in supply	No	
		Fauna destroying water intake structures	No	
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	Yes	Fluoride, iodide and nitrate.
		Un-lined landfills	No	
		Extensive agriculture	No	
		Low vegetation cover (dust, sediment runoff)	No	
		Poor access to supply	No	
		Unsustainable water extraction	No*	Extraction considered to be within sustainable limits, but may require reassessment due to climate change.
		Aquifer turning saline due to high extraction	No	
		Hard water	Yes	172 mg/L vs. ADWG value of 200 mg/L.
		Aging or inadequate pipe work and associated infrastructure	No	
		Significant water losses due to leaking pipes	No	
	Governance	High per capita water consumption	Yes	
		Inappropriate water quality standards / objectives	N/A	
		Lack of infrastructure maintenance	No	
		Poor management or governance	No	
		Vandalism / sabotage / terrorism	Yes	Previous vandalism and intrusions to service storages detected.
		Insufficient trained personnel	No	
	Industries	Inadequate funding for maintenance or upgrades	No	
		Mining / minerals	No	
		Irrigation	No	
	Population	Chemicals / process	No	
		Seasonal population loadings	Yes	Popular tourist gateway.
		Rapid population growth	No	
WATER QUALITY OR SECURITY RISK (EFFECT)	Pathogenic contamination	Yes	E. coli detected throughout system in May 2009.	
	Algal blooms	N/A		
	Heavy metal contamination	No		
	Poor chlorine residuals	Yes	No disinfection barrier so no chlorine residual maintained.	
	Pesticide contamination	No		
	Boil water notices	Yes	One issued in May 2009.	
	Deaths or illness due to water quality	No reported deaths	Elevated risk of contamination as no disinfection barrier and hence heightened risk of illness in community. Risk of potential illness if boil water alert instructions not adhered to.	
	Water restrictions (current and historic)	No		
	Taste and odour issues	No		
	Other contamination that would affect health	Elevated fluoride and iodide	Elevated fluoride level is naturally occurring. Iodide level in ADWG 2010 expected to be raised to 0.4 mg/L.	
Notes				

Town # 97

TOWN	State/Territory	NT	
	Town Name	Yulara	
	Town Population	1,186 (ABS ERP SLA for 2008 Reference 3218.0)	
WATER UTILITY	Name of Water Utility	Power and Water Corporation	
	Rate (\$/kL)	89.90 cents/kL for domestic and commercial; 95.36 cents/kL for government	
	Per Capita Water Consumption (ML/day)	2260kL/connection/annum	
CATCHMENT AND WATER SUPPLY	Number of Connections	247	
	Catchment	Western Plateau	
	Sub-Catchment	-	
	Catchment Management Authority (CMA)	NT Dept of Natural Resources, Environment, The Arts and Sport	
	CMA Web-Link	www.nt.gov.au/nreta/water	
	Catchment Protection Status	None	
	Potable Water Source(s)	Dune Plains Aquifer - groundwater - 6 bores	
WATER QUALITY	Supply Capacity	1600 ML/yr total borefield licence	
	Level of Treatment	Reverse osmosis and disinfection (for potable component)	
	Treatment Plant(s)	Yulara Water Treatment Plant, Yulara NT 0872	
	Drinking Water Guidelines	ADWG 2004, TDS guideline value set by the Department of Environmental Health.	
		<i>Health Parameters - 95th Percentile Values (mg/L)</i>	
		Antimony	<0.0002
		Arsenic	<0.0005
		Barium	<0.05
		Boron	0.68
		Cadmium	0.0012
		Chlorine (free)	0.65
		Chromium	<0.005
		Copper	0.15
		Fluoride	0.1
		Iodide	0.06
		Lead	<0.001
		Manganese	0.005
		Mercury	<0.0001
		Molybdenum	<0.005
		Nickel	0.004
		Nitrate	37
		Radiological mSv/yr	DNA
		Selenium	<0.001
		Silver	<0.01
		Sulfate	328
		THM's	<0.004
		Uranium	0.00008
		<i>Aesthetic Parameters - Mean Values (mg/L)</i>	
		Aluminium	<0.02
		Chloride	44
		Chlorine (free)	0.48
		Copper	0.08
		Hardness (mg/L) CaCO ₃	26
		Iron	0.02
		Manganese	<0.005
		pH	7.0
		Sodium	38
		Sulfate	59
		TDS	158
		Zinc	0.05
		<i>Other Parameters - Mean Values (mg/L)</i>	
		Alkalinity	15
		Beryllium	<0.001
		Bromide	0.27
		Calcium	7
		Electrical conductivity (µS/cm)	266
		Magnesium	2
		Potassium	4.3
		Silica	5
		Tin	<0.01
		* Radiological value reported is an average annual dose	
		* Values in bold exceed ADWG values	
		* DNA - Data Not Available	
		<i>Bacteriological Parameters (% compliance 2007-08)</i>	
		E. coli	100%
		Total Coliforms	100%
WATER SECURITY	Current Water Restrictions	No	
	Proportion of Potable Water Supplied to Households (%)	Yulara is predominantly a tourist resort (household residential consumption is between 2-3%)	
	Distance from the Coast (km)	Approximately 1850 km	
	Climate	Desert/Arid	
	Average Annual Rainfall	266.3mm (Yulara Airport)	
	FACTOR	YES / NO	NOTES / EXPLANATION
	Drought	No	
	Single drinking water source	Yes	
	Poor quality water source	Yes	Slightly brackish, requires RO for potable supply.
	Sewage overflow or disposal into water source	Yes	Treated effluent recharges the aquifer.
	Flooding	No	

WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Fauna defecating in supply	No	
		Fauna destroying water intake structures	No	
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	Yes	Nitrate.
		Un-lined landfills	Yes	Not overlying aquifer.
		Extensive agriculture	No	
		Low vegetation cover (dust, sediment runoff)	Yes	Not a significant issue.
		Poor access to supply	No	
		Unsustainable water extraction	No	Considered to be approximately at the aquifer sustainable yield.
		Aquifer turning saline due to high extraction	No	
		Hard water	No	
		Aging or inadequate pipe work and associated infrastructure	No	
		Significant water losses due to leaking pipes	No	
	Governance	High per capita water consumption	Yes	
		Inappropriate water quality standards / objectives	N/A	
		Lack of infrastructure maintenance	No	
		Poor management or governance	No	
		Vandalism / sabotage / terrorism	No	
		Insufficient trained personnel	No	
		Inadequate funding for maintenance or upgrades	No	
	Industries	Mining / minerals	No	
		Irrigation	No	
		Chemicals / process	No	
	Population	Seasonal population loadings	Yes	Popular tourist destination.
		Rapid population growth	No	
WATER QUALITY OR SECURITY RISK (EFFECT)		Pathogenic contamination	No	No E. coli detected or Naegleria fowleri detected in 2007-08.
		Algal blooms	N/A	
		Heavy metal contamination	No	
		Poor chlorine residuals	No	
		Pesticide contamination	No	
		Boil water notices	No	None in 2007-08.
		Deaths or illness due to water quality	No reported deaths	
		Water restrictions (current and historic)	No	
		Taste and odour issues	No	
		Other contamination that would affect health	No	
		Notes		

