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PREFACE

BACKGROUND

Reliable information on Australia's water is essential for the management of this vital natural resource. The Water Account plays a key role in informing decision-making, research and discussion within governments and the broader community. Importantly the Water Account is a step towards meeting the water accounting requirements of the 2004 Intergovernmental Agreement on a National Water Initiative (NWI), which aims "...to ensure that adequate measurement, monitoring and reporting systems are in place in all jurisdictions, to support public and investor confidence in the amount of water being traded, extracted for consumptive use, and recovered for environmental and other public benefit outcomes" (NWI, paragraph 80). Further actions are being undertaken by Australia's governments and water authorities to define, standardise and implement a system supporting national water accounting for the NWI.

ABOUT THIS PUBLICATION

This is the third edition of the ABS Water Account and is a significant improvement on previous editions. In particular, increased ABS survey activity, better business reporting and greater access to State and Territory data have led to improvements in data quality and additional information on water entitlements, allocations and trading has been added. In the near future the ABS will also provide regional information on water use. This publication is also more timely than previous editions. The improvements to data quality, additional information and accelerated delivery were made possible by funding provided by the National Water Commission for the Australian Water Resources 2005 (AWR 2005) project.

The Water Account is compiled using the international *System of Integrated Environmental and Economic Accounting*. The standards, systems and methods for compiling environmental accounts are evolving nationally and internationally. Suggestions or comments on this publication, or environmental accounting in general, would be appreciated and should be sent to the Director, Centre of Environment and Energy Statistics, Locked Bag 10, Belconnen ACT 2616.

ACKNOWLEDGEMENT

The ABS is indebted to the many people and organisations that provided data for inclusion in this publication, and to those who refereed the draft tables and manuscript. The ABS acknowledges the important contributions from federal, State, Territory and local government agencies, water authorities and a range of private sector organisations. Without these contributions, this publication would not have been possible.

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CHAPTER 1 INTRODUCTION AND MAIN FINDINGS

INTRODUCTION

This publication presents information on the supply and use of water in the Australian economy in 2004–05, compiled in accordance with the *System of Integrated Environmental and Economic Accounting* (UN 2003a). Figure 1.1 shows the flows of water within and between the economy and the environment and is useful for understanding the scope of the Water Account as well as providing an overview of key data. Additional data on other aspects of water use by particular industries (e.g. the AGRICULTURE and WATER SUPPLY, SEWERAGE AND DRAINAGE SERVICES industries) are presented in thematic chapters.

Climate

Water supply and use in the Australian economy needs to be viewed in the context of Australia's climate. Mean annual rainfall in Australia varies substantially across the continent. Large areas of Australia have a mean annual rainfall of 600–1500 mm, an amount comparable with most of Europe and North America. However, a key feature of Australia's climate is not the amount of rainfall but the variability in rainfall from year-to-year and season-to-season. Annual rainfall variability is greater for Australia than any other continental region (Smith 1998). Any assessment of water supply and use over time must take this variability into account, including comparisons between the Water Accounts for 2000–01 and 2004–05.

Rainfall in 2004–05 was significantly less than in 2000–01. Similarly, rainfall was less in 2002–03 and 2003–04 than in 1998–99 and 1999–2000. Many parts of Australia experienced below average rainfall in 2004–05, with drought conditions existing in some areas. Consequences of this included urban water restrictions and reduced availability of water for irrigators. Appendix 1 provides additional information on the climatic conditions and comparisons between 2000–01 and 2004–05 and for the years before these periods.

Data Quality and Comparability

The Water Account has drawn on data from a large number of sources. It made use of surveys conducted by the ABS and others, as well as publicly available information found on websites, research papers, annual reports, etc. There are nearly 100 references in the Bibliography, providing an indication of the breadth of information used to compile the Water Account. The data sources were of varying quality and the Explanatory Notes provide information on the degree of confidence, in qualitative terms, that can be placed in the estimates.

There have been a number of improvements in the data used to compile the 2004–05 Water Account. In particular, more data were sourced from ABS surveys in this edition of the Water Account than previous editions. This, together with increased cooperation and assistance from State, Territory and Australian government agencies as well as with the water providers, has led to substantial improvements in the quality of data. Revisions

Data Quality and Comparability continued

have also been made to the data for 2000–01. This allows for greater comparability between the 2000–01 and 2004–05 Water Accounts.

While every care has been taken to ensure consistency between 2000–01 and 2004–05, the changes between the reference periods need to be interpreted cautiously owing to differences in climate, data sources, data availability and data quality. Extreme care should be taken when making comparisons to the data included in the first Water Account in respect of the years 1993–94 to 1996–97 with the data for 2004–05 and 2000–01. Some data for 1993–94 to 1996–97 are included in the publication (e.g. in Chapter 3) where the quality of the data supports such comparisons.

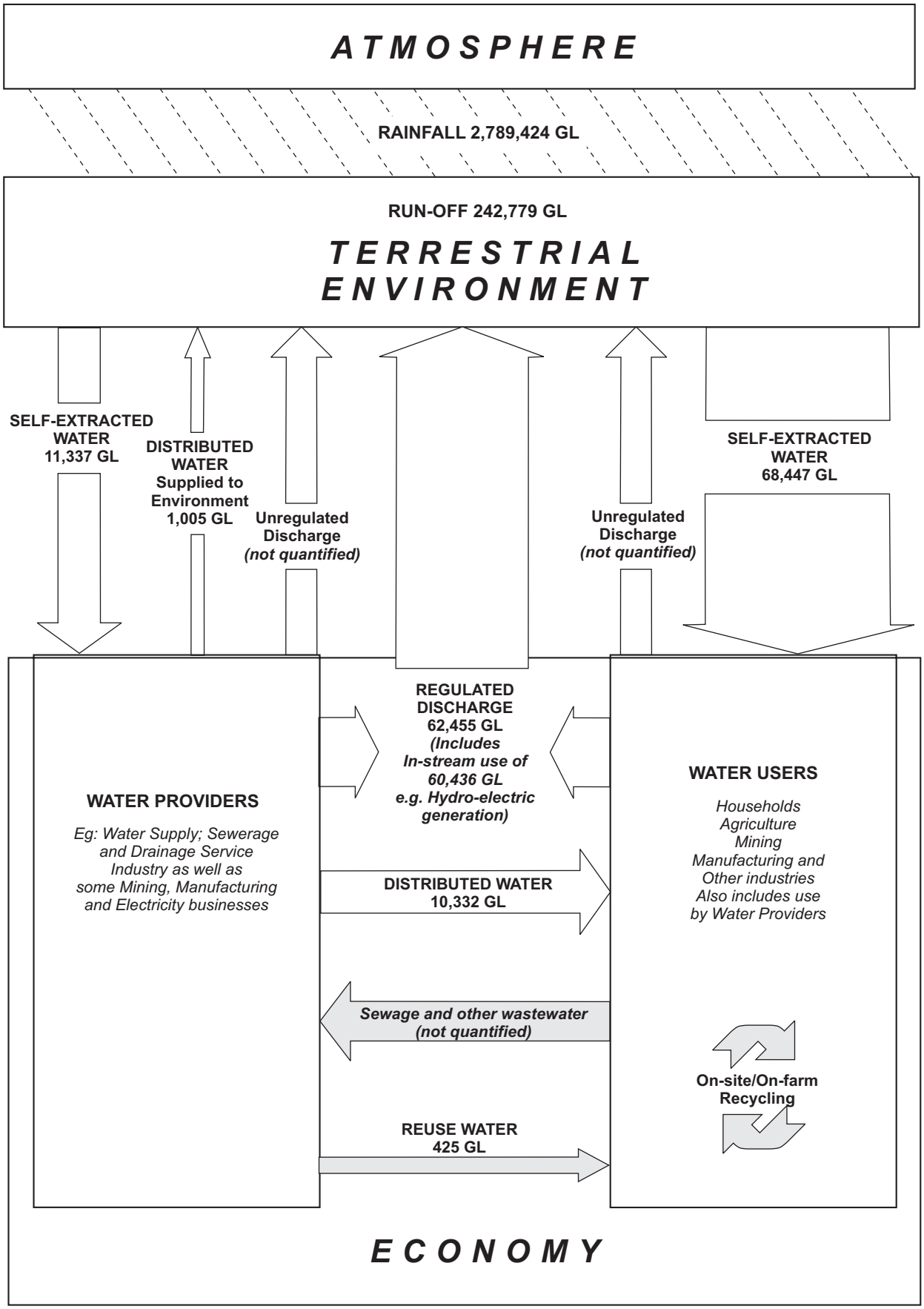
MAIN FINDINGS

Figure 1.1 and Tables 1.2 and 1.3 summarise much of the data contained in the Water Account.

Main findings include:

- In 2004–05, rainfall for Australia was 2,789,424 GL and run-off was 242,779 GL. Compared to 2000–01 and average levels of rainfall, 2004–05 was a dry year, with drought or below average rainfall experienced throughout much of Australia.
- During 2004–05, 79,784 GL of water was extracted from the environment and used within the Australia economy. Of this amount, 11,337 GL was extracted by water providers, while water users directly extracted 68,447 GL.
- Of the total volume extracted from the environment (79,784 GL), 62,445 GL was returned to the environment as regulated discharge, with 60,436 GL of this discharge being in-stream use, almost entirely by the ELECTRICITY AND GAS SUPPLY industry (59,924 GL) for hydro-electric power generation.
- Water consumption was 18,767 GL in 2004–05, a decrease of 14% from 2000–01 when it was 21,703 GL.
- Water consumption represented just under 8% of run-off in 2004–05.
- The AGRICULTURE industry consumed the largest volume of water with 12,191 GL, representing 65% of water consumption in Australia in 2004–05. This is a decrease from 2000–01 when it was 14,989 GL and 69% percent of water consumption.
- New South Wales and the Australian Capital Territory combined showed the largest fall in water consumption from 8,783 GL in 2000–01 to 5,978 GL in 2004–05. This is mostly because of a 2,661 GL or 39% decrease in the consumption of water by the AGRICULTURE industry in these jurisdictions.
- In 2004–05, Australia's large dams had a capacity of 83,853 GL. They contained 39,959 GL of water at 30 June 2005, a decline of 10% from 30 June 2004 when they contained 44,164 GL.
- Water consumption in 2004–05 was 22% of the storage capacity of large dams and 47% of the volume in storage at 30 June 2005.
- The entitlement volume of water access entitlements was 29,831 GL in 2004–05.
- The volume of water traded in 2004–05 was 1,300 GL, made up of 1,053 GL of temporary trades and 247 GL of permanant trades. Because of differences in the terminology, legislative arrangements and administrative systems, water trading data need to be interpreted cautiously.
- The 1,300 GL traded in 2004–05 represented 7% of water consumption and 4% of the entitlement volume of water access entitlements.

1.1 WATER SUPPLY AND USE IN THE AUSTRALIAN ECONOMY—2004–05



MAIN FINDINGS *continued*

- In 2004–05, there were 413 water providers in Australia, supplying 11,337 GL of distributed water. This compares to 479 providers and 12,934 GL in 2000–01.
- Of the 11,337 GL of distributed water, 1,005 GL were supplied to the environment, while 10,332 were supplied to industry and Household users.
- Of the 413 water providers, 384 were in the WATER SUPPLY, SEWERAGE AND DRAINAGE SERVICES industry, supplying 11,160 GL or 98% of distributed water in 2004–05.
- Surface water made up 10,712 GL or 96% of the distributed water supplied by the WATER SUPPLY, SEWERAGE AND DRAINAGE SERVICES industry in 2004–05.
- Reuse water made up 425 GL of total water supplied by water providers in 2004–05, compared to 507 GL in 2000–01. In both reference years it represented just under 4% of total water supplied by water providers. This compares to 134 GL and 1% in 1996–97.
- The decline in the use of reuse water between 2000–01 and 2004–05 is mostly due to a reduction by the AGRICULTURE industry (from 423 to 280 GL) and is largely a reflection of the decrease in the availability of water.
- Between 2000–01 and 2004–05 there was an increase in the volume of reuse water use by the MANUFACTURING (7 to 13 GL) and MINING (5 to 7 GL) industries.
- Households experienced a ten-fold increase in the use of reuse water (167 ML to 1,767 ML), but the volumes involved were small.

BACKGROUND

Environmental and economic accounting is an evolving field of statistics. Since the publication of the first two editions of the Water Account, advances have been made in the theory and practice of water accounting nationally and overseas. In addition, Australia's governments have developed and begun implementing the Intergovernmental Agreement on a National Water Initiative (NWI; COAG 2004). The NWI, which builds on the 1994 COAG agreement on reforming the Australian water industry, specifically mentions water resource accounting and calls for the annual compilation of water accounts. While the exact nature of these accounts is still being determined, it is apparent that the Water Accounts presented here are consistent with those envisaged in the NWI (see SKM 2006).

SEEA 2003

Internationally, the United Nations (UN) has published a draft handbook on the *System of Environmental and Economic Accounting for Water* (SEEAW) (UN 2006). Australia was a leading contributor to the development of SEEAW, which builds on the SEEA 2003 (UN 2003a). SEEAW has strengthened the conceptual foundations of the Water Accounts as well as providing guidance on the practical compilation of accounts.

Water Consumption and Water Use

Calculating water use by industries is not straightforward. Water use can include self-extracted water, distributed water, or reuse water, and sometimes a combination of all three sources are used. Calculating water use estimates for an industry or business is made more complicated when water is also supplied to other users, or when water is used in-stream. As such, simply adding self-extracted water, distributed water, and reuse water to derive a figure for total water use can be misleading.

Water Consumption and Water Use continued

In the Water Account, volumes of water used and supplied by each industry have been balanced to derive 'water consumption'. This figure takes into account the different characteristics of water supply and use of industries and is a way of standardising water use, allowing for comparisons between industries. As such, the following accounting identities have been used:

- *Total water use* is equal to the sum of Distributed water use, Self-extracted water use and Reuse water use;
- *Water consumption* is equal to the sum of Distributed water use, Self-extracted water use and Reuse water use less Water supplied to other users less In-stream use and less Distributed water use by the environment.