Town # 98

TOWN	State/Territory	NT	
	Town Name	Galiwinku	
	Town Population	2,156 (Census 2006, Urban Centre/Locality)	
WATER UTILITY	Name of Water Utility	Power and Water Corporation	
	Rate (\$/kL)	89.90 cents/kL for domestic and commercial; 95.36 cents/kL for government	
	Per Capita Water Consumption (L/day)	562L/day	
	Number of Connections	Unknown	
CATCHMENT AND WATER SUPPLY	Catchment	Arafura Basin	
	Sub-Catchment	Elcho Island Formation	
	Catchment Management Authority (CMA)	Regulator - NT Dept of Natural Resources, Entertainment, the Arts and Sports	
	CMA Web-Link	www.nt.gov.au/nreta/water	
	Catchment Protection Status	State wide Policy	
	Potable Water Source(s)	Bore RN8474 Bore RN20921 Bore RN20922 Bore RN20927	
	Supply Capacity	3000 ML/year (sustainable yield)	
	Level of Treatment	Groundwater-Disinfection	
WATER QUALITY	Treatment Plant(s)	In-line Sodium Hypochlorite dosing	
	Drinking Water Guidelines	ADWG 2004, TDS guideline value set by the Department of Environmental Health.	
	Results (% compliance for 2008 reporting period)	Health Parameters - 95th Percentile Values (mg/L)	
		Antimony	0.0001
		Arsenic	0.0003
		Barium	0.03
		Boron	0.01
		Cadmium	0.0001
		Chromium	0.003
		Fluoride	0.05
		Lead	0.0008
		Mercury	0.00005
		Molybdenum	0.003
		Nickel	0.001
		Nitrate	1
		Nitrite	DNA
		Radiological (mSv/yr)	Gross $\alpha, \beta < 0.5$ Bq/L
		Selenium	0.0005
		Silver	0.005
		Uranium	0.00002
		Aesthetic Parameters - Mean Values (mg/L)	
		Aluminium	0.01
		Chloride	9
		Copper	0.01
		Hardness	6
		Iodine	0.005
		Iron Fe _T	0.4
		Manganese	0.003
		pH (pH Units)	5.6
		Sodium	6
		Sulfate	1
		Total Dissolved Solids	40
		True Colour (CU)	DNA
		Turbidity (NTU)	DNA
		Zinc	0.008
		Other Parameters - Mean Values (mg/L)	
		Alkalinity	5
		Beryllium	0.0005
		Bromide	0.03
		Calcium	1
		Electrical conductivity (μ S/cm)	50
		Magnesium	0.9
		Potassium	1
		Silica	12
		Tin	0.005
		* Radiological value reported is an average annual dose	
		* Values in bold exceed ADWG values	
		* DNA - Data not available	
		Bacteriological Parameters (% compliance 2008-09)	
		E. coli	100%
		Total Coliforms	100%
WATER SECURITY	Current Water Restrictions	No water restrictions	
	Proportion of Potable Water Supplied to Households (%)	DNA	
	Distance from the Coast (km)	0.1 km	
	Climate	Wet/Dry Tropics	
	Average Annual Rainfall	1430.6 mm (BOM data)	
FACTOR		YES / NO	NOTES / EXPLANATION
	Drought	No	
	Single drinking water source	Yes	
	Poor quality water source	No	
	Sewage overflow or disposal into water source	No	Swamp/Marshland
	Flooding	Yes	

WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Fauna defecating in supply	No	
		Fauna destroying water intake structures	No	
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	Yes	Total Iron values above ADW Guidelines
		Un-lined landfills		
		Extensive agriculture	No	
		Low vegetation cover (dust, sediment runoff)	No	
		Poor access to supply	No	
		Unsustainable water extraction	No	
		Aquifer turning saline due to high extraction	No	
		Hard water	No	
		Aging or inadequate pipe work and associated infrastructure	No	
		Significant water losses due to leaking pipes	No	
	Governance	High per capita water consumption	Yes	
		Inappropriate water quality standards / objectives	No	
		Lack of infrastructure maintenance	No	
		Poor management or governance	No	
		Vandalism / sabotage / terrorism	No	
		Insufficient trained personnel	No	
		Inadequate funding for maintenance or upgrades	No	
	Industries	Mining / minerals	No	
		Irrigation	No	
		Chemicals / process	No	
	Population	Seasonal population loadings	No	
		Rapid population growth	Yes	14.2% - projected (ABS census 2001-2006)
WATER QUALITY OR SECURITY RISK (EFFECT)		Pathogenic contamination	No	
		Algal blooms	No	
		Heavy metal contamination	No	
		Poor chlorine residuals	No	
		Pesticide contamination	No	
		Boil water notices	No	
		Deaths or illness due to water quality	No	
		Water restrictions (current and historic)	No	
		Taste and odour issues	No	
		Other contamination that would affect health	No	
	Notes			

Town # 99

TOWN	State/Territory	NT
	Town Name	Wadeye
	Town Population	2,675 (Census 2006, Urban Centre/Locality)
WATER UTILITY	Name of Water Utility	Power and Water Corporation
	Rate (\$/kL)	89.90 cents/kL for domestic and commercial; 95.36 cents/kL for government
	Per Capita Water Consumption (L/day)	397L/day
	Number of Connections	Unknown
CATCHMENT AND WATER SUPPLY	Catchment	Bonaparte Gulf Basin
	Sub-Catchment	Hyland Bay Formation
	Catchment Management Authority (CMA)	none
	CMA Web-Link	none
	Catchment Protection Status	none
	Potable Water Source(s)	Groundwater
	Supply Capacity	912ML/year (Aquifer Sustainable Yield)
WATER QUALITY	Level of Treatment	Groundwater-Disinfection
	Treatment Plant(s)	In-line Sodium Hypochlorite dosing
	Drinking Water Guidelines	ADWG 2004, TDS guideline value set by the Department of Environmental Health.
	Health Parameters - 95th Percentile Values (mg/L)	
	Antimony	0.0001
	Arsenic	0.0005
	Barium	0.025
	Boron	0.54
	Cadmium	0.0001
	Chromium	0.0025
	Fluoride	0.05
	Lead	0.002
	Mercury	0.00005
	Molybdenum	0.0025
	Nickel	0.001
	Nitrate	0.005
	Nitrite	DNA
	Radiological (mSv/yr)	0.007
	Selenium	0.004
	Silver	0.005
	Uranium	0.0199
	Aesthetic Parameters - Mean Values (mg/L)	
	Aluminium	0.01
	Chloride	6.5
	Copper	0.01
	Hardness	16
	Iodine	0.34
	Iron Fe T	0.18
	Manganese	0.0025
	pH (pH Units)	5.8
	Sodium	4.4
	Sulfate	0.59
	Total Dissolved Solids	31
	True Colour (CU)	1
	Turbidity (NTU)	0.1
	Zinc	0.08
	Other Parameters - Mean Values (mg/L)	
	Alkalinity	5.2
	Beryllium	0.0005
	Bromide	2.04
	Calcium	5.6
	Electrical conductivity (µS/cm)	34
	Magnesium	0.6
	Potassium	0.68
	Silica	19
	Tin	0.005
	* Radiological value reported is an average annual dose	
	* Values in bold exceed ADWG values	
	* DNA - Data not available	
	Bacteriological Parameters (% compliance 2008-09)	
	E. coli	98.4%
	Total Coliforms	97.3%
WATER SECURITY	Current Water Restrictions	Nil
	Proportion of Potable Water Supplied to Households (%)	Unknown
	Distance from the Coast (km)	6km
	Climate	Dry Tropics
	Average Annual Rainfall	1300mm
FACTOR		YES / NO
Water Supply	Drought	No
	Single drinking water source	Yes
	Poor quality water source	No
	Sewage overflow or disposal into water source	No
	Flooding	Yes
	Fauna defecating in supply	No
	Fauna destroying water intake structures	No
	Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	No
	Un-lined landfills	Unknown
	NOTES / EXPLANATION	
	Sewer overflow during wet season - not into water source	
	Seasonal during summer Wet season	
	Iodine level above ADWG guidelines	

WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and	Extensive agriculture	No	
		Low vegetation cover (dust, sediment runoff)	No	
		Poor access to supply	No	
		Unsustainable water extraction	No	
		Aquifer turning saline due to high extraction	No	
		Hard water	No	
		Aging or inadequate pipe work and associated infrastructure	Yes	Concrete cancer developing in sewer network
		Significant water losses due to leaking pipes	No	
	Governance	High per capita water consumption	Yes	
		Inappropriate water quality standards / objectives	No	
		Lack of infrastructure maintenance	No	
		Poor management or governance	No	
		Vandalism / sabotage / terrorism	No	
		Insufficient trained personnel	No	
		Inadequate funding for maintenance or upgrades	No	
	Industries	Mining / minerals	No	
		Irrigation	No	
		Chemicals / process	No	
	Population	Seasonal population loadings	No	
		Rapid population growth	Yes	
WATER QUALITY OR SECURITY RISK (EFFECT)	Pathogenic contamination	Yes	E.coli Non-conformances: 3	
	Algal blooms	No		
	Heavy metal contamination	No		
	Poor chlorine residuals	No		
	Pesticide contamination	No		
	Boil water notices	Yes	Issued 18/12/2008 Lifted 20/12/2008	
	Deaths or illness due to water quality	No		
	Water restrictions (current and historic)	No		
	Taste and odour issues	No		
	Other contamination that would affect health	No		
Notes				

Town Profiles – TAS

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Town # 100

TOWN	State/Territory	TAS	
	Town Name	Ulverstone	
	Town Population	9,514	
WATER UTILITY	Name of Water Utility	Cradle Mountain Water	
	Rate (\$/kL)	0.72/kL	
	Per Capita Water Consumption (L/day)	133L/day	
	Number of Connections	28,558	
CATCHMENT AND WATER SUPPLY	Catchment	-	
	Sub-Catchment	-	
	Catchment Management Authority (CMA)	Council - Central Coast Council	
	CMA Web-Link	http://www.centralcoast.tas.gov.au/site/page.cfm	
	Catchment Protection Status	Likely not protected (only catchments in southern Tasmania protected).	
	Potable Water Source(s)	Deep Creek System	
		Cam River	
		Leven River	
Supply Capacity	Gawler River, Forth River, Lake Paloona, Lake Barrington, Dowling Creek Unknown		
WATER QUALITY	Treatment Plant(s)	Gawler River, Forth River, Lake Paloona, Lake Barrington, Dowling Creek, Leven River, Cam River, Deep Creek System (137 ML/d each)	
	Level of Treatment	The water supply is 77% treated, 10% Chlorinated and 13% Non - Chlorinated water	
	Drinking Water Guidelines	ADWG, 2004	
	Results	Physical & chemical	100%
WATER SECURITY	E-coli	100%	
	Current Water Restrictions	n/a	
	Proportion of Potable Water Supplied to Households (%)	Approximately 70% to domestic users; 30% to 'special' customers.	
	Distance from the Coast (km)	1km	
	Climate	Temperate (no dry season)	
Average Annual Rainfall	768mm		
FACTOR			

Town # 101

TOWN	State/Territory	TAS	
	Town Name	Circular Head	
	Town Population	4,400	
WATER UTILITY	Name of Water Utility	Cradle Mountain Water	
	Rate (\$/kL)	\$0.72/kL	
	Per Capita Water Consumption (L/day)	681kL/property	
CATCHMENT AND WATER SUPPLY	Number of Connections	28,558	
	Catchment	-	
	Sub-Catchment	-	
	Catchment Management Authority (CMA)	Council - Central Coast Council	
	CMA Web-Link	http://www.centralcoast.tas.gov.au/site/page.cfm	
	Catchment Protection Status	Likely not protected (only catchments in southern Tasmania protected).	
	Potable Water Source(s)	Unknown	
WATER QUALITY	Supply Capacity	Unknown	
	Treatment Plant(s)	Gawler River, Forth River, Lake Paloona, Lake Barrington, Dowling Creek, Leven River, Cam River, Deep Creek System (137 ML/d each)	
	Level of Treatment	The water supply is 77% treated, 10% Chlorinated and 13% Non - Chlorinated water	
	Drinking Water Guidelines	ADWG, 2004	
	Results (% compliance for 2008 reporting period)	Physical & chemical	100%
WATER SECURITY		E-coli	100%
	Current Water Restrictions	n/a	
	Proportion of Potable Water Supplied to Households (%)	Approximately 70% to domestic users; 30% to 'special' customers.	
	Distance from the Coast (km)	6km	
	Climate	temperate (no dry season)	
WATER QUALITY OR SECURITY RISK (CAUSE)	Average Annual Rainfall	932mm	
	FACTOR	YES / NO	NOTES / EXPLANATION
	Drought	no	
	Single drinking water source	yes	Deep Creek bulk water supply system
	Poor quality water source	no	
	Sewage overflow or disposal into water	no	
	Flooding	yes	Forth Valley flood event after heavy rainfall
	Fauna defecating in supply	no	
	Fauna destroying water intake structures	no	
	Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	yes	occurred to local storm water and nearby creek after ruptured pipe at Burnie treatment plant
	Un-lined landfills	no	
	Extensive agriculture	no	although water is supplied to irrigators, farmers etc.
	Low vegetation cover (dust, sediment)	no	
	Poor access to supply	no	
	Unsustainable water extraction	no	
	Aquifer turning saline due to high extraction	no	
	Hard water	no	
	Aging or inadequate pipe work and associated infrastructure	yes	Council investigated infrastructure and found number of risks within system (unknown what they are, however Council is addressing them).
	Significant water losses due to leaking	no	
	High per capita water consumption	no	
	Inappropriate water quality standards / objectives	no	
	Lack of infrastructure maintenance	yes	Council investigated infrastructure and found number of risks within system (unknown what they are, however Council is addressing them).
	Poor management or governance	yes	Council investigated infrastructure and found number of risks within system (unknown what they are, however Council is addressing them).
	Vandalism / sabotage / terrorism	no	
	Insufficient trained personnel	no	
	Inadequate funding for maintenance or upgrades	no	
	Industries		
	Mining / minerals		
	Irrigation		
	Chemicals / process		
	Population		
	Seasonal population loadings		
	Rapid population growth		
WATER QUALITY OR SECURITY RISK (EFFECT)	Pathogenic contamination	yes	Low level E.coli contamination detected in May 2007. Precautionary boil water notice issued and lifted after 5 days.
	Algal blooms	no	
	Heavy metal contamination	no	
	Poor chlorine residuals	no	
	Pesticide contamination	no	
	Boil water notices	yes	Low level E.coli contamination detected in May 2007. Precautionary boil water notice issued and lifted after 5 days.
	Deaths or illness due to water quality	no	
	Water restrictions (current and historic)	no	
	Taste and odour issues	yes	complaints received by Cradle Mountain Water re chlorine taste in water supplies
	Other contamination that would affect		
Notes			