For most industries, water use and water consumption are the same as most industries do not have any in-stream use or supply water to other users. However water consumption will be considerably different for some industries, specifically the WATER SUPPLY, SEWERAGE AND DRAINAGE SERVICES industry, ELECTRICITY AND GAS SUPPLY industry, MINING industry, and MANUFACTURING industry where in-stream water use and water supply volumes are significant.

CHANGES TO THIS EDITION

Additional Data

A range of data have been added to the 2004–05 Water Accounts. For the first time the accounts include data on water access entitlements and allocations, while the information on water trading has also been expanded. Information on water stocks has also been increased. Data on rainfall and run-off for 2004–05 are included, while the volume held in large dams has also been added.

The addition of these data has been possible because of the cooperation and assistance provided by a range of Australian, State and Territory government agencies as well as water providers.

Methods

The estimation methods used in the 2004–05 Water Account are consistent with those used in the 2000–01 edition. However, while the methods are essentially unchanged, the increases in the availability, amount and quality of data from ABS and non-ABS sources in this edition have enabled additional refinements to the estimates. The Explanatory Notes provide details on the methods used.

Terminology

Mains water has been re-named Distributed water to reflect the terminology of SEEAW (UN 2006). The term Environmental flows has various definitions around Australia. To avoid confusion this term is no longer used in the Water Account to describe the water supplied by industry to the environment. These are instead referred to as environmental provisions. Appendix 2 provides some general information on environmental flows, while additional information can be found at the Australian Water Resources 2005 (AWR 2005) website <www.water.gov.au> and from the websites of State and Territory government agencies responsible for water management. A glossary is also provided to assist with interpretation of terms.

Every endeavour has been made to ensure the terminology used in the 2004–05 Water Account is consistent with definitions found in the 2000–01 Water Account and the NWI.

Water Quality

The 2000–01 Water Account presented some information on the quality of groundwater. The 2004–05 account does not present similar information. However, it does present information on the treatment level of water discharged to the environment by the WATER SUPPLY, SEWERAGE AND DRAINAGE SERVICES industry in Chapter 3.

Ideally, the supply and use tables would include information on the quality of water used in the economy as well as the quality of the water returned to the environment. Comprehensive national data on water quality are not yet available for 2004–05. Some information on wetland and river health will become available as part of the AWR 2005, while the 2004–05 National Pollutant Inventory (NPI) is available from the NPI website <www.npi.gov.au>.

Because of differences in scope and coverage, the information reported in the NPI on emissions to water are not able to be directly compared to the physical flows of water reported here. The ABS has investigated the feasibility of producing a Water Emissions Account for 2004–05, based on data collected in the NPI. However, this is not feasible at present.

REVISIONS TO 2000–01

In general, increased ABS survey activity, better business reporting and greater access to State, Territory and Australian government data have led to improvements in data quality for the 2004–05 Water Account. Improved data for 2004-05 has also enabled a greater understanding of the data used in 2000–01 and these data have been updated to reflect this as well as some changes in accounting treatments. During this process some errors in data and estimation procedures used in 2000–01 were identified and these too have been corrected. The main revisions are outlined below.

For the AGRICULTURE industry estimates of water were revised downwards for all jurisdictions for 2000–01. Based on data from ABS surveys of water use by irrigators for 2002–03 to 2004–05, the majority of crop application rates used to produce estimates for the 2000–01 Water Account were found to be high. In 2000–01, the Agricultural Census only collected data on irrigated area, whereas latter surveys collected additional data on the volume of water applied to irrigated crops and pastures as well as sources of water.

For the MINING and MANUFACTURING industries, the 2000–01 estimates were found to have errors. For example some businesses reported data in kL rather than ML and this was not fully identified at the time. In addition, some units were incorrectly weighted in the estimation procedure. Estimates were revised using corrected data and weights and the same methodology used for 2004–05. Regulated discharge was revised to reflect a change in the definition of mine dewatering, which was expanded to include the pumping of groundwater out of mines, as well as the reallocation of some data which was incorrectly included in reuse estimates for 2000–01.

For the ELECTRICITY AND GAS SUPPLY industry, the ABS census of this industry in respect of 2004–05 enabled more detailed data to be identified and collected. This meant that data for 2000–01 could be revised based on the increased availability and better understanding of the data. In addition, a change in accounting treatment, whereby water discharged to holding ponds and then re-extracted was treated as recycled water, and not as multiple self-extractions and unmeasured discharges.

REVISIONS TO 2000–01 *continued*

Estimates of own use of distributed water by WATER SUPPLY, SEWERAGE AND DRAINAGE SERVICES industry were not included in 2000–01, while information on losses was also incomplete. Additional and better quality data were supplied in 2004–05 and the 2000–01 information was revised on the basis of these data. This resulted in a larger estimate for losses and a slightly increased consumption figure for this industry in 2000–01.

CHAPTER CONTENTS

This edition of the Water Account consists of nine Chapters, three Appendices, Explanatory Notes, Glossary and Bibliography. Each chapter begins with an introduction and contains commentary to highlight key data and assist with interpretation of tables, which are located at the end of chapters. In some cases information and explanations are repeated so that chapters can stand alone as a source of information. Chapter 2 presents the supply and use (or flow) tables for 2004–05 as well as the revised data for 2000–01. Volumes of water supplied, used and discharged are presented by industry in these tables. Water use is split by self-extracted, distributed water, and reuse water. Chapters 3–7 take a more detailed look at the supply and use of water in the Australian economy and include a range of additional information to help understand the data.

Chapter 8 includes a summary of information on water access entitlements, allocations and trading. More detailed information was released in October 2006 in *Water Access Entitlements, Allocations and Trading Australia, 2004–05* (cat. no. 4610.0.55.003) (ABS 2006d). Because of differences in terminology, legislative arrangements and administrative systems, these data need to be interpreted cautiously, particularly when making comparisons between jurisdictions.

Chapter 9 presents information on water stocks. Water stocks refer to the long term availability of water resources, and data are presented for rainfall, run-off, as well as the storage capacity and volume held in large dams.

1.2 WATER ACCOUNT SUMMARY TABLE, 2000–01 and 2004–05

	AUSTRALIA		2004-05							
	2000-01	*2004-05*	*NSW*	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*
Rainfall (GL)	na	2 789 424	406 562	146 928	865 973	147 773	639 609	75 189	505 623	1 767
Run-off (GL)(a)	385 924	242 779	30 266	14 266	93 018	1 285	24 560	32 084	47 151	149
Water extracted from environment (GL)(b)	76 668	79 784	16 528	11 213	7 964	1 352	3 417	39 081	145	84
Water consumption (GL)	21 703	18 767	5 922	4 993	4 361	1 365	1 495	434	141	56
Capacity of large dams (GL)(c)	83 312	83 853	24 629	12 109	10 657	258	12 148	23 652	280	120
Volume in large dams (GL)(d)	na	39 959	8 200	4 729	5 309	116	10 135	11 191	196	82
Entitlements (GL)	na	29 831	13 302	6 680	4 397	1 661	2 547	1 038	140	66
Allocations (GL)	na	na	9 799	4 734	na	1 661	2 547	1 038	140	66
Trade (GL)(e)(f)	na	1 300	424	502	214	83	71	43	—	—
Population ('000)	19 387	20 329	6 774	5 022	3 964	1 542	2 010	485	203	325
Area (000 km^2)	7 673	7 673	800	227	1 726	983	2 522	67	1 345	2
Gross State Product ($m)(g)	784 017	896 568	305 859	222 221	160 986	59 457	102 837	16 054	10 678	18 473

— nil or rounded to zero (including null cells)
na not available
(a) For 2000-01 this is the Mean Annual Run-off as reported in the Water Resource Assessment 2000 (NLWRA 2001) and the 2000-01 Water Account, Australia.
(b) Includes water extracted from the environment for use.
(c) Volume at 30 June and includes 'dead' storage.
(d) Volume at 30 June.
(e) Temporary and permanent trades.
(f) Total for Australia cannot be calculated by taking the sum of the States and Territories as this would double count interstate trades.
(g) Chain volume measure. Source: Australian National Accounts: State Accounts 2005–06 (cat. no. 5220.0)

1.3 WATER CONSUMPTION, 2000–01 and 2004–05

	AUSTRALIA		2004-05							
	2000-01	*2004-05*	*NSW*	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*
	GL	GL	GL	GL	GL	GL	GL	GL	GL	GL
Agriculture	14 989	12 191	4 133	3 281	2 916	1 020	535	258	47	1
Forestry and fishing(a)	44	51	11	8	3	1	25	4	1	—
Mining	321	413	63	32	83	19	183	16	17	—
Manufacturing	549	589	126	114	158	55	81	49	6	1
Electricity and gas	255	271	75	99	81	3	13	—	1	—
Water supply(b)(c)	2 165	2 083	631	793	426	71	128	20	8	5
Other industries	1 102	1 059	310	262	201	52	168	18	30	17
Household	2 278	2 108	572	405	493	144	362	69	31	31
Total	**21 703**	**18 767**	**5 922**	**4 993**	**4 361**	**1 365**	**1 495**	**434**	**141**	**56**

— nil or rounded to zero (including null cells)
(a) Includes Services to agriculture; hunting and trapping.
(b) Includes Sewerage and drainage services.
(c) Includes water losses.

CHAPTER 2 WATER SUPPLY AND USE

INTRODUCTION

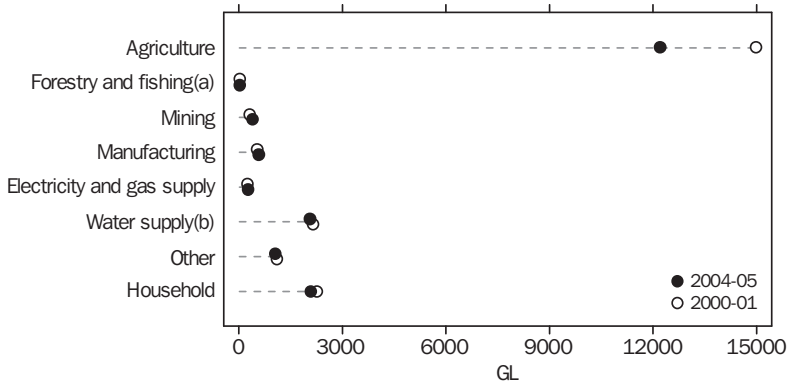
This chapter presents information on the volume of water supplied and used within the Australian economy in 2004–05, along with revised estimates for 2000–01. Water consumption by the States and Territories is presented, as well as water consumption by main industry groups. The industries are based on the Australian and New Zealand Standard Industrial Classification 1993 (ANZSIC) (ABS and New Zealand Department of Statistics 1993) but have been adapted. For example, AGRICULTURE is split by commodity, not by lower level ANZSIC classes.

WATER CONSUMPTION BY INDUSTRY

Calculating total water use and water consumption by industries is not straightforward. For many industries, total water use and water consumption are the same as they do not have any in-stream use or supply water to other users. However, total water use and water consumption will be different in industries where in-stream water use and water supply volumes are significant; specifically the WATER SUPPLY, SEWERAGE AND DRAINAGE SERVICES industry, the ELECTRICITY AND GAS SUPPLY industry, the MINING industry, and the MANUFACTURING industry. More information is available on specific industries in the respective chapters.

Graph 2.1 shows water consumption, by sector and industry, for Australia in 2004–05 and 2000–01. Water consumption is presented instead of total water use to take into account the different characteristics of water supply and use of industries, thereby allowing more meaningful comparisons. The information used to calculate water consumption for different industries is found in Tables 2.9 to 2.25.

2.1 WATER CONSUMPTION, Australia—2000–01 and 2004–05



(a) Includes Services to agriculture; hunting and trapping.
(b) Includes Sewerage and drainage services.

Water consumption in Australia for 2004–05 was 18,767 GL compared to 21,702 GL in 2000–01. The AGRICULTURE industry had the highest water consumption in 2004–05, accounting for 12,191 GL (or 65%), a decrease from 14,989 GL in 2000–01. Households were the next highest consumer of water in 2004–05, accounting for 2,108 GL (or 11%)

WATER CONSUMPTION BY INDUSTRY *continued*

of water consumption. The WATER SUPPLY, SEWERAGE AND DRAINAGE SERVICES industry was also a significant consumer of water, accounting for 2,083 GL (or 11%) of water consumption(mostly due to losses in distribution), followed by MANUFACTURING with 589 GL (or 3%).

WATER CONSUMPTION BY STATE AND TERRITORY

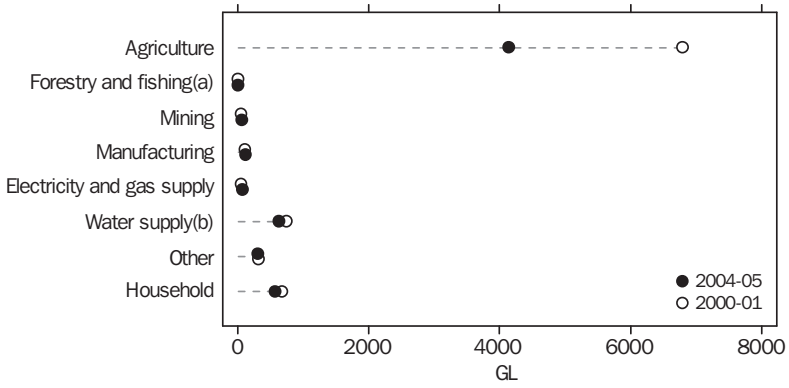
In previous editions of the Water Account, data were amalgamated to protect the confidentiality of water providers and users in the Australian Capital Territory. For 2004–05, water providers and users in the Australian Capital Territory have given the ABS consent to publish data which may identify them. This has allowed data for New South Wales and the Australian Capital Territory to be presented separately. However, to allow comparisons with 2000–01 data, New South Wales and the Australian Capital Territory have been amalgamated for Graph 2.2.