Case Studies

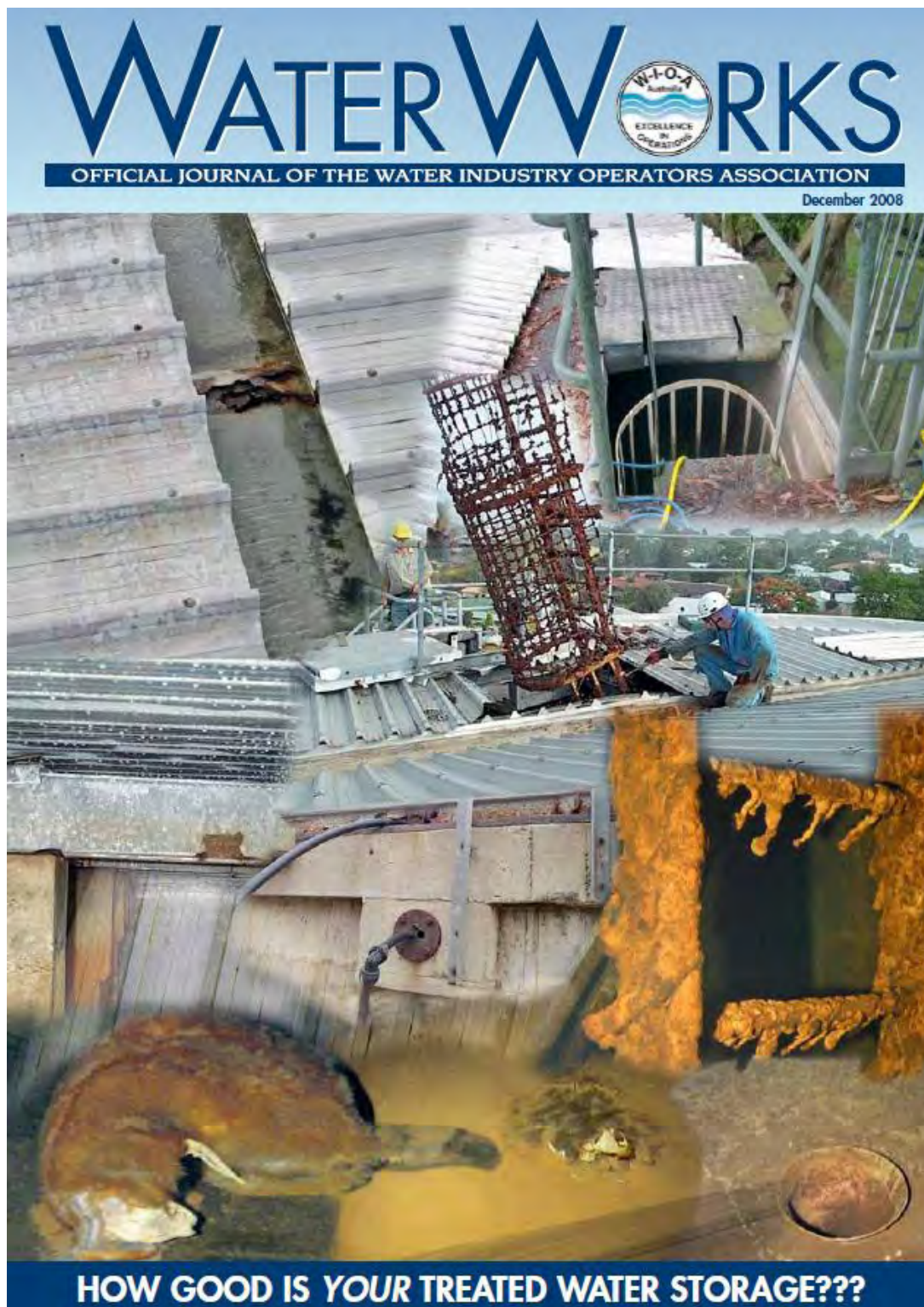
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Appendix K Case Studies



Risks to public health through poor maintenance and management of treated water reservoirs - corrosion of reservoir roof guttering allowing roof runoff to enter reservoir; poor reservoir hatch design that does not achieve a proper seal; severe corrosion on access ladders; dead animals in the bottom of treated water reservoirs, (WIOA Waterworks Journal, December 2008)

Case Study 1 – Jindabyne/Smiggin Holes, NSW, Australia, E.Coli contamination 2009

In August this year, the **drinking water supply** of Jindabyne and surrounds was affected by a **sewage overflow**. The leak occurred at a sewer pump station behind the Lake Jindabyne Bowling Club. The Snowy River Shire Council telemetry records indicate that the sewage spill began around midday on the 7th August and **went undetected for three days**. An alarm system should have alerted Council workers to the leak, but it did not go off due a technical fault. Between 0.5 and 0.8 mega litres (1ML = 1000,000 L) of sewage spilled into Lake Jindabyne during the event (Summit Sun 13th August 2009). A boil water alert was issued to all customers as a precaution until three consecutive water quality tests revealed no *E.coli* in the reticulation system (Summit Sun 13th August 2009).

In a separate incident in the same region, around **120 guests became ill with gastroenteritis** at the Smiggin Holes ski resort. **One child required medical assistance** while on a bus trip home from the ski resort (Summit Sun 20th August 2009). None of the drinking water samples showed any signs of contamination, but Stuart Cohen of the NSW National Parks and Wildlife Service stated that given the number of people who fell ill and the timing of the gastro outbreak, the event was directly related to the drinking water (NSW NPWS, 2009).

Case Study 2 – Cairns/Port Douglas, Qld, Australia, E.coli contamination 2008

In September 2008 *E.coli* was found in seven of the thirteen Port Douglas and Mossman **reservoirs**, prompting Queensland Health to advise that residents in Port Douglas, Craiglee, Mowbray, Rock Point and Daintree Village to boil drinking water until further notice (Dickson, 2008).

Following discovery of the contamination, **seventeen people** presented at Mosman Hospital with **gastroenteritis** symptoms, with **six admitted for overnight observation** (Dickson, 2008).

Open areas and damaged roofs on the reservoirs were highlighted as the possible point of contamination. Prior to the detection of this contamination event, only the water treatment plant and the pipe work were being tested for water quality compliance (Dickson, 2008).

A one-off dose of chlorine was added to the contaminated reservoirs as local residents had an intense objection to the addition of chlorine to the water supply:

“Chlorination of our water supply tears at our social fabric” (Friends of the Douglas Shire 7th September 2009)

“There doesn't appear to be any comprehension regarding just how passionately the residents of the old Douglas Shire feel about a chemical free water supply, perhaps the Cairns Regional Council think that we will simply fall into line with their dictates like the rest of the Cairns metropolis appears to do. We will need to demonstrate to them that we are indeed not a herd of sheep to be pushed into whatever convenient pen they see fit. **Chemical free water is our right...**” (Friends of the Douglas Shire 7th September 2009)

Chlorination of the entire Douglas water system went ahead in October 2009 because of the repeated instances of *E.coli* contamination in the region (Pashley, 2009); between April and September 2009, there were reportedly 40 positive tests for *E.coli* (ABC News 28 September 2009). Queensland Health indicated that permanent chlorination will not go ahead if the source of contamination could be isolated (Pashley, 2009).

Case Study 3 – Sydney, NSW, cryptosporidium and giardia contamination

In August 1998 Sydney's drinking water supply was affected by cryptosporidium and giardia. Contamination was first detected in the system on the 21st July. A series of tests were conducted across the city to determine the extent and the severity of the contamination. The first boil water alert was issued on the 27th July to some parts of the Eastern CBD. The alert was extended to other parts of the city on the 29th of July and again on the 30th of July. The alerts were progressively lifted between the 2nd and the 4th July.

An Inquiry into the incident cited five possible causes of the contamination event:

- A localised contamination event in the eastern CBD
- Contamination at Potts Hill Reservoir
- Catchment area impacts on the inflow to the Prospect Plant (raw water turbidity events, septic systems draining in to Warragamba Dam, contamination in the upper canal or extraction from low levels in the

dam)

- Contamination at the Prospect Plant (release of sediment deposits from the inlet chamber during flow surges; loss of dilution water; reduced effectiveness of the coagulation process; problems in the backwash procedure; cleaning of the clear water tanks and the use of a bypass channel)
- Potential impacts downstream from the prospect plant

Source: (Smith, 1998)

Case Study 4 – Walkerton, Southern Ontario, Canada, *E.Coli* and *Campylobacter jejuni* contamination

In May 2000, the Walkerton drinking water system became contaminated with *E.coli* and *Campylobacter jejuni*. **Seven people died and over 2,300 people became ill with bloody diarrhoea, stomach pain and nausea.** Some victims, particularly children may experience lasting health effects from the contamination event.

The government of Ontario held an inquiry following the contamination event to determine the cause, who was responsible, how it could have been prevented and how to stop it from happening again. The inquiry heard from 114 witnesses, including residents of the town, local officials, senior civil servants, two former ministers of the environment and the Ontario Premier.

The inquiry found that the primary source of the contamination was from manure that had been spread on a farm near a drinking water well. The main findings of the inquiry were:

- The farmer was following proper practices and should not be faulted
- The contamination event could have been prevented if continuous chlorine residual monitors and turbidity monitors were in place
- Staff at the Walkerton Public Utilities Commission did not have sufficient skills to identify the vulnerability of the well to contamination and the requirement for continuous chlorine residual and turbidity monitors
- The failure to use monitors at the well resulted from short-comings in the approvals and inspections program of the Ministry of the Environment
- The provincial government's budget reductions made it less likely that the Ministry of the Environment would identify poor practices
- For a long period of time (years), the operators had been engaging in improper operating practices including failing to use adequate doses of chlorine, failing to monitor residuals daily, making false entries about residuals and reporting monitoring information at the wrong locations
- Following detection of the contamination event, the boil water alert that was issued should have been more widely disseminated; had this been done, hundreds of illnesses could have been avoided
- When the provincial government ceased government laboratory testing, they should have mandated that non-government testing laboratories notify the regulatory authorities immediately and directly of adverse results so that boil water alerts could have been issued sooner, preventing hundreds of illnesses

Source: (O'Conner, 2002)

Reconstructing the community's water supply is reported to have cost around \$11 million, while the estimated total cost of the contamination event was \$155 million by 2001 (Meinhardt, 2002, cited in Meinhardt, 2005).

Case Study 5 – Milwaukee, Wisconsin, USA, cryptosporidium

In 1993, Milwaukee in the USA experienced a large outbreak of waterborne cryptosporidiosis. The event was attributed as the underlying or contributing **cause of death in 54 residents** (Meinhardt, 2005). William et. al. (1994) report that an estimated **403,000 residents (or 52% of the population) developed diarrhoea** as a result of the outbreak. **Over 4,000 residents required hospitalisation** (Meinhardt, 2005). Susceptible members of the community were most severely affected (Meinhardt, 2005).

The following factors are highlighted in the literature:

- Cryptosporidium oocysts passed through the filtration system of one of the city's water treatment plants from Lake Michigan (William et. al., 1994)
- The outbreak went undetected for the period between the 23rd March 23 and the 9th April because the water quality standards and testing of patients for cryptosporidium were not adequate to detect the outbreak
- No specific source of the cryptosporidium was ever identified but runoff from abnormally heavy spring rains

most likely carried the cryptosporidium to the lake from a variety of sources (Wisconsin DNR, 2008)

- There are reports to suggest that 725,000 productive days were lost due to the event, costing almost \$54 million lost work time and additional expenses to residents and local government (Meinhardt, 2005)
- As a result of the outbreak, more restrictive federal requirements were implemented for turbidity, including more frequent testing and more stringent standards (Wisconsin DNR, 2008)

Case Study 6 – North Thames, United Kingdom, cryptosporidium contamination in groundwater

In 1997, **345 people** were confirmed to be suffering **cryptosporidiosis** due to a large waterborne outbreak in North Thames. Studies carried out by Willocks et. al. (1998) indicate that the outbreak was attributed to one groundwater borehole. Cryptosporidium contamination was detected in the raw water, the filtered water, and in the distribution system (Willocks et. al., 1998). A boil water alert was in place for a period of sixteen days.

This is a unique case because at that time, it may have been the **first published case of cryptosporidium in a groundwater supply** (Willocks et. al., 1998). The cause of the contamination was unclear following investigations into the outbreak, however potential sources of contamination were infiltration from the nearby river through the aquifer and into the well, ingress through the well access system or cracks in the well lining (Willocks et. al., 1998).

Case Study 7 – North Pine, Qld, Australia, fluoride over-dosing/operator error

During April 2009, a series of events lead to **over-dosing of fluoride** at the North Pine water treatment plant in Queensland.

The North Pine treated water pumps were shut down just prior to midnight on the 27th April to allow scheduled maintenance to go ahead. At this time, the delivery flow meter should have displayed a zero flow, corresponding to zero fluoride dosing.

Approximately 19 hours after the pumps were shut down, a **false flow signal from the main delivery flow meter initiated fluoride dosing**. Normally, if the flow meter and flow switch show different signals, dosing will not occur. At this time, the flow switch had been repaired and had not been re-calibrated, so was showing a false signal of 'on'. Therefore the combination of the incorrect (positive) flow signal and the false flow signal of 'on' allowed dosing to go ahead.

There are two separate automated safety alarms that sound when the concentration of fluoride exceeds 1mg/L. Seqwater staff had disabled the function of one alarm due to it being faulty, so dosing occurred intermittently for several hours until the second online analyser initiating a "high high" fluoride alarm. This resulted in an automated shut down of the fluoride dosing facility, which occurred at 12:35am on the 29th April 2009. A total of **13,000 litres** of concentrated fluoride solution had been dosed before it was detected at the online analyser sample point (Queensland Health, 2009). Some of the water was potentially supplied to customers.