Graphs 2.2 to 2.8 show water consumption by industry for each State and Territory for 2000–01 and 2004–05. These graphs illustrate the different patterns of water consumption by the main industry groups in the States and Territories.

New South Wales and Australian Capital Territory

In New South Wales and the Australian Capital Territory combined, water consumption was 5,978 GL during 2004–05 compared to 8,783 GL in 2000–01. In 2004–05, the highest consumer was the AGRICULTURE industry with 4,134 GL or 69% of water consumption. This was followed by the WATER SUPPLY, SEWERAGE AND DRAINAGE SERVICES industry which consumed 637 GL or 11% of water.

2.2 WATER CONSUMPTION, New South Wales and Australian Capital Territory—2000–01 and 2004–05



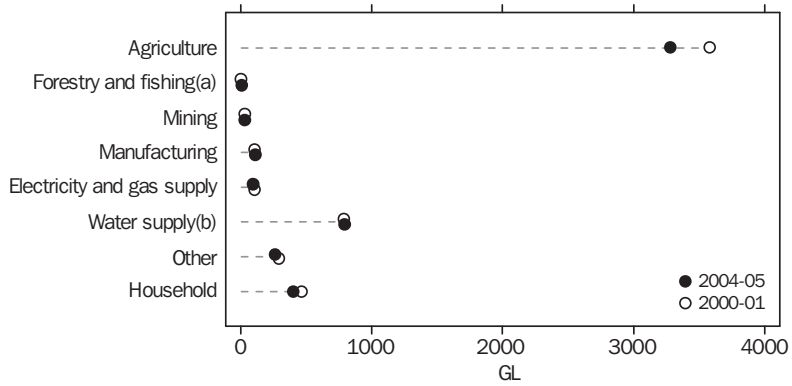
(a) Includes Services to agriculture; hunting and trapping.
(b) Includes Sewerage and drainage services.

Victoria

In Victoria, 4,993 GL of water was consumed in 2004–05 compared to 5,375 GL in 2000–01. The AGRICULTURE industry was the highest consumer of water in Victoria in 2004–05 (Graph 2.3), with 3,281 GL (or 66%) of Victoria's water consumption. The WATER SUPPLY, SEWERAGE AND DRAINAGE SERVICES industry was the next highest consumer of water, accounting for 793 GL (or 16%). Households were also a significant consumer of water with 405 GL or 8% of Victoria's water consumption.

Victoria continued

2.3 WATER CONSUMPTION, Victoria—2000–01 and 2004–05

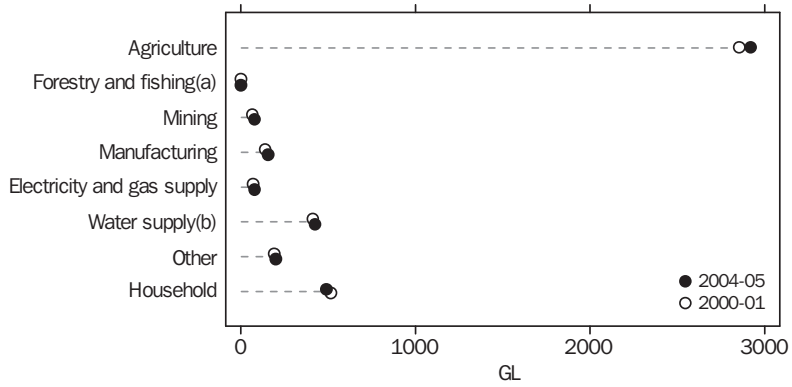


(a) Includes Services to agriculture; hunting and trapping.
(b) Includes Sewerage and drainage services.

Queensland

In Queensland, 4,361 GL of water was consumed in 2004–05 compared to 4,267 GL in 2000–01. The AGRICULTURE industry consumed the most water in 2004–05 with 2,916 GL or 67% of Queensland's water consumption. Sugar and Cotton were the main consumers within the AGRICULTURE industry, with 1,116 GL and 857 GL consumed respectively. The next largest consumers were Households, with 493 GL or 11% of Queensland's water consumption (Graph 2.4).

2.4 WATER CONSUMPTION, Queensland—2000–01 and 2004–05



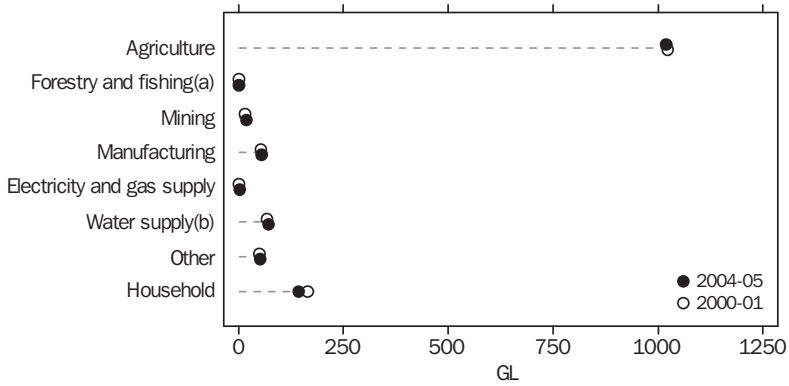
(a) Includes Services to agriculture; hunting and trapping.
(b) Includes Sewerage and drainage services.

South Australia

Water consumption in South Australia was 1,365 GL in 2004–05 compared to 1,383 GL in 2000–01. The AGRICULTURE industry was the largest consumer of water in 2004–05, accounting for 1,020 GL or 75% of South Australia's water consumption. This proportion of water consumption by the AGRICULTURE industry was the largest of all the States and Territories. Livestock, pasture, grains and other agriculture had the highest water consumption within the AGRICULTURE industry with 483 GL (or 47%) followed by Grapes with 204 GL (or 20%). Water consumption by Fruit was also significant (144 GL or 14% of water consumption by the AGRICULTURE industry). Households were also large consumers of water with 144 GL or 11% of South Australia's water consumption (Graph 2.5).

South Australia continued

2.5 WATER CONSUMPTION, South Australia—2000–01 and 2004–05

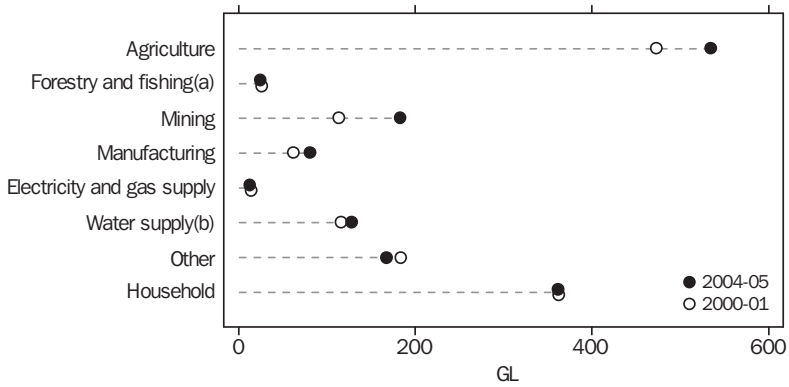


(a) Includes Services to agriculture; hunting and trapping.
(b) Includes Sewerage and drainage services.

Western Australia

In Western Australia, 1,495 GL of water was consumed in 2004–05 compared to 1,353 GL in 2000–01. In 2004–05, the AGRICULTURE industry consumed the largest volume (535 GL or 36%) followed by Households (362 GL or 24%) (Graph 2.6). Consumption by the MINING industry was also substantial (183 GL or 12%), due to a significant level of mining activity in Western Australia compared to other States and Territories.

2.6 WATER CONSUMPTION, Western Australia—2000–01 and 2004–05



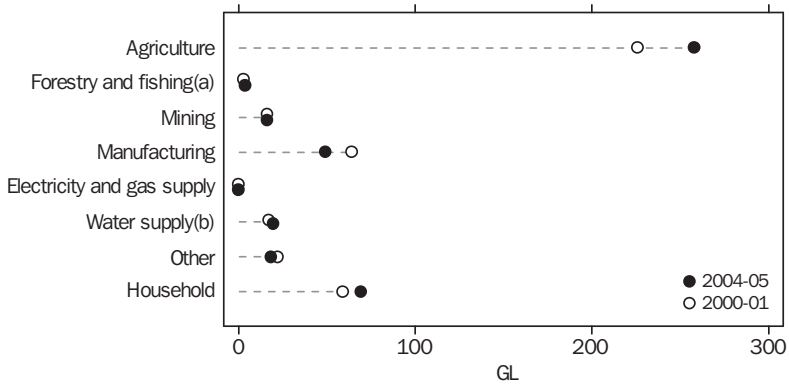
(a) Includes Services to agriculture; hunting and trapping.
(b) Includes Sewerage and drainage services.

Tasmania

Water consumption was 434 GL in Tasmania in 2004–05 compared to 408 GL in 2000–01. In 2004–05, the AGRICULTURE industry was the largest consumer accounting for 258 GL or 59% of water consumption in the State (Graph 2.7). Households were also a major consumer of water in Tasmania, with 69 GL or 16%. The MANUFACTURING industry consumed 49 GL or 11%. Most of the water consumed by the MANUFACTURING industry in Tasmania, was by the WOOD AND PAPER PRODUCTS industry (71% of water consumption by the MANUFACTURING industry in Tasmania).

Tasmania continued

2.7 WATER CONSUMPTION, Tasmania—2000–01 and 2004–05

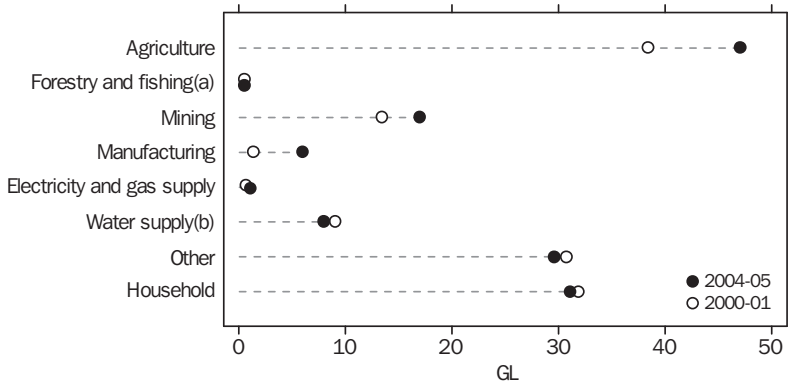


(a) Includes Services to agriculture; hunting and trapping.
(b) Includes Sewerage and drainage services.

Northern Territory

In the Northern Territory, 141 GL of water was consumed in 2004–05 compared to 134 GL in 2000–01. In 2004–05, the AGRICULTURE industry accounted for 47 GL (or 33%)(Graph 2.8). The next highest consumer of water was households, consuming 31 GL (or 22%), followed by OTHER industries with 30 GL or 21%.

2.8 WATER CONSUMPTION, Northern Territory—2000–01 and 2004–05



(a) Includes Services to agriculture; hunting and trapping.
(b) Includes Sewerage and drainage services.

2.9 WATER SUPPLY AND USE, Australia—2004–05

	SUPPLY			
	Self-extracted(a)	*Distributed*(b)	*Reuse*(c)	*Regulated discharge*(d)
Agriculture				
Dairy farming	—	—	—	na
Vegetables	—	—	—	na
Sugar	—	—	—	na
Fruit	—	—	—	na
Grapes	—	—	—	na
Cotton	—	—	—	na
Rice	—	—	—	na
Livestock, pasture, grains & other				
Livestock	—	—	—	na
Pasture(e)	—	—	—	na
Grains	—	—	—	na
Other	—	—	—	na
Total	—	—	—	na
Total	—	—	—	na
Services to agriculture; hunting & trapping	—	—	—	na
Forestry and fishing	—	—	—	385 159
Mining				
Coal mining	—	4 255	—	50 165
Oil & gas extraction	—	—	—	19 811
Metal ore mining	—	7 647	165	152 552
Other mining	—	—	—	4 220
Total	—	*11 902*	*165*	*226 748*
Manufacturing				
Food, beverage & tobacco	—	—	1 040	88 568
Textile, clothing, footwear & leather	—	—	—	na
Wood & paper products	—	—	213	21 307
Printing, publishing & recorded media	—	—	—	na
Petroleum, coal, chemical & associated product	—	20	493	na
Non-metallic mineral products	—	—	—	na
Metal products	—	11 152	—	na
Machinery & equipment	—	—	—	na
Other manufacturing	—	—	—	na
Total	—	*11 172*	*1 746*	*109 875*
Electricity & gas(f)	—	154 109	7 471	59 924 125
Water supply, sewerage & drainage services(g)	—	11 159 809	414 115	1 808 832
Other industries	—	—	1 118	na
Household	—	—	—	na
Environment	79 783 832	—	—	na
Total	**79 783 832**	**11 336 992**	**424 615**	**62 454 739**

— nil or rounded to zero (including null cells)
na not available
(a) Includes water extracted directly from the environment for use.
(b) Includes water supplied to a user usually through a non-natural network (piped/open channel or other carrier) where an economic transaction has occurred for the exchange of water regardless of method of delivery. Distributed water is a subset of the Self-extracted total.
(c) Refers to waste or drainage water that may have been treated to some extent and supplied for use.
(d) Refers to water discharged after use where that discharge does not match the natural flow regime of the receiving water body.
(e) Excludes pasture for Dairy farming.
(f) The majority of water used by this industry is 'in-stream' and is often used again downstream by other water users.
(g) Includes losses as well as water used by the Water supply, sewerage and drainage services industry.