The Queensland Health report (2009) cited inappropriate operational responses, **lack of understanding** and **lack of reporting** on the operator's behalf as **contributing factors** to the event.

Case Study 8 - Gideon, Missouri, USA, salmonella contamination in an undisinfected supply

In November 1993, seven cases of *Salmonella typhimurium* gastroenteritis were detected amongst residents of the Anderson Township. The local health department found no common food exposures but all patients had drank water in the township of Gideon, which was an unchlorinated supply. When the water was tested, it was confirmed to contain faecal coliforms. A boil water alert was issued.

By the end of December, more than 650 people were ill, 15 residents had been hospitalised, 28 nursing home residents were ill with diarrhoea, 7 of whom would later die as a result.

The contamination entered the water system at the water storage tower/reservoir. The roof had an improper roof vent that allowed free access to wild birds.

Source: (Angulo et. al., 1997)

Water Quality Media Monitoring



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Appendix L Water Quality Media Monitoring

Index #	Media Report
1	'Swansea water clean by summer', <i>Hobart Mercury</i>, 15 September 2009.
	Swansea, TAS The construction of a new dam and water treatment plant will enable residents of Swansea to drink their tap water without having to boil it. The project is expected to be complete by the summer of 2009-2010.
2	Ker, P, 'Drinking-water fears raised over cattle in rivers', <i>The Age</i>, 7 September 2009.
	VIC There are concerns over the protection of drinking water supplies as the Brumby Government prepares to re-issue licences that allow farmers to let their stock roam on river frontages that are part of Crown land. The managing director of North East Water said there were no doubts cattle created water quality challenges.
3	'Sewage spill threatens Jindabyne water supply', <i>Canberra Times</i>, 12 August 2009.
	Jindabyne, NSW A sewage spill in Lake Jindabyne contaminated the area's water supply. People reliant on the water source should boil their drinking water to avoid E.Coli bacteria, which causes diarrhoea, pneumonia and other illnesses.
4	'Not weak on water', <i>Hobart Mercury</i>, 4 August 2009.
	Hobart, TAS A pilot study monitoring bore water across Tasmania has found evidence of pesticides and herbicides commonly used in the farming and forestry sectors. This is not the first time chemicals have been found in Tasmania's water sources.
5	Hopkin, M, 'Recycled sewage trial on track to start in January', <i>The West Australian</i>, 10 July 2009.
	Perth, WA Perth's groundwater supplies are to be injected with treated sewage as part of the WA Government's plan to boost aquifers. Before injection, the sewage will be subject to an intensive purification process. The Health Department is to issue new quality guidelines for the treated water.
6	Williams, M, 'Salt threat to city water', <i>The Advertiser</i>, 7 July 2009.
	Adelaide, SA The salinity levels of River Murray water being pumped to the homes of 1.2 million people across Adelaide have more than doubled in the past three years. A fact sheet produced by SA Health warns there could be impacts for those people who need to limit their daily salt intake.
7	'Sydney's water safe', <i>Daily Telegraph</i>, 19 June 2009.
	Sydney, NSW A Sydney Catchment Authority spokeswoman has said that Sydney's water supply is safe despite high levels of metals and salts in a river feeding it. High levels of arsenic, copper and boron have been found in the Coxs River near Wallerawang power station west of Lithgow.
8	Cubby, B, Jenson, E, 'Government knew about toxic threat', <i>The Sydney Morning Herald</i>, 19 June 2009.
	Sydney, NSW High levels of toxic metals and poisons, including arsenic, have been found in the Coxs River, which feeds Sydney's water supply. It is thought that the pollution is caused by industries within the catchment, including collieries and power stations.
9	Cubby, B, 'Toxic metals threat', <i>The Sydney Morning Herald</i>, 18 June 2009.
	Sydney, NSW A University of Western Sydney researcher has identified heavy metals and poisons such as arsenic, copper and boron in the Coxs River, which feeds Sydney's water supply. The source of the pollution is believed to be the Wallerawang power station.
10	Johnstone, C, 'Still none the wiser – water quality reports delayed', <i>The Courier-Mail</i>, 27 May 2009.
	QLD The Bligh Government has delayed reports detailing water quality results for southeast Queensland's new water grid. The quarterly reports are to detail the monitoring results for fluoride, E.coli and pathogens such as Giardia.

Index #	Media Report
11	Ker, P, 'Fight looms over whether to lead cattle to rivers', <i>The Age</i>, 26 May 2009.
	VIC Thousands of licences allowing farmers to graze cattle on river banks in Victoria are up for renewal. There is increased pressure by environmental groups to have cattle barred from river banks. Cattle hooves increase the erosion of river banks and grazing strips the banks of riparian vegetation which is important for controlling water quality. Cows also create problems by defecating, or even dying, in the rivers, increasing the risk of algal blooms and eroding water quality.
12	'HOPELESS – REVEALED: Even more blunders foul our water', <i>The Courier-Mail</i>, 23 May 2009.
	QLD Inadequately treated drinking water has been distributed around southeast Queensland's troubled water grid. This includes one case where E.coli contaminated a reservoir in Brisbane.
13	'Open tap on vital water information', <i>The Courier-Mail</i>, 23 May 2009.
	QLD Evidence indicates that there are teething problems with the new southeast Queensland's water system. These problems include a lack of communication between water agencies and government departments, and the reliability of water quality information made available to the public.
14	'Claims drinking water contaminated by farm chemical', <i>ABC Rural</i>, 21 April 2009.
	QLD Scientists believe the drinking water in several Queensland communities is being contaminated by the commonly used farm herbicide atrazine. The herbicide is suspected to be disruptive to the human endocrine system and it is thought to cause cancer and infertility.
15	'Algae adds to river urgency', <i>The Advertiser</i>, 30 January, 2009; 'Murray toxic algae alert', <i>The Advertiser</i>, 30 January, 2009
	Murray River/Waikerie, VIC Detection of toxic blue-green algae blooms in the River Murray.
16	Guerrera, O, 'Locals hot under the collar about boiling 'unsafe' water', <i>The Age</i>, 28 July 2007.
	Mt Beauty, Tawonga, Tawonga South and Myrtleford, VIC Boil water notice issued, with a plan to remain in place indefinitely.
17	'Radiation blunder', <i>Herald Sun</i>, 24 July, 2007.
	Beverley Mine, SA A worker mistakenly added uranium solution rather than hydrochloric acid to a water desalination unit at the mine. Approximately 100 workers were exposed. An EPA spokesman said it was unlikely anyone would be affected as it was a weak solution, but an investigation would be carried out.
18	'Businesses blamed for WA's contaminated groundwater', <i>The West Australian</i>, 2 July 2007.
	WA The State of the Environment Report 2007 identified water contamination as one of the key issues facing WA. WA businesses are contributing by dumping pesticides and other pollutants into drains. In the Wheat belt, high levels of lead, iron and aluminium had been found in deep drains. Conservation Council president Philip Jennings said that the number of household bores which had been contaminated over recent years was alarming.
19	Brown, T, 'Waiting at hell's gate', <i>Herald Sun</i>, 9 December 2006.
	Tolmie and surrounds, VIC Township under boil water notice due to ash from bush fires fouling supplies.
20	'Sigh of relief amid devastation', <i>Herald Sun</i>, 22 March, 2006.
	Innisfail, Qld Residents issued with a boil water notice due to the impacts of Cyclone Larry.
21	Crawford, W, 'More than surface water', <i>Hobart Mercury</i>, 2 October 2004.
	TAS Opinion piece on the negative media attention on the state of drinking water in Tasmania. Includes info on the contamination of drinking water with atrazine; a potentially carcinogenic herbicide that was being used to spray timber plantations adjacent to drinking water source.
22	DiGirolamo, R, 'PVC drinking water review in pipeline', <i>The Australian</i>, 24 January 2001.
	Indulkana, SA PVC pipes contaminated drinking water. Lead levels four times the above the guidelines. Cause was human error and confusion over the correct standards to be used for drinking water pipes.