2.9 WATER SUPPLY AND USE, Australia—2004–05 *continued*

	USE				
	Self-extracted(a)	*Distributed*(b)	*Reuse*(c)	*In-stream*(d)	*Consumption*(e)
Agriculture					
Dairy farming	856 993	1 339 473	79 136	—	2 275 603
Vegetables	307 033	132 544	15 796	—	455 373
Sugar	404 068	858 767	6 177	—	1 269 012
Fruit	306 978	339 315	1 370	—	647 662
Grapes	191 363	522 029	3 655	—	717 047
Cotton	1 697 245	122 071	2 194	—	1 821 509
Rice	224 806	394 158	11 908	—	630 872
Livestock, pasture, grains & other					
Livestock	935 396	100 078	—	—	1 035 474
Pasture(f)	1 000 850	887 144	39 898	—	1 927 892
Grains	461 815	582 098	118 356	—	1 162 268
Other	195 887	51 337	1 436	—	248 659
Total	2 593 948	1 620 656	159 689	—	4 374 293
Total	*6 582 435*	*5 329 012*	*279 925*	—	*12 191 372*
Services to agriculture; hunting & trapping	3 103	782	—	—	3 885
Forestry and fishing	391 580	23 692	17 483	385 158	47 596
Mining					
Coal mining	117 503	31 537	5 933	32 914	117 803
Oil & gas extraction	30 144	1 565	—	19 753	11 956
Metal ore mining	337 512	26 150	1 335	127 560	229 791
Other mining	43 944	12 951	—	3 179	53 716
Total	*529 103*	*72 203*	*7 268*	*183 406*	*413 266*
Manufacturing					
Food, beverage & tobacco	76 645	137 039	1 345	—	215 029
Textile, clothing, footwear & leather	2 451	12 793	—	—	15 244
Wood & paper products	52 933	46 176	129	—	99 238
Printing, publishing & recorded media	92	6 320	3	—	6 416
Petroleum, coal, chemical & associated product	14 700	47 974	7 649	—	70 304
Non-metallic mineral products	6 490	13 403	—	—	19 893
Metal products	92 742	60 743	3 885	—	146 218
Machinery & equipment	101	15 345	24	—	15 469
Other manufacturing	7	1 515	—	—	1 522
Total	*246 162*	*341 308*	*13 035*	—	*589 333*
Electricity & gas(g)	60 171 834	114 720	6 002	59 867 227	271 220
Water supply, sewerage & drainage services(h)	11 159 809	2 044 529	38 514	—	2 083 043
Other industries	467 360	531 419	60 621	—	1 059 400
Household	232 446	1 874 050	1 767	—	2 108 263
Environment	—	1 005 277	—	—	—
Total	**79 783 832**	**11 336 992**	**424 615**	**60 435 791**	**18 767 379**

— nil or rounded to zero (including null cells)

(a) Includes water extracted directly from the environment for use.

(b) Includes water supplied to a user usually through a non-natural network (piped/open channel or other carrier) where an economic transaction has occurred for the exchange of water regardless of method of delivery.

(c) Refers to waste or drainage water that may have been treated to some extent before being used. It excludes 'on-site' recycling.

(d) This is a subset of Self-extracted water use.

(e) Water consumption = Self-extracted use + Distributed water use + Reuse water use - Distributed water supplied to other users - In-stream water use - Distributed water used by the environment.

(f) Excludes pasture for Dairy farming.

(g) The majority of water used by this industry is 'in-stream' and is often used again downstream by other water users.

(h) Includes losses as well as water used by the Water supply, sewerage and drainage services industry.

2.10 WATER SUPPLY AND USE, New South Wales—2004–05

	SUPPLY			
	Self-extracted(a)	*Distributed*(b)	*Reuse*(c)	*Regulated discharge*(d)
	ML	ML	ML	ML
Agriculture				
Dairy farming	—	—	—	na
Vegetables	—	—	—	na
Sugar	—	—	—	na
Fruit	—	—	—	na
Grapes	—	—	—	na
Cotton	—	—	—	na
Rice	—	—	—	na
Livestock, pasture, grains & other				
Livestock	—	—	—	na
Pasture(e)	—	—	—	na
Grains	—	—	—	na
Other	—	—	—	na
Total	—	—	—	na
Total	—	—	—	na
Services to agriculture; hunting & trapping	—	—	—	na
Forestry and fishing	—	—	—	959
Mining				
Coal mining	—	—	—	36 597
Oil & gas extraction	—	—	—	na
Metal ore mining	—	—	—	160
Other mining	—	—	—	375
Total	—	—	—	*37 132*
Manufacturing				
Food, beverage & tobacco	—	—	—	30 359
Textile, clothing, footwear & leather	—	—	—	na
Wood & paper products	—	—	—	2 699
Printing, publishing & recorded media	—	—	—	na
Petroleum, coal, chemical & associated product	—	—	—	na
Non-metallic mineral products	—	—	—	na
Metal products	—	1 140	—	na
Machinery & equipment	—	—	—	na
Other manufacturing	—	—	—	na
Total	—	*1 140*	—	*33 058*
Electricity & gas(f)	—	36 825	129	10 682 173
Water supply, sewerage & drainage services(g)	—	3 073 847	192 951	660 068
Other industries	—	—	786	na
Household	—	—	—	na
Environment	16 528 356	—	—	na
Total	**16 528 356**	**3 111 812**	**193 866**	**11 413 390**

— nil or rounded to zero (including null cells)
na not available
(a) Includes water extracted directly from the environment for use.
(b) Includes water supplied to a user usually through a non-natural network (piped/open channel or other carrier) where an economic transaction has occurred for the exchange of water regardless of method of delivery. Distributed water is a subset of the Self-extracted total.
(c) Refers to waste or drainage water that may have been treated to some extent and supplied for use.
(d) Refers to water discharged after use where that discharge does not match the natural flow regime of the receiving water body.
(e) Excludes pasture for Dairy farming.
(f) The majority of water used by this industry is 'in-stream' and is often used again downstream by other water users.
(g) Includes losses as well as water used by the Water supply, sewerage and drainage services industry.

2.10 WATER SUPPLY AND USE, New South Wales—2004–05 *continued*

USE

	Self-extracted(a)	*Distributed*(b)	*Reuse*(c)	*In-stream*(d)	*Consumption*(e)
	ML	ML	ML	ML	ML
Agriculture					
Dairy farming	173 223	86 229	3 095	—	262 547
Vegetables	41 426	26 863	403	—	68 692
Sugar	531	—	—	—	531
Fruit	46 965	86 575	—	—	133 540
Grapes	59 579	111 871	—	—	171 450
Cotton	963 454	853	—	—	964 306
Rice	218 356	394 158	11 908	—	624 422
Livestock, pasture, grains & other					
Livestock	233 660	25 516	—	—	259 177
Pasture(f)	306 380	361 855	25 273	—	693 508
Grains	232 003	487 962	118 356	—	838 321
Other	112 665	2 309	1 068	—	116 042
Total	884 708	877 643	144 697	—	1 907 048
Total	*2 388 242*	*1 584 192*	*160 103*	—	*4 132 537*
Services to agriculture; hunting & trapping	1 060	305	—	—	1 365
Forestry and fishing	959	6 141	3 219	959	9 359
Mining					
Coal mining	56 511	1 354	4 791	23 367	39 289
Oil & gas extraction	—	—	—	—	—
Metal ore mining	9 656	3 900	1 307	160	14 702
Other mining	7 919	1 332	—	375	8 877
Total	*74 087*	*6 586*	*6 098*	*23 902*	*62 868*
Manufacturing					
Food, beverage & tobacco	8 489	40 507	10	—	49 006
Textile, clothing, footwear & leather	305	4 020	—	—	4 324
Wood & paper products	13 300	6 591	129	—	20 019
Printing, publishing & recorded media	32	2 587	3	—	2 622
Petroleum, coal, chemical & associated product	268	19 285	3	—	19 557
Non-metallic mineral products	198	3 988	—	—	4 186
Metal products	360	22 333	—	—	21 553
Machinery & equipment	42	4 166	24	—	4 231
Other manufacturing	2	495	—	—	497
Total	*22 995*	*103 971*	*169*	—	*125 995*
Electricity & gas(g)	10 781 364	7 839	1 318	10 678 407	75 289
Water supply, sewerage & drainage services(h)	3 073 847	621 052	10 311	—	631 363
Other industries	160 280	139 314	10 882	—	310 476
Household	25 521	545 423	1 767	—	572 711
Environment	—	96 990	—	—	—
Total	**16 528 356**	**3 111 812**	**193 866**	**10 703 268**	**5 921 964**

— nil or rounded to zero (including null cells)

(a) Includes water extracted directly from the environment for use.

(b) Includes water supplied to a user usually through a non-natural network (piped/open channel or other carrier) where an economic transaction has occurred for the exchange of water regardless of method of delivery.

(c) Refers to waste or drainage water that may have been treated to some extent before being used. It excludes 'on-site' recycling.

(d) This is a subset of Self-extracted water use.

(e) Water consumption = Self-extracted use + Distributed water use + Reuse water use - Distributed water supplied to other users - In-stream water use - Distributed water used by the environment.

(f) Excludes pasture for Dairy farming.

(g) The majority of water used by this industry is 'in-stream' and is often used again downstream by other water users.

(h) Includes losses as well as water used by the Water supply, sewerage and drainage services industry.

2.11 WATER SUPPLY AND USE, Victoria—2004–05

	SUPPLY			
	Self-extracted(a)	*Distributed*(b)	*Reuse*(c)	*Regulated discharge*(d)
	ML	ML	ML	ML
Agriculture				
Dairy farming	—	—	—	na
Vegetables	—	—	—	na
Sugar	—	—	—	na
Fruit	—	—	—	na
Grapes	—	—	—	na
Cotton	—	—	—	na
Rice	—	—	—	na
Livestock, pasture, grains & other				
Livestock	—	—	—	na
Pasture(e)	—	—	—	na
Grains	—	—	—	na
Other	—	—	—	na
Total	—	—	—	na
Total	—	—	—	na
Services to agriculture; hunting & trapping	—	—	—	na
Forestry and fishing	—	—	—	717
Mining				
Coal mining	—	—	—	3 340
Oil & gas extraction	—	—	—	58
Metal ore mining	—	—	—	na
Other mining	—	—	—	220
Total	—	—	—	*3 618*
Manufacturing				
Food, beverage & tobacco	—	—	—	na
Textile, clothing, footwear & leather	—	—	—	na
Wood & paper products	—	—	213	5 000
Printing, publishing & recorded media	—	—	—	na
Petroleum, coal, chemical & associated product	—	20	—	na
Non-metallic mineral products	—	—	—	na
Metal products	—	—	—	na
Machinery & equipment	—	—	—	na
Other manufacturing	—	—	—	na
Total	—	*20*	*213*	*5 000*
Electricity & gas(f)	—	25	—	6 002 735
Water supply, sewerage & drainage services(g)	—	4 003 846	130 029	528 100
Other industries	—	—	332	na
Household	—	—	—	na
Environment	11 212 653	—	—	na
Total	**11 212 653**	**4 003 891**	**130 574**	**6 540 170**

— nil or rounded to zero (including null cells)
na not available
(a) Includes water extracted directly from the environment for use.
(b) Includes water supplied to a user usually through a non-natural network (piped/open channel or other carrier) where an economic transaction has occurred for the exchange of water regardless of method of delivery. Distributed water is a subset of the Self-extracted total.
(c) Refers to waste or drainage water that may have been treated to some extent and supplied for use.
(d) Refers to water discharged after use where that discharge does not match the natural flow regime of the receiving water body.
(e) Excludes pasture for Dairy farming.
(f) The majority of water used by this industry is 'in-stream' and is often used again downstream by other water users.
(g) Includes losses as well as water used by the Water supply, sewerage and drainage services industry.

2.11 WATER SUPPLY AND USE, Victoria—2004–05 *continued*

USE

	Self-extracted(a)	*Distributed*(b)	*Reuse*(c)	*In-stream*(d)	*Consumption*(e)
	ML	ML	ML	ML	ML
Agriculture					
Dairy farming	424 381	1 210 010	76 042	—	1 710 433
Vegetables	35 107	48 825	424	—	84 356
Sugar	—	—	—	—	—
Fruit	34 645	162 556	424	—	197 625
Grapes	65 117	254 565	484	—	320 166
Cotton	—	—	—	—	—
Rice	6 450	—	—	—	6 450
Livestock, pasture, grains & other					
Livestock	115 852	39 959	—	—	155 810
Pasture(f)	172 076	440 807	9 481	—	622 364
Grains	99 034	54 906	—	—	153 940
Other	13 519	16 726	—	—	30 245
Total	400 481	552 397	9 481	—	962 359
Total	*966 181*	*2 228 353*	*86 855*	—	*3 281 389*
Services to agriculture; hunting & trapping	904	86	—	—	990
Forestry and fishing	784	635	5 869	717	6 571
Mining					
Coal mining	25 926	215	—	1 670	24 471
Oil & gas extraction	673	1 142	—	—	1 815
Metal ore mining	1 437	576	—	—	2 013
Other mining	1 790	1 809	—	162	3 437
Total	*29 826*	*3 742*	—	*1 832*	*31 736*
Manufacturing					
Food, beverage & tobacco	1 809	35 187	—	—	36 996
Textile, clothing, footwear & leather	1 241	5 978	—	—	7 218
Wood & paper products	3 854	30 767	—	—	34 621
Printing, publishing & recorded media	20	1 744	—	—	1 763
Petroleum, coal, chemical & associated product	1 378	14 829	—	—	16 188
Non-metallic mineral products	248	3 101	—	—	3 349
Metal products	2 262	6 160	—	—	8 422
Machinery & equipment	26	4 578	—	—	4 603
Other manufacturing	2	426	—	—	428
Total	*10 840*	*102 769*	—	—	*113 589*
Electricity & gas(g)	6 051 163	21 759	—	5 974 095	98 802
Water supply, sewerage & drainage services(h)	4 003 846	777 848	15 370	—	793 218
Other industries	133 469	105 779	22 480	—	261 728
Household	15 641	388 991	—	—	404 632
Environment	—	373 929	—	—	—
Total	**11 212 653**	**4 003 891**	**130 574**	**5 976 644**	**4 992 654**

— nil or rounded to zero (including null cells)

(a) Includes water extracted directly from the environment for use.

(b) Includes water supplied to a user usually through a non-natural network (piped/open channel or other carrier) where an economic transaction has occurred for the exchange of water regardless of method of delivery.

(c) Refers to waste or drainage water that may have been treated to some extent before being used. It excludes 'on-site' recycling.

(d) This is a subset of Self-extracted water use.

(e) Water consumption = Self-extracted use + Distributed water use + Reuse water use - Distributed water supplied to other users - In-stream water use - Distributed water used by the environment.

(f) Excludes pasture for Dairy farming.

(g) The majority of water used by this industry is 'in-stream' and is often used again downstream by other water users.

(h) Includes losses as well as water used by the Water supply, sewerage and drainage services industry.

2.12 WATER SUPPLY AND USE, Queensland—2004–05

	SUPPLY			
	Self-extracted(a)	*Distributed*(b)	*Reuse*(c)	*Regulated discharge*(d)
	ML	ML	ML	ML
Agriculture				
Dairy farming	—	—	—	na
Vegetables	—	—	—	na
Sugar	—	—	—	na
Fruit	—	—	—	na
Grapes	—	—	—	na
Cotton	—	—	—	na
Rice	—	—	—	na
Livestock, pasture, grains & other				
Livestock	—	—	—	na
Pasture(e)	—	—	—	na
Grains	—	—	—	na
Other	—	—	—	na
Total	—	—	—	na
Total	—	—	—	na
Services to agriculture; hunting & trapping	—	—	—	na
Forestry and fishing	—	—	—	2 329
Mining				
Coal mining	—	—	—	8 456
Oil & gas extraction	—	—	—	11 564
Metal ore mining	—	3 634	—	33 740
Other mining	—	—	—	775
Total	—	*3 634*	—	*54 534*
Manufacturing				
Food, beverage & tobacco	—	—	1 040	54 038
Textile, clothing, footwear & leather	—	—	—	na
Wood & paper products	—	—	—	na
Printing, publishing & recorded media	—	—	—	na
Petroleum, coal, chemical & associated product	—	—	—	na
Non-metallic mineral products	—	—	—	na
Metal products	—	5 827	—	na
Machinery & equipment	—	—	—	na
Other manufacturing	—	—	—	na
Total	—	*5 827*	*1 040*	*54 038*
Electricity & gas(f)	—	478	4 081	3 239 028
Water supply, sewerage & drainage services(g)	—	2 641 619	46 461	309 458
Other industries	—	—	—	na
Household	—	—	—	na
Environment	7 964 348	—	—	na
Total	**7 964 348**	**2 651 558**	**51 582**	**3 659 387**

— nil or rounded to zero (including null cells)
na not available
(a) Includes water extracted directly from the environment for use.
(b) Includes water supplied to a user usually through a non-natural network (piped/open channel or other carrier) where an economic transaction has occurred for the exchange of water regardless of method of delivery. Distributed water is a subset of the Self-extracted total.
(c) Refers to waste or drainage water that may have been treated to some extent and supplied for use.
(d) Refers to water discharged after use where that discharge does not match the natural flow regime of the receiving water body.
(e) Excludes pasture for Dairy farming.
(f) The majority of water used by this industry is 'in-stream' and is often used again downstream by other water users.
(g) Includes losses as well as water used by the Water supply, sewerage and drainage services industry.

2.12 WATER SUPPLY AND USE, Queensland—2004–05 *continued*

USE

	Self-extracted(a)	*Distributed*(b)	*Reuse*(c)	*In-stream*(d)	*Consumption*(e)
	ML	ML	ML	ML	ML
Agriculture					
Dairy farming	57 647	11 318	—	—	68 964
Vegetables	65 326	37 508	—	—	102 833
Sugar	403 537	706 380	6 123	—	1 116 041
Fruit	72 826	42 177	946	—	115 949
Grapes	3 335	4 526	—	—	7 860
Cotton	733 791	121 218	2 194	—	857 203
Rice	—	—	—	—	—
Livestock, pasture, grains & other					
Livestock	263 285	30 287	—	—	293 572
Pasture(f)	126 533	42 229	2 687	—	171 449
Grains	97 391	38 359	—	—	135 750
Other	35 874	10 274	367	—	46 515
Total	523 084	121 149	3 055	—	647 287
Total	*1 859 545*	*1 044 275*	*12 318*	—	*2 916 138*
Services to agriculture; hunting & trapping	—	285	—	—	285
Forestry and fishing	2 859	17	2 106	2 329	2 654
Mining					
Coal mining	21 724	29 162	1 142	7 877	44 152
Oil & gas extraction	12 266	—	—	11 564	702
Metal ore mining	55 601	9 911	—	32 164	29 713
Other mining	6 228	2 943	—	680	8 490
Total	*95 818*	*42 015*	*1 142*	*52 285*	*83 057*
Manufacturing					
Food, beverage & tobacco	60 777	26 056	1 335	—	88 168
Textile, clothing, footwear & leather	386	1 406	—	—	1 792
Wood & paper products	761	4 978	—	—	5 739
Printing, publishing & recorded media	33	940	—	—	973
Petroleum, coal, chemical & associated product	5 498	10 450	3 653	—	19 600
Non-metallic mineral products	160	2 928	—	—	3 088
Metal products	18 082	19 595	3 579	—	35 428
Machinery & equipment	13	2 659	—	—	2 672
Other manufacturing	2	292	—	—	294
Total	*85 710*	*69 303*	*8 567*	—	*157 754*
Electricity & gas(g)	3 217 027	77 459	3 361	3 216 863	80 506
Water supply, sewerage & drainage services(h)	2 641 619	419 673	6 418	—	426 091
Other industries	26 777	157 008	17 670	—	201 455
Household	34 992	457 916	—	—	492 908
Environment	—	383 606	—	—	—
Total	**7 964 348**	**2 651 558**	**51 582**	**3 271 477**	**4 360 847**

— nil or rounded to zero (including null cells)

(a) Includes water extracted directly from the environment for use.

(b) Includes water supplied to a user usually through a non-natural network (piped/open channel or other carrier) where an economic transaction has occurred for the exchange of water regardless of method of delivery.

(c) Refers to waste or drainage water that may have been treated to some extent before being used. It excludes 'on-site' recycling.

(d) This is a subset of Self-extracted water use.

(e) Water consumption = Self-extracted use + Distributed water use + Reuse water use - Distributed water supplied to other users - In-stream water use - Distributed water used by the environment.

(f) Excludes pasture for Dairy farming.

(g) The majority of water used by this industry is 'in-stream' and is often used again downstream by other water users.

(h) Includes losses as well as water used by the Water supply, sewerage and drainage services industry.

2.13 WATER SUPPLY AND USE, South Australia—2004–05

	SUPPLY			
	Self-extracted(a)	*Distributed*(b)	*Reuse*(c)	*Regulated discharge*(d)
	ML	ML	ML	ML
Agriculture				
Dairy farming	—	—	—	na
Vegetables	—	—	—	na
Sugar	—	—	—	na
Fruit	—	—	—	na
Grapes	—	—	—	na
Cotton	—	—	—	na
Rice	—	—	—	na
Livestock, pasture, grains & other				
Livestock	—	—	—	na
Pasture(e)	—	—	—	na
Grains	—	—	—	na
Other	—	—	—	na
Total	—	—	—	na
Total	—	—	—	na
Services to agriculture; hunting & trapping	—	—	—	na
Forestry and fishing	—	—	—	476
Mining				
Coal mining	—	—	—	na
Oil & gas extraction	—	—	—	7 954
Metal ore mining	—	—	—	na
Other mining	—	—	—	na
Total	—	—	—	*7 954*
Manufacturing				
Food, beverage & tobacco	—	—	—	na
Textile, clothing, footwear & leather	—	—	—	na
Wood & paper products	—	—	—	76
Printing, publishing & recorded media	—	—	—	na
Petroleum, coal, chemical & associated product	—	—	493	na
Non-metallic mineral products	—	—	—	na
Metal products	—	—	—	na
Machinery & equipment	—	—	—	na
Other manufacturing	—	—	—	na
Total	—	—	*493*	*76*
Electricity & gas(f)	—	2	1 196	892
Water supply, sewerage & drainage services(g)	—	461 155	20 497	84 315
Other industries	—	—	—	na
Household	—	—	—	na
Environment	1 352 255	—	—	na
Total	**1 352 255**	**461 157**	**22 186**	**93 713**

— nil or rounded to zero (including null cells)
na not available
(a) Includes water extracted directly from the environment for use.
(b) Includes water supplied to a user usually through a non-natural network (piped/open channel or other carrier) where an economic transaction has occurred for the exchange of water regardless of method of delivery. Distributed water is a subset of the Self-extracted total.
(c) Refers to waste or drainage water that may have been treated to some extent and supplied for use.
(d) Refers to water discharged after use where that discharge does not match the natural flow regime of the receiving water body.
(e) Excludes pasture for Dairy farming.
(f) The majority of water used by this industry is 'in-stream' and is often used again downstream by other water users.
(g) Includes losses as well as water used by the Water supply, sewerage and drainage services industry.

2.13 WATER SUPPLY AND USE, South Australia—2004–05 *continued*

USE

	Self-extracted(a)	*Distributed*(b)	*Reuse*(c)	*In-stream*(d)	*Consumption*(e)
	ML	ML	ML	ML	ML
Agriculture					
Dairy farming	94 096	496	—	—	94 592
Vegetables	72 353	7 553	14 969	—	94 874
Sugar	—	—	—	—	—
Fruit	116 807	27 001	—	—	143 808
Grapes	51 958	148 863	3 170	—	203 992
Cotton	—	—	—	—	—
Rice	—	—	—	—	—
Livestock, pasture, grains & other					
Livestock	115 185	3 369	—	—	118 554
Pasture(f)	336 032	688	—	—	336 720
Grains	11 853	561	—	—	12 413
Other	8 598	6 290	—	—	14 888
Total	471 668	10 907	—	—	482 576
Total	*806 882*	*194 820*	*18 139*	—	*1 019 841*
Services to agriculture; hunting & trapping	316	29	—	—	345
Forestry and fishing	708	—	32	476	264
Mining					
Coal mining	417	21	—	—	438
Oil & gas extraction	10 006	1	—	7 954	2 053
Metal ore mining	12 372	207	—	—	12 579
Other mining	3 634	527	—	—	4 161
Total	*26 429*	*756*	—	*7 954*	*19 230*
Manufacturing					
Food, beverage & tobacco	1 618	11 600	—	—	13 218
Textile, clothing, footwear & leather	362	497	—	—	860
Wood & paper products	277	1 112	—	—	1 389
Printing, publishing & recorded media	2	375	—	—	377
Petroleum, coal, chemical & associated product	21	1 121	1 196	—	2 338
Non-metallic mineral products	46	1 128	—	—	1 174
Metal products	27 516	5 471	—	—	32 987
Machinery & equipment	5	2 541	—	—	2 546
Other manufacturing	—	115	—	—	115
Total	*29 847*	*23 960*	*1 196*	—	*55 004*
Electricity & gas(g)	285	1 036	1 223	—	2 542
Water supply, sewerage & drainage services(h)	461 155	71 331	—	—	71 331
Other industries	24 472	26 232	1 596	—	52 301
Household	2 161	142 279	—	—	144 440
Environment	—	713	—	—	—
Total	**1 352 255**	**461 157**	**22 186**	**8 430**	**1 365 298**

— nil or rounded to zero (including null cells)

(a) Includes water extracted directly from the environment for use.

(b) Includes water supplied to a user usually through a non-natural network (piped/open channel or other carrier) where an economic transaction has occurred for the exchange of water regardless of method of delivery.

(c) Refers to waste or drainage water that may have been treated to some extent before being used. It excludes 'on-site' recycling.

(d) This is a subset of Self-extracted water use.

(e) Water consumption = Self-extracted use + Distributed water use + Reuse water use - Distributed water supplied to other users - In-stream water use - Distributed water used by the environment.

(f) Excludes pasture for Dairy farming.

(g) The majority of water used by this industry is 'in-stream' and is often used again downstream by other water users.

(h) Includes losses as well as water used by the Water supply, sewerage and drainage services industry.

2.14 WATER SUPPLY AND USE, Western Australia—2004–05

	SUPPLY			
	Self-extracted(a)	*Distributed*(b)	*Reuse*(c)	*Regulated discharge*(d)
	ML	ML	ML	ML
Agriculture				
Dairy farming	—	—	—	na
Vegetables	—	—	—	na
Sugar	—	—	—	na
Fruit	—	—	—	na
Grapes	—	—	—	na
Cotton	—	—	—	na
Rice	—	—	—	na
Livestock, pasture, grains & other				
Livestock	—	—	—	na
Pasture(e)	—	—	—	na
Grains	—	—	—	na
Other	—	—	—	na
Total	—	—	—	na
Total	—	—	—	na
Services to agriculture; hunting & trapping	—	—	—	na
Forestry and fishing	—	—	—	12 526
Mining				
Coal mining	—	4 255	—	1 772
Oil & gas extraction	—	—	—	235
Metal ore mining	—	3 904	165	100 537
Other mining	—	—	—	2 847
Total	—	*8 159*	*165*	*105 391*
Manufacturing				
Food, beverage & tobacco	—	—	—	4 171
Textile, clothing, footwear & leather	—	—	—	na
Wood & paper products	—	—	—	na
Printing, publishing & recorded media	—	—	—	na
Petroleum, coal, chemical & associated product	—	—	—	na
Non-metallic mineral products	—	—	—	na
Metal products	—	1 723	—	na
Machinery & equipment	—	—	—	na
Other manufacturing	—	—	—	na
Total	—	*1 723*	—	*4 171*
Electricity & gas(f)	—	2	2 065	1 837 170
Water supply, sewerage & drainage services(g)	—	726 384	15 278	130 854
Other industries	—	—	—	na
Household	—	—	—	na
Environment	3 416 937	—	—	na
Total	**3 416 937**	**736 268**	**17 508**	**2 090 112**

— nil or rounded to zero (including null cells)
na not available
(a) Includes water extracted directly from the environment for use.
(b) Includes water supplied to a user usually through a non-natural network (piped/open channel or other carrier) where an economic transaction has occurred for the exchange of water regardless of method of delivery. Distributed water is a subset of the Self-extracted total.
(c) Refers to waste or drainage water that may have been treated to some extent and supplied for use.
(d) Refers to water discharged after use where that discharge does not match the natural flow regime of the receiving water body.
(e) Excludes pasture for Dairy farming.
(f) The majority of water used by this industry is 'in-stream' and is often used again downstream by other water users.
(g) Includes losses as well as water used by the Water supply, sewerage and drainage services industry.