Index #	Media Report
23	James, C, 'Block on herbicide use', <i>Adelaide Advertiser</i>, 24 January 2001.
	South Para & Warren Reservoirs, SA Forestry SA forced by the EPA to stop using potentially carcinogenic herbicides after its operations contaminated drinking water supplies. The herbicide was found in the Warren Reservoir "continuously since September 1997". The herbicide was traced to new pine plantations near the Barossa Valley.
24	'Blooming invaders in our waters', <i>Canberra Times</i>, 30 November 2000.
	Armidale NSW; Palm Island, QLD Studies of blood samples from residents who had consumed water from an algal bloom in Armidale show mild liver damage. Following an algal bloom in the Solomon Dam, Palm Island Qld (in 1979), some children showed signs of gastrointestinal, liver and kidney damage.
25	Flint, J, 'Water leaves bad taste in union mouth', <i>The West Australian</i>, 26 June 1999.
	Worsley, WA Workers went on strike after their drinking water was contaminated at the Worsley Alumina mine. Heavy rain and construction activity had caused extra soil to wash into the company's fresh water dam, increasing bacteria levels. Unions wanted bottled water be trucked in for workers, rather than drinking water from Collie while an upgrade of the onsite water filtration plant was completed.
26	Overington, C, 'Polluted water crisis', <i>The Age</i>, 31 July 1998.
	Sydney, NSW Drinking water contamination by cryptosporidium and giardia. Boil water alerts issued.

Water Security Media Monitoring

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Appendix M Water Security Media Monitoring

Index #	Media Report
27	Caldwell, A, O'Loan, J, 'Towns near last dregs in drought', <i>Courier Mail</i>, 2 December 2009.
	Maleny and Dalby, QLD Maleny, a town of population 5,000 located in the Queensland Sunshine Coast hinterland may require water to be trucked in within weeks. The town received only 39.2mm of rain in November, which is almost 100mm short of the average. The town has been participating in a water conservation program since September, but are not on track with the program's targets. Dalby, a town of population 12,000 reportedly had only a few hours supply remaining on the 2nd of December. The town was consuming 6.5ML/day when the available supply was only 4.5ML/day, partly due to high temperatures. Councillors are planning on increasing water restrictions to Level 6. The towns of Chinchilla, Miles and Tara are also running short on water, while Toowoomba's dams are only at 8.2% capacity.
28	Cubby, B, Wilkinson, M, 'People v power station as water levels plunge', <i>Sydney Morning Herald</i>, 19 November 2009.
	Oberon, NSW The record low level of Oberon Dam (currently at 12.5%) has caused friction between two of the dam's priority users; Oberon Council and Wallerawang power station. The township of Oberon, which is under tight water restrictions, uses less than 2 million litres a day against the power station's allocation of 9 million. A spokesman for Water Minister Phil Costa has clearly stated, however, that water for critical human needs comes first.
29	Tovey, J, 'Rivers, dams fail Lachlan Valley towns', <i>Sydney Morning Herald</i>, 26 November 2009
	Lachlan Valley, NSW Due to prolonged drought, many towns on the Lachlan River are from next month to receive their water rations by truck. Wyangala Dam, at the top of the Lachlan River, is only at 4.9 percent capacity, and if flows from the dam are not reduced and the drought continues there will be no flows left by Autumn.
30	Gaynore, M, 'Toowoomba runs dry', <i>The Sunday Mail</i>, 20 September 2009.
	Toowoomba, QLD Toowoomba has been forced to tap into an emergency allocation of bore water, while a pipeline connecting the Wivenhoe Dam to the region's water supply is complete. The region is within a decade-long drought, with dam levels falling to below 9.8%. Three years ago the town rejected a recycled water referendum when dam levels were over 23%.
31	Kretowicz, E, 'Cotter dam expansion may start next month', <i>Canberra Times</i>, 17 September 2009.
	Canberra, ACT The ACT Government has approved the expansion of Cotter Dam. The dam will increase Canberra's water supply by 35 percent.
32	Jenkin, C, 'Stormwater plan will ease drain on Murray', <i>The Advertiser</i>, 14 September 2009.
	Adelaide, SA A key element of one of South Australia's largest stormwater recycling projects has been approved, helping save 3.8 GL of water each year from the River Murray. The project will help improve the sustainability of the city's water supply.
33	'Water bans an election risk', <i>The Advertiser</i>, 10 September 2009.
	Adelaide, SA The management and security of Adelaide's water supply is expected to significantly influence the next state government election in March next year.
34	Ker, P, 'Water plan a 'threat to river'', <i>The Age</i>, 9 September 2009.
	Thomson River, VIC To boost Melbourne's water supply the State Government plans to extract an extra 10 billion litres annually from the Thomson River. This is equivalent to 15% of the river's flow after allocations to farmers. Scientific advice has found that extra extractions from the river would deteriorate water quality and reduce the potential for fish to move up the river.
35	'Water costs still value for money', <i>Canberra Times</i>, 4 September 2009.
	Canberra, ACT Cotter Dam is to be enlarged and the cost will ultimately be borne by consumers, with annual bills expected to rise by \$100 on average. It has been suggested that paying an extra \$2 a week to ensure