2.14 WATER SUPPLY AND USE, Western Australia—2004–05 *continued*

USE

	Self-extracted(a)	*Distributed*(b)	*Reuse*(c)	*In-stream*(d)	*Consumption*(e)
	ML	ML	ML	ML	ML
Agriculture					
Dairy farming	24 929	29 528	—	—	54 458
Vegetables	45 616	5 994	—	—	51 609
Sugar	—	152 386	54	—	152 440
Fruit	18 595	20 528	—	—	39 124
Grapes	7 054	1 928	—	—	8 982
Cotton	—	—	—	—	—
Rice	—	—	—	—	—
Livestock, pasture, grains & other					
Livestock	155 103	947	—	—	156 050
Pasture(f)	1 952	37 497	—	—	39 449
Grains	12 865	—	—	—	12 865
Other	6 445	13 890	—	—	20 335
Total	176 366	52 333	—	—	228 699
Total	*272 560*	*262 698*	*54*	—	*535 312*
Services to agriculture; hunting & trapping	618	12	—	—	630
Forestry and fishing	15 749	15 432	5 946	12 526	24 601
Mining					
Coal mining	12 579	782	—	—	9 106
Oil & gas extraction	7 181	421	—	235	7 367
Metal ore mining	222 655	8 353	29	88 512	138 620
Other mining	23 192	6 228	—	1 960	27 459
Total	*265 606*	*15 783*	*29*	*90 707*	*182 552*
Manufacturing					
Food, beverage & tobacco	813	17 423	—	—	18 236
Textile, clothing, footwear & leather	3	665	—	—	668
Wood & paper products	713	1 847	—	—	2 560
Printing, publishing & recorded media	5	449	—	—	454
Petroleum, coal, chemical & associated product	7 533	2 025	2 797	—	12 355
Non-metallic mineral products	5 821	1 412	—	—	7 233
Metal products	36 469	3 278	305	—	38 329
Machinery & equipment	9	1 088	—	—	1 097
Other manufacturing	1	156	—	—	157
Total	*51 366*	*28 343*	*3 102*	—	*81 089*
Electricity & gas(g)	1 841 998	6 511	100	1 835 766	12 841
Water supply, sewerage & drainage services(h)	726 384	125 212	2 825	—	128 037
Other industries	106 767	56 107	5 452	—	168 325
Household	135 890	226 151	—	—	362 041
Environment	—	18	—	—	—
Total	**3 416 937**	**736 268**	**17 508**	**1 938 999**	**1 495 427**

— nil or rounded to zero (including null cells)

(a) Includes water extracted directly from the environment for use.

(b) Includes water supplied to a user usually through a non-natural network (piped/open channel or other carrier) where an economic transaction has occurred for the exchange of water regardless of method of delivery.

(c) Refers to waste or drainage water that may have been treated to some extent before being used. It excludes 'on-site' recycling.

(d) This is a subset of Self-extracted water use.

(e) Water consumption = Self-extracted use + Distributed water use + Reuse water use - Distributed water supplied to other users - In-stream water use - Distributed water used by the environment.

(f) Excludes pasture for Dairy farming.

(g) The majority of water used by this industry is 'in-stream' and is often used again downstream by other water users.

(h) Includes losses as well as water used by the Water supply, sewerage and drainage services industry.

2.15 WATER SUPPLY AND USE, Tasmania—2004–05

	SUPPLY			
	Self-extracted(a)	*Distributed*(b)	*Reuse*(c)	*Regulated discharge*(d)
	ML	ML	ML	ML
Agriculture				
Dairy farming	—	—	—	na
Vegetables	—	—	—	na
Sugar	—	—	—	na
Fruit	—	—	—	na
Grapes	—	—	—	na
Cotton	—	—	—	na
Rice	—	—	—	na
Livestock, pasture, grains & other				
Livestock	—	—	—	na
Pasture(e)	—	—	—	na
Grains	—	—	—	na
Other	—	—	—	na
Total	—	—	—	na
Total	—	—	—	na
Services to agriculture; hunting & trapping	—	—	—	na
Forestry and fishing	—	—	—	363 672
Mining				
Coal mining	—	—	—	na
Oil & gas extraction	—	—	—	na
Metal ore mining	—	—	—	14 496
Other mining	—	—	—	3
Total	—	—	—	*14 499*
Manufacturing				
Food, beverage & tobacco	—	—	—	na
Textile, clothing, footwear & leather	—	—	—	na
Wood & paper products	—	—	—	13 532
Printing, publishing & recorded media	—	—	—	na
Petroleum, coal, chemical & associated product	—	—	—	na
Non-metallic mineral products	—	—	—	na
Metal products	—	—	—	na
Machinery & equipment	—	—	—	na
Other manufacturing	—	—	—	na
Total	—	—	—	*13 532*
Electricity & gas(f)	—	116 777	—	38 162 096
Water supply, sewerage & drainage services(g)	—	112 325	4 858	57 603
Other industries	—	—	—	na
Household	—	—	—	na
Environment	39 080 691	—	—	na
Total	**39 080 691**	**229 102**	**4 858**	**38 611 402**

— nil or rounded to zero (including null cells)
na not available
(a) Includes water extracted directly from the environment for use.
(b) Includes water supplied to a user usually through a non-natural network (piped/open channel or other carrier) where an economic transaction has occurred for the exchange of water regardless of method of delivery. Distributed water is a subset of the Self-extracted total.
(c) Refers to waste or drainage water that may have been treated to some extent and supplied for use.
(d) Refers to water discharged after use where that discharge does not match the natural flow regime of the receiving water body.
(e) Excludes pasture for Dairy farming.
(f) The majority of water used by this industry is 'in-stream' and is often used again downstream by other water users.
(g) Includes losses as well as water used by the Water supply, sewerage and drainage services industry.

2.15 WATER SUPPLY AND USE, Tasmania—2004–05 *continued*

USE

	Self-extracted(a)	*Distributed*(b)	*Reuse*(c)	*In-stream*(d)	*Consumption*(e)
	ML	ML	ML	ML	ML
Agriculture					
Dairy farming	82 717	1 893	—	—	84 610
Vegetables	45 980	5 802	—	—	51 782
Sugar	—	—	—	—	—
Fruit	9 696	477	—	—	10 173
Grapes	1 323	276	—	—	1 600
Cotton	—	—	—	—	—
Rice	—	—	—	—	—
Livestock, pasture, grains & other					
Livestock	19 590	—	—	—	19 590
Pasture(f)	56 945	4 068	1 904	—	62 917
Grains	8 669	310	—	—	8 979
Other	16 320	1 849	—	—	18 169
Total	101 524	6 227	1 904	—	109 655
Total	*241 241*	*14 674*	*1 904*	—	*257 819*
Services to agriculture; hunting & trapping	179	16	—	—	195
Forestry and fishing	365 694	1 392	110	363 672	3 524
Mining					
Coal mining	346	3	—	—	349
Oil & gas extraction	—	—	—	—	—
Metal ore mining	21 876	9	—	6 723	15 162
Other mining	774	13	—	3	784
Total	*22 996*	*24*	—	*6 725*	*16 294*
Manufacturing					
Food, beverage & tobacco	3 134	5 709	—	—	8 844
Textile, clothing, footwear & leather	154	171	—	—	325
Wood & paper products	34 018	744	—	—	34 763
Printing, publishing & recorded media	—	87	—	—	87
Petroleum, coal, chemical & associated product	2	235	—	—	237
Non-metallic mineral products	12	641	—	—	653
Metal products	1	3 800	—	—	3 802
Machinery & equipment	1	211	—	—	212
Other manufacturing	—	18	—	—	18
Total	*37 323*	*11 617*	—	—	*48 940*
Electricity & gas(g)	38 278 873	102	—	38 162 096	102
Water supply, sewerage & drainage services(h)	112 325	17 666	1 956	—	19 622
Other industries	9 534	7 989	888	—	18 411
Household	12 526	56 905	—	—	69 431
Environment	—	118 718	—	—	—
Total	**39 080 691**	**229 102**	**4 858**	**38 532 493**	**434 338**

— nil or rounded to zero (including null cells)

(a) Includes water extracted directly from the environment for use.

(b) Includes water supplied to a user usually through a non-natural network (piped/open channel or other carrier) where an economic transaction has occurred for the exchange of water regardless of method of delivery.

(c) Refers to waste or drainage water that may have been treated to some extent before being used. It excludes 'on-site' recycling.

(d) This is a subset of Self-extracted water use.

(e) Water consumption = Self-extracted use + Distributed water use + Reuse water use - Distributed water supplied to other users - In-stream water use - Distributed water used by the environment.

(f) Excludes pasture for Dairy farming.

(g) The majority of water used by this industry is 'in-stream' and is often used again downstream by other water users.

(h) Includes losses as well as water used by the Water supply, sewerage and drainage services industry.

2.16 WATER SUPPLY AND USE, Northern Territory—2004–05

	SUPPLY			
	Self-extracted(a)	*Distributed*(b)	*Reuse*(c)	*Regulated discharge*(d)
	ML	ML	ML	ML
Agriculture				
Dairy farming	—	—	—	na
Vegetables	—	—	—	na
Sugar	—	—	—	na
Fruit	—	—	—	na
Grapes	—	—	—	na
Cotton	—	—	—	na
Rice	—	—	—	na
Livestock, pasture, grains & other				
Livestock	—	—	—	na
Pasture(e)	—	—	—	na
Grains	—	—	—	na
Other	—	—	—	na
Total	—	—	—	na
Total	—	—	—	na
Services to agriculture; hunting & trapping	—	—	—	na
Forestry and fishing	—	—	—	4 480
Mining				
Coal mining	—	—	—	na
Oil & gas extraction	—	—	—	na
Metal ore mining	—	109	—	3 619
Other mining	—	—	—	na
Total	—	*109*	—	*3 619*
Manufacturing				
Food, beverage & tobacco	—	—	—	na
Textile, clothing, footwear & leather	—	—	—	na
Wood & paper products	—	—	—	na
Printing, publishing & recorded media	—	—	—	na
Petroleum, coal, chemical & associated product	—	—	—	na
Non-metallic mineral products	—	—	—	na
Metal products	—	2 462	—	na
Machinery & equipment	—	—	—	na
Other manufacturing	—	—	—	na
Total	—	*2 462*	—	na
Electricity & gas(f)	—	—	—	31
Water supply, sewerage & drainage services(g)	—	63 520	1 852	11 141
Other industries	—	—	—	na
Household	—	—	—	na
Environment	144 982	—	—	na
Total	**144 982**	**66 091**	**1 852**	**19 271**

— nil or rounded to zero (including null cells)
na not available
(a) Includes water extracted directly from the environment for use.
(b) Includes water supplied to a user usually through a non-natural network (piped/open channel or other carrier) where an economic transaction has occurred for the exchange of water regardless of method of delivery. Distributed water is a subset of the Self-extracted total.
(c) Refers to waste or drainage water that may have been treated to some extent and supplied for use.
(d) Refers to water discharged after use where that discharge does not match the natural flow regime of the receiving water body.
(e) Excludes pasture for Dairy farming.
(f) The majority of water used by this industry is 'in-stream' and is often used again downstream by other water users.
(g) Includes losses as well as water used by the Water supply, sewerage and drainage services industry.

2.16 WATER SUPPLY AND USE, Northern Territory—2004–05 *continued*

	USE				
	Self-extracted(a)	*Distributed*(b)	*Reuse*(c)	*In-stream*(d)	*Consumption*(e)
	ML	ML	ML	ML	ML
Agriculture					
Dairy farming	—	—	—	—	—
Vegetables	1 226	—	—	—	1 226
Sugar	—	—	—	—	—
Fruit	7 422	—	—	—	7 422
Grapes	2 819	—	—	—	2 819
Cotton	—	—	—	—	—
Rice	—	—	—	—	—
Livestock, pasture, grains & other					
Livestock	32 354	—	—	—	32 354
Pasture(f)	932	—	552	—	1 484
Grains	—	—	—	—	—
Other	1 800	—	—	—	1 800
Total	35 086	—	552	—	35 638
Total	*46 553*	—	*552*	—	*47 105*
Services to agriculture; hunting & trapping	—	15	—	—	15
Forestry and fishing	4 763	76	200	4 480	559
Mining					
Coal mining	—	—	—	—	—
Oil & gas extraction	19	—	—	—	19
Metal ore mining	13 916	3 196	—	—	17 002
Other mining	289	100	—	—	390
Total	*14 224*	*3 297*	—	—	*17 411*
Manufacturing					
Food, beverage & tobacco	3	364	—	—	367
Textile, clothing, footwear & leather	—	17	—	—	17
Wood & paper products	1	33	—	—	34
Printing, publishing & recorded media	—	34	—	—	34
Petroleum, coal, chemical & associated product	1	12	—	—	12
Non-metallic mineral products	1	115	—	—	116
Metal products	8 052	81	—	—	5 671
Machinery & equipment	5	63	—	—	68
Other manufacturing	—	5	—	—	5
Total	*8 062*	*724*	—	—	*6 324*
Electricity & gas(g)	1 124	14	—	—	1 138
Water supply, sewerage & drainage services(h)	63 520	8 026	—	—	8 026
Other industries	1 022	27 441	1 100	—	29 562
Household	5 715	25 396	—	—	31 111
Environment	—	1 103	—	—	—
Total	**144 982**	**66 091**	**1 852**	**4 480**	**141 251**

— nil or rounded to zero (including null cells)

(a) Includes water extracted directly from the environment for use.

(b) Includes water supplied to a user usually through a non-natural network (piped/open channel or other carrier) where an economic transaction has occurred for the exchange of water regardless of method of delivery.

(c) Refers to waste or drainage water that may have been treated to some extent before being used. It excludes 'on-site' recycling.

(d) This is a subset of Self-extracted water use.

(e) Water consumption = Self-extracted use + Distributed water use + Reuse water use - Distributed water supplied to other users - In-stream water use - Distributed water used by the environment.

(f) Excludes pasture for Dairy farming.

(g) The majority of water used by this industry is 'in-stream' and is often used again downstream by other water users.

(h) Includes losses as well as water used by the Water supply, sewerage and drainage services industry.

2.17 WATER SUPPLY AND USE, Australian Capital Territory—2004–05

	SUPPLY			
	Self-extracted(a)	*Distributed*(b)	*Reuse*(c)	*Regulated discharge*(d)
	ML	ML	ML	ML
Agriculture				
Dairy farming	—	—	—	na
Vegetables	—	—	—	na
Sugar	—	—	—	na
Fruit	—	—	—	na
Grapes	—	—	—	na
Cotton	—	—	—	na
Rice	—	—	—	na
Livestock, pasture, grains & other				
Livestock	—	—	—	na
Pasture(e)	—	—	—	na
Grains	—	—	—	na
Other	—	—	—	na
Total	—	—	—	na
Total	—	—	—	na
Services to agriculture; hunting & trapping	—	—	—	na
Forestry and fishing	—	—	—	na
Mining				
Coal mining	—	—	—	na
Oil & gas extraction	—	—	—	na
Metal ore mining	—	—	—	na
Other mining	—	—	—	na
Total	—	—	—	na
Manufacturing				
Food, beverage & tobacco	—	—	—	na
Textile, clothing, footwear & leather	—	—	—	na
Wood & paper products	—	—	—	na
Printing, publishing & recorded media	—	—	—	na
Petroleum, coal, chemical & associated product	—	—	—	na
Non-metallic mineral products	—	—	—	na
Metal products	—	—	—	na
Machinery & equipment	—	—	—	na
Other manufacturing	—	—	—	na
Total	—	—	—	na
Electricity & gas(f)	—	—	—	na
Water supply, sewerage & drainage services(g)	—	77 112	2 189	27 293
Other industries	—	—	—	na
Household	—	—	—	na
Environment	83 611	—	—	na
Total	**83 611**	**77 112**	**2 189**	**27 293**

— nil or rounded to zero (including null cells)
na not available
(a) Includes water extracted directly from the environment for use.
(b) Includes water supplied to a user usually through a non-natural network (piped/open channel or other carrier) where an economic transaction has occurred for the exchange of water regardless of method of delivery. Distributed water is a subset of the Self-extracted total.
(c) Refers to waste or drainage water that may have been treated to some extent and supplied for use.
(d) Refers to water discharged after use where that discharge does not match the natural flow regime of the receiving water body.
(e) Excludes pasture for Dairy farming.
(f) The majority of water used by this industry is 'in-stream' and is often used again downstream by other water users.
(g) Includes losses as well as water used by the Water supply, sewerage and drainage services industry.

2.17 WATER SUPPLY AND USE, Australian Capital Territory—2004–05 *continued*

USE

	Self-extracted(a)	*Distributed*(b)	*Reuse*(c)	*In-stream*(d)	*Consumption*(e)
	ML	ML	ML	ML	ML
Agriculture					
Dairy farming	—	—	—	—	—
Vegetables	1	—	—	—	1
Sugar	—	—	—	—	—
Fruit	21	—	—	—	21
Grapes	178	—	—	—	178
Cotton	—	—	—	—	—
Rice	—	—	—	—	—
Livestock, pasture, grains & other					
Livestock	367	—	—	—	367
Pasture(f)	—	—	—	—	—
Grains	—	—	—	—	—
Other	664	—	—	—	664
Total	1 031	—	—	—	1 031
Total	*1 231*	—	—	—	*1 231*
Services to agriculture; hunting & trapping	27	33	—	—	60
Forestry and fishing	64	—	—	—	64
Mining					
Coal mining	—	—	—	—	—
Oil & gas extraction	—	—	—	—	—
Metal ore mining	—	—	—	—	—
Other mining	118	—	—	—	118
Total	*118*	—	—	—	*118*
Manufacturing					
Food, beverage & tobacco	3	193	—	—	196
Textile, clothing, footwear & leather	—	39	—	—	39
Wood & paper products	9	104	—	—	113
Printing, publishing & recorded media	1	105	—	—	106
Petroleum, coal, chemical & associated product	—	17	—	—	17
Non-metallic mineral products	5	89	—	—	94
Metal products	—	25	—	—	25
Machinery & equipment	—	39	—	—	40
Other manufacturing	—	8	—	—	8
Total	*18*	*621*	—	—	*639*
Electricity & gas(g)	—	—	—	—	—
Water supply, sewerage & drainage services(h)	77 112	3 720	1 634	—	5 354
Other industries	5 040	11 549	555	—	17 144
Household	—	30 989	—	—	30 989
Environment	—	30 200	—	—	—
Total	**83 611**	**77 112**	**2 189**	—	**55 600**

— nil or rounded to zero (including null cells)

(a) Includes water extracted directly from the environment for use.

(b) Includes water supplied to a user usually through a non-natural network (piped/open channel or other carrier) where an economic transaction has occurred for the exchange of water regardless of method of delivery.

(c) Refers to waste or drainage water that may have been treated to some extent before being used. It excludes 'on-site' recycling.

(d) This is a subset of Self-extracted water use.

(e) Water consumption = Self-extracted use + Distributed water use + Reuse water use - Distributed water supplied to other users - In-stream water use - Distributed water used by the environment.

(f) Excludes pasture for Dairy farming.

(g) The majority of water used by this industry is 'in-stream' and is often used again downstream by other water users.

(h) Includes losses as well as water used by the Water supply, sewerage and drainage services industry.

2.18 WATER SUPPLY AND USE, Australia—2000–01

	SUPPLY			
	Self-extracted(a)	*Distributed*(b)	*Reuse*(c)	*Regulated discharge*(d)
	ML	ML	ML	ML
Agriculture				
Dairy farming	—	—	—	na
Vegetables	—	—	—	na
Sugar	—	—	—	na
Fruit	—	—	—	na
Grapes	—	—	—	na
Cotton	—	—	—	na
Rice	—	—	—	na
Livestock, pasture, grains & other	—	—	—	na
Total	—	—	—	na
Services to agriculture; hunting & trapping	—	—	—	na
Forestry & fishing	—	—	—	367 840
Mining				
Coal mining	—	2 247	—	42 735
Oil & gas extraction	—	—	—	21 580
Metal ore mining	—	3 973	—	97 520
Other mining	—	—	—	3 746
Total	—	*6 220*	—	*165 581*
Manufacturing				
Food, beverage & tobacco	—	—	—	27 318
Textile, clothing, footwear & leather	—	—	—	na
Wood & paper products	—	—	—	38 107
Printing, publishing & recorded media	—	—	—	na
Petroleum, coal, chemical & associated product	—	—	720	na
Non-metallic mineral products	—	—	—	na
Metal products	—	—	—	na
Machinery & equipment	—	—	—	na
Other manufacturing	—	—	—	na
Total	—	—	*720*	*65 425*
Electricity & gas(e)	—	12 682	4 506	54 578 294
Water supply, sewerage & drainage services(f)	—	12 915 404	501 697	1 837 171
Other industries	—	—	—	na
Household	—	—	—	na
Environment	76 668 348	—	—	na
Total	**76 668 348**	**12 934 306**	**506 923**	**57 014 311**

— nil or rounded to zero (including null cells)
na not available
(a) Includes water extracted directly from the environment for use.
(b) Includes water supplied to a user usually through a non-natural network (piped/open channel or other carrier) where an economic transaction has occurred for the exchange of water regardless of method of delivery. Distributed water is a subset of the Self-extracted total.
(c) Refers to waste or drainage water that may have been treated to some extent and supplied for use.
(d) Refers to water discharged after use where that discharge does not match the natural flow regime of the receiving water body.
(e) The majority of water used by this industry is 'in-stream' and is often used again downstream by other water users.
(f) Includes losses as well as water used by the Water supply, sewerage and drainage services industry.

2.18 WATER SUPPLY AND USE, Australia—2000–01 *continued*

USE

	Self-extracted(a)	*Distributed*(b)	*Reuse*(c)	*In-stream*(d)	*Consumption*(e)
	ML	ML	ML	ML	ML
Agriculture					
Dairy farming	967 849	1 573 066	51 855	—	2 592 769
Vegetables	352 515	137 394	16 670	—	506 579
Sugar	506 489	726 155	1 875	—	1 234 519
Fruit	255 037	375 382	14 824	—	645 244
Grapes	269 272	366 932	19 576	—	655 780
Cotton	2 555 857	337 878	2 085	—	2 895 821
Rice	405 626	1 692 674	124 501	—	2 222 801
Livestock, pasture, grains & other	2 219 760	1 823 656	191 880	—	4 235 296
Total	*7 532 405*	*7 033 139*	*423 265*	—	*14 988 809*
Services to agriculture; hunting & trapping	2 014	2 127	57	—	4 200
Forestry & fishing	374 654	26 181	7 144	367 840	40 138
Mining					
Coal mining	104 787	24 254	2 655	30 329	99 119
Oil & gas extraction	29 204	1 688	—	21 413	9 479
Metal ore mining	207 010	23 384	2 754	56 410	172 766
Other mining	42 865	13 868	—	17 248	39 485
Total	*383 866*	*63 194*	*5 409*	*125 400*	*320 848*
Manufacturing					
Food, beverage & tobacco	65 492	135 436	972	—	201 900
Textile, clothing, footwear & leather	1 312	11 203	559	—	13 074
Wood & paper products	60 720	43 684	575	—	104 979
Printing, publishing & recorded media	60	5 279	—	—	5 339
Petroleum, coal, chemical & associated product	10 597	47 675	4 901	—	63 174
Non-metallic mineral products	5 162	11 548	233	—	16 943
Metal products	71 804	56 885	—	—	128 689
Machinery & equipment	66	13 455	234	—	13 754
Other manufacturing	4	1 031	—	—	1 034
Total	*215 216*	*326 197*	*7 474*	—	*548 887*
Electricity & gas(f)	54 677 163	105 478	4 802	54 519 736	255 024
Water supply, sewerage & drainage services(g)	12 915 404	2 142 137	23 057	—	2 165 194
Other industries	346 076	720 005	35 546	—	1 101 627
Household	221 550	2 056 455	167	—	2 278 173
Environment	—	459 393	—	—	—
Total	**76 668 348**	**12 934 306**	**506 921**	**55 012 976**	**21 702 899**

— nil or rounded to zero (including null cells)

(a) Includes water extracted directly from the environment for use.

(b) Includes water supplied to a user usually through a non-natural network (piped/open channel or other carrier) where an economic transaction has occurred for the exchange of water regardless of method of delivery.

(c) Refers to waste or drainage water that may have been treated to some extent before being used. It excludes 'on-site' recycling.

(d) This is a subset of Self-extracted water use.

(e) Water consumption = Self-extracted use + Distributed water use + Reuse water use - Distributed water supplied to other users - In-stream water use - Distributed water used by the environment.

(f) The majority of water used by this industry is 'in-stream' and is often used again downstream by other water users.

(g) Includes losses as well as water used by the Water supply, sewerage and drainage services industry.

2.19 WATER SUPPLY AND USE, New South Wales and Australian Capital Territory—2000–01

	SUPPLY			
	Self-extracted(a)	*Distributed*(b)	*Reuse*(c)	*Regulated discharge*(d)
	ML	ML	ML	ML
Agriculture				
Dairy farming	—	—	—	na
Vegetables	—	—	—	na
Sugar	—	—	—	na
Fruit	—	—	—	na
Grapes	—	—	—	na
Cotton	—	—	—	na
Rice	—	—	—	na
Livestock, pasture, grains & other	—	—	—	na
Total	—	—	—	na
Services to agriculture; hunting & trapping	—	—	—	na
Forestry & fishing	—	—	—	448
Mining				
Coal mining	—	—	—	31 623
Oil & gas extraction	—	—	—	na
Metal ore mining	—	—	—	na
Other mining	—	—	—	374
Total	—	—	—	*31 997*
Manufacturing				
Food, beverage & tobacco	—	—	—	27 318
Textile, clothing, footwear & leather	—	—	—	na
Wood & paper products	—	—	—	2 022
Printing, publishing & recorded media	—	—	—	na
Petroleum, coal, chemical & associated product	—	—	—	na
Non-metallic mineral products	—	—	—	na
Metal products	—	—	—	na
Machinery & equipment	—	—	—	na
Other manufacturing	—	—	—	na
Total	—	—	—	*29 340*
Electricity & gas(e)	—	8 987	—	7 969 199
Water supply, sewerage & drainage services(f)	—	4 823 032	266 964	820 876
Other industries	—	—	—	na
Household	—	—	—	na
Environment	16 704 779	—	—	na
Total	**16 704 779**	**4 832 019**	**266 964**	**8 851 860**

— nil or rounded to zero (including null cells)
na not available
(a) Includes water extracted directly from the environment for use.
(b) Includes water supplied to a user usually through a non-natural network (piped/open channel or other carrier) where an economic transaction has occurred for the exchange of water regardless of method of delivery. Distributed water is a subset of the Self-extracted total.
(c) Refers to waste or drainage water that may have been treated to some extent and supplied for use.
(d) Refers to water discharged after use where that discharge does not match the natural flow regime of the receiving water body.
(e) The majority of water used by this industry is 'in-stream' and is often used again downstream by other water users.
(f) Includes losses as well as water used by the Water supply, sewerage and drainage services industry.