Index #	Media Report
	security of supply now and well into the future is money well spent. The increase in water bills reflects the growing scarcity of water supply.
36	Ker, P, Morton, A, 'Clean-coal technologies may imperil water supply', The Age, 7 August 2009.
	Melbourne, VIC A report by the National Water Commission has warned that water consumption would significantly increase if carbon capture and storage methods were built into coal-fired power stations. Power stations consume large amounts of fresh water, and the report estimated that incorporating carbon capture and storage could be one-quarter to one-third more water intensive.
37	Owen M, 'Upgrade to ease Murray's burden', The Australian, 29 July 2009.
	Adelaide, SA The SA government will spend \$400 million on improving the connectivity between Adelaide's southern and northern water supply systems. This will allow the delivery of water at full capacity from Adelaide's desalination plant, which will come online in 2012 and reduce the city's reliance on the Murray River.
38	Cubby, B, 'New mine could crack dam floor', The Sydney Morning Herald, 23 July 2009.
	Woronora Catchment, Sydney A new longwall coalmine directly beneath Woronora Reservoir has the potential to crack the dam floor and cause serious leaks from southern Sydney's main drinking water supply.
39	Cubby, B, Dart, J, 'Toxic waste in town's drinking water', The Sydney Morning Herald, 15 July 2009.
	Lithgow, NSW Doctors in Lithgow are protesting against Council's plans to increase the amount of recycled industrial water in the town's drinking water supply. No research has been done on possible links between heavy metals in the water and health effects.
40	Downie, G, 'Cotter Dam EIS gets approval', Canberra Times, 21 June 2009.
	Canberra, ACT The Environmental Impact Statement assessment report for Canberra's Cotter Dam project has been approved, allowing for development applications to be lodged. The project will increase the capacity of Cotter Dam from 4GL to 78GL and will help to secure Canberra's water supply against drought.
41	Jenkin, C, 'TECHNOLOGY Industries world leaders in purification making most of the little water we have', The Advertiser, 6 June 2009.
	Adelaide, SA The water problems facing South Australian have been a key impetus for the growth of the state as a global player in water-related technology and intelligence. Researchers and businesses are developing new and improved methods for dealing with water shortages, with many local businesses now exporting technology and services around the world.
42	Johnstone, C, 'Supply cut as main floods suburb – giant pipeline given the all-clear recently', The Courier-Mail, 20 May 2009.
	Brisbane, QLD A giant water distribution main in Brisbane burst, flooding neighbouring properties and nearby creeks. Many properties in Brisbane's west and south were without water supply or with reduced pressure for several hours following the failure.

Water Quality and Security Risks

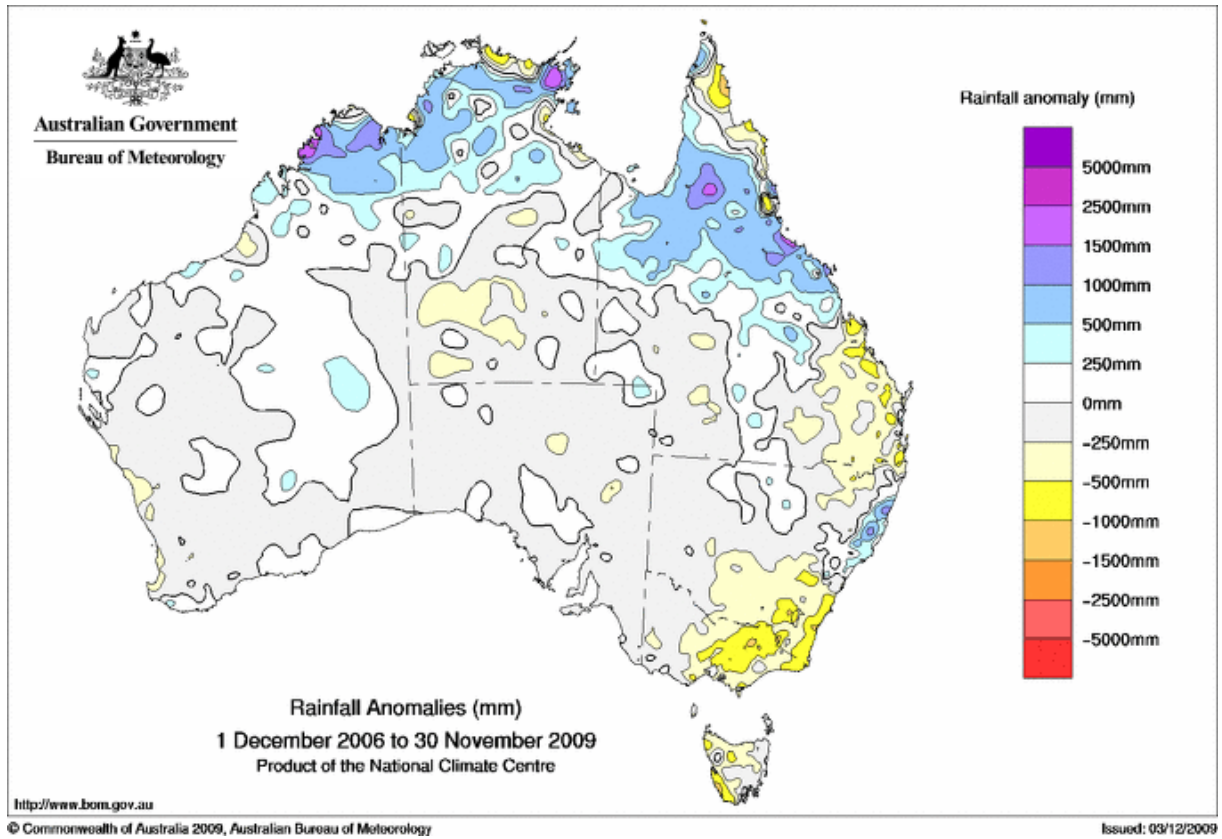
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Appendix N Water Quality and Security Risks



Water Quality or Security Risk			No. of Selected Towns With Risk Factor	% of Selected Towns With Risk Factor
WATER QUALITY OR SECURITY RISK (CAUSE)	Catchment and Water Supply	Drought	75	74
		Single drinking water source	66	65
		Poor quality water source	26	26
		Sewage overflow or disposal into water source	10	10
		Flooding	35	35
		Fauna defecating in supply	44	44
		Fauna destroying water intake structures	7	7
		Natural mineral pollutants (e.g. uranium, nitrates, iron, fluoride)	25	25
		Un-lined landfills	14	14
		Extensive agriculture	54	53
		Low vegetation cover (dust, sediment runoff)	46	46
		Poor access to supply	1	1
		Unsustainable water extraction	30	30
		Aquifer turning saline due to high extraction	18	18
		Hard water	9	9
		Aging or inadequate pipework and associated infrastructure	22	22
		Significant water losses due to leaking pipes	7	7
	Governance	High per capita water consumption	11	11
		Inappropriate water quality standards / objectives	0	0
		Lack of infrastructure maintenance	6	6
		Poor management or governance	5	5
		Vandalism / sabotage / terrorism	3	3
		Insufficient trained personnel	4	4
		Inadequate funding for maintenance or upgrades	5	5
	Industries	Mining / minerals	16	16
		Irrigation	45	45
		Chemicals / process	16	16
	Population	Seasonal population loadings	26	26
		Rapid population growth	25	25
WATER QUALITY OR SECURITY RISK (EFFECT)		Bacteriological and / or viral contamination	24	24
		Algal blooms	22	22
		Heavy metal contamination	17	17
		Poor chlorine residuals	14	14
		Pesticide contamination	4	4
		High suspended solids	8	8
		Boil water notices	7	7
		Deaths or illness due to water quality	1	1
		Water restrictions (current and historic)	68	67
		Taste and odour issues	20	20
		Other contamination that may affect health	35	35

A photograph of a boat docked at a wooden pier. The scene is overlaid with a color gradient that transitions from a deep purple on the left to a bright blue on the right. The text "Innovate. Collaborate. Create." is written in white, bold, sans-serif font in the upper left quadrant. The background shows a calm body of water reflecting the sky and the pier's structure. A small boat is moored at the pier, and a tall light pole is visible in the distance. The overall mood is serene and modern.

**Innovate.
Collaborate.
Create.**

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