2.19 WATER SUPPLY AND USE, New South Wales and Australian Capital Territory—2000–01 *continued*

USE

	Self-extracted(a)	*Distributed*(b)	*Reuse*(c)	*In-stream*(d)	*Consumption*(e)
	ML	ML	ML	ML	ML
Agriculture					
Dairy farming	250 325	36 002	636	—	286 963
Vegetables	54 974	20 627	3 972	—	79 574
Sugar	594	80	18	—	692
Fruit	88 299	46 852	10 525	—	145 676
Grapes	101 147	50 369	11 324	—	162 839
Cotton	1 966 469	83 992	876	—	2 051 336
Rice	379 978	1 692 674	124 501	—	2 197 153
Livestock, pasture, grains & other	822 802	959 091	88 541	—	1 870 434
Total	*3 664 587*	*2 889 687*	*240 393*	—	*6 794 668*
Services to agriculture; hunting & trapping	586	1 042	52	—	1 680
Forestry & fishing	448	232	2 517	448	2 749
Mining					
Coal mining	50 450	1 209	2 651	21 297	33 013
Oil & gas extraction	—	—	—	—	—
Metal ore mining	11 698	4 724	2 754	—	19 177
Other mining	8 178	1 355	—	374	9 159
Total	*70 327*	*7 288*	*5 405*	*21 671*	*61 349*
Manufacturing					
Food, beverage & tobacco	7 294	34 961	—	—	42 255
Textile, clothing, footwear & leather	233	3 100	—	—	3 333
Wood & paper products	11 309	5 690	10	—	17 009
Printing, publishing & recorded media	28	2 279	—	—	2 306
Petroleum, coal, chemical & associated product	266	19 189	—	—	19 456
Non-metallic mineral products	147	2 951	—	—	3 098
Metal products	350	21 690	—	—	22 040
Machinery & equipment	36	3 541	—	—	3 577
Other manufacturing	2	322	—	—	324
Total	*19 664*	*93 724*	*10*	—	*113 398*
Electricity & gas(f)	8 023 412	9 550	1 210	7 965 765	59 420
Water supply, sewerage & drainage services(g)	4 823 032	740 876	9 689	—	750 565
Other industries	66 173	251 337	7 522	—	325 031
Household	36 550	637 754	167	—	674 471
Environment	—	200 528	—	—	—
Total	**16 704 779**	**4 832 019**	**266 964**	**7 987 884**	**8 783 331**

— nil or rounded to zero (including null cells)

(a) Includes water extracted directly from the environment for use.

(b) Includes water supplied to a user usually through a non-natural network (piped/open channel or other carrier) where an economic transaction has occurred for the exchange of water regardless of method of delivery.

(c) Refers to waste or drainage water that may have been treated to some extent before being used. It excludes 'on-site' recycling.

(d) This is a subset of Self-extracted water use.

(e) Water consumption = Self-extracted use + Distributed water use + Reuse water use - Distributed water supplied to other users - In-stream water use - Distributed water used by the environment.

(f) The majority of water used by this industry is 'in-stream' and is often used again downstream by other water users.

(g) Includes losses as well as water used by the Water supply, sewerage and drainage services industry.

2.20 WATER SUPPLY AND USE, Victoria—2000–01

	SUPPLY			
	Self-extracted(a)	*Distributed*(b)	*Reuse*(c)	*Regulated discharge*(d)
	ML	ML	ML	ML
Agriculture				
Dairy farming	—	—	—	na
Vegetables	—	—	—	na
Sugar	—	—	—	na
Fruit	—	—	—	na
Grapes	—	—	—	na
Cotton	—	—	—	na
Rice	—	—	—	na
Livestock, pasture, grains & other	—	—	—	na
Total	—	—	—	na
Services to agriculture; hunting & trapping	—	—	—	na
Forestry & fishing	—	—	—	717
Mining				
Coal mining	—	—	—	3 100
Oil & gas extraction	—	—	—	19
Metal ore mining	—	—	—	na
Other mining	—	—	—	153
Total	—	—	—	*3 272*
Manufacturing				
Food, beverage & tobacco	—	—	—	na
Textile, clothing, footwear & leather	—	—	—	na
Wood & paper products	—	—	—	4 618
Printing, publishing & recorded media	—	—	—	na
Petroleum, coal, chemical & associated product	—	—	—	na
Non-metallic mineral products	—	—	—	na
Metal products	—	—	—	na
Machinery & equipment	—	—	—	na
Other manufacturing	—	—	—	na
Total	—	—	—	*4 618*
Electricity & gas(e)	—	136	2 745	6 045 447
Water supply, sewerage & drainage services(f)	—	4 268 289	183 967	428 624
Other industries	—	—	—	na
Household	—	—	—	na
Environment	11 448 221	—	—	na
Total	**11 448 221**	**4 268 425**	**186 712**	**6 482 678**

— nil or rounded to zero (including null cells)
na not available
(a) Includes water extracted directly from the environment for use.
(b) Includes water supplied to a user usually through a non-natural network (piped/open channel or other carrier) where an economic transaction has occurred for the exchange of water regardless of method of delivery. Distributed water is a subset of the Self-extracted total.
(c) Refers to waste or drainage water that may have been treated to some extent and supplied for use.
(d) Refers to water discharged after use where that discharge does not match the natural flow regime of the receiving water body.
(e) The majority of water used by this industry is 'in-stream' and is often used again downstream by other water users.
(f) Includes losses as well as water used by the Water supply, sewerage and drainage services industry.

2.20 WATER SUPPLY AND USE, Victoria—2000–01 *continued*

USE

	Self-extracted(a)	*Distributed*(b)	*Reuse*(c)	*In-stream*(d)	*Consumption*(e)
	ML	ML	ML	ML	ML
Agriculture					
Dairy farming	424 292	1 452 464	51 219	—	1 927 975
Vegetables	26 142	67 678	2 326	—	96 145
Sugar	—	—	—	—	—
Fruit	12 141	174 778	3 216	—	190 134
Grapes	93 108	187 503	6 495	—	287 106
Cotton	—	—	—	—	—
Rice	25 648	—	—	—	25 648
Livestock, pasture, grains & other	296 866	654 574	101 938	—	1 053 378
Total	*878 196*	*2 536 996*	*165 193*	—	*3 580 385*
Services to agriculture; hunting & trapping	104	116	5	—	225
Forestry & fishing	4 407	688	1 355	717	5 733
Mining					
Coal mining	25 050	207	4	3 100	22 162
Oil & gas extraction	782	1 328	—	—	2 111
Metal ore mining	2 873	1 153	—	—	4 026
Other mining	1 912	1 931	—	121	3 722
Total	*30 618*	*4 620*	*4*	*3 221*	*32 020*
Manufacturing					
Food, beverage & tobacco	522	34 315	135	—	34 971
Textile, clothing, footwear & leather	354	5 764	27	—	6 145
Wood & paper products	1 087	29 338	565	—	30 990
Printing, publishing & recorded media	5	1 500	—	—	1 505
Petroleum, coal, chemical & associated product	426	15 491	355	—	16 271
Non-metallic mineral products	68	2 867	—	—	2 935
Metal products	614	5 657	—	—	6 272
Machinery & equipment	7	4 399	—	—	4 406
Other manufacturing	1	338	—	—	338
Total	*3 083*	*99 669*	*1 082*	—	*103 834*
Electricity & gas(f)	6 087 306	20 687	2 766	6 002 811	107 812
Water supply, sewerage & drainage services(g)	4 268 289	778 759	8 211	—	786 970
Other industries	159 415	126 262	8 096	—	293 772
Household	18 522	445 739	—	—	464 260
Environment	—	253 172	—	—	—
Total	**11 448 221**	**4 268 425**	**186 712**	**6 006 749**	**5 375 012**

— nil or rounded to zero (including null cells)

(a) Includes water extracted directly from the environment for use.

(b) Includes water supplied to a user usually through a non-natural network (piped/open channel or other carrier) where an economic transaction has occurred for the exchange of water regardless of method of delivery.

(c) Refers to waste or drainage water that may have been treated to some extent before being used. It excludes 'on-site' recycling.

(d) This is a subset of Self-extracted water use.

(e) Water consumption = Self-extracted use + Distributed water use + Reuse water use - Distributed water supplied to other users - In-stream water use - Distributed water used by the environment.

(f) The majority of water used by this industry is 'in-stream' and is often used again downstream by other water users.

(g) Includes losses as well as water used by the Water supply, sewerage and drainage services industry.

2.21 WATER SUPPLY AND USE, Queensland—2000–01

	SUPPLY			
	Self-extracted(a)	*Distributed*(b)	*Reuse*(c)	*Regulated discharge*(d)
	ML	ML	ML	ML
Agriculture				
Dairy farming	—	—	—	na
Vegetables	—	—	—	na
Sugar	—	—	—	na
Fruit	—	—	—	na
Grapes	—	—	—	na
Cotton	—	—	—	na
Rice	—	—	—	na
Livestock, pasture, grains & other	—	—	—	na
Total	—	—	—	na
Services to agriculture; hunting & trapping	—	—	—	na
Forestry & fishing	—	—	—	2 261
Mining				
Coal mining	—	2 247	—	6 350
Oil & gas extraction	—	—	—	8 256
Metal ore mining	—	—	—	28 249
Other mining	—	—	—	1 016
Total	—	*2 247*	—	*43 871*
Manufacturing				
Food, beverage & tobacco	—	—	—	na
Textile, clothing, footwear & leather	—	—	—	na
Wood & paper products	—	—	—	23 114
Printing, publishing & recorded media	—	—	—	na
Petroleum, coal, chemical & associated product	—	—	—	na
Non-metallic mineral products	—	—	—	na
Metal products	—	—	—	na
Machinery & equipment	—	—	—	na
Other manufacturing	—	—	—	na
Total	—	—	—	*23 114*
Electricity & gas(e)	—	3 194	—	1 459 362
Water supply, sewerage & drainage services(f)	—	2 372 496	23 818	309 029
Other industries	—	—	—	na
Household	—	—	—	na
Environment	5 739 474	—	—	na
Total	**5 739 474**	**2 377 937**	**23 818**	**1 837 637**

— nil or rounded to zero (including null cells)
na not available
(a) Includes water extracted directly from the environment for use.
(b) Includes water supplied to a user usually through a non-natural network (piped/open channel or other carrier) where an economic transaction has occurred for the exchange of water regardless of method of delivery. Distributed water is a subset of the Self-extracted total.
(c) Refers to waste or drainage water that may have been treated to some extent and supplied for use.
(d) Refers to water discharged after use where that discharge does not match the natural flow regime of the receiving water body.
(e) The majority of water used by this industry is 'in-stream' and is often used again downstream by other water users.
(f) Includes losses as well as water used by the Water supply, sewerage and drainage services industry.

2.21 WATER SUPPLY AND USE, Queensland—2000–01 *continued*

USE

	Self-extracted(a)	*Distributed*(b)	*Reuse*(c)	*In-stream*(d)	*Consumption*(e)
	ML	ML	ML	ML	ML
Agriculture					
Dairy farming	97 083	24 882	—	—	121 965
Vegetables	72 535	28 238	—	—	100 773
Sugar	505 895	602 501	1 757	—	1 110 153
Fruit	63 788	52 427	1 083	—	117 298
Grapes	3 387	1 575	—	—	4 962
Cotton	587 419	253 887	1 209	—	842 515
Rice	—	—	—	—	—
Livestock, pasture, grains & other	411 621	143 042	751	—	555 414
Total	*1 741 728*	*1 106 552*	*4 800*	—	*2 853 080*
Services to agriculture; hunting & trapping	163	722	—	—	885
Forestry & fishing	2 261	2 312	28	2 261	2 340
Mining					
Coal mining	16 336	21 929	—	5 932	30 087
Oil & gas extraction	9 114	—	—	8 256	858
Metal ore mining	46 488	8 286	—	27 234	27 541
Other mining	6 011	2 841	—	690	8 162
Total	*77 950*	*33 056*	—	*42 112*	*66 647*
Manufacturing					
Food, beverage & tobacco	52 315	29 569	837	—	82 720
Textile, clothing, footwear & leather	206	988	532	—	1 726
Wood & paper products	643	5 550	—	—	6 193
Printing, publishing & recorded media	22	835	—	—	857
Petroleum, coal, chemical & associated product	4 017	10 067	3 369	—	17 453
Non-metallic mineral products	120	2 891	—	—	3 011
Metal products	11 827	16 897	—	—	28 724
Machinery & equipment	8	2 175	—	—	2 183
Other manufacturing	1	187	—	—	188
Total	*69 159*	*69 159*	*4 738*	—	*143 056*
Electricity & gas(f)	1 448 997	72 601	106	1 447 605	70 905
Water supply, sewerage & drainage services(g)	2 372 496	412 722	3 367	—	416 089
Other industries	3 736	180 601	10 778	—	195 116
Household	22 985	495 749	—	—	518 734
Environment	—	4 462	—	—	—
Total	**5 739 474**	**2 377 937**	**23 817**	**1 491 978**	**4 266 851**

— nil or rounded to zero (including null cells)

(a) Includes water extracted directly from the environment for use.

(b) Includes water supplied to a user usually through a non-natural network (piped/open channel or other carrier) where an economic transaction has occurred for the exchange of water regardless of method of delivery.

(c) Refers to waste or drainage water that may have been treated to some extent before being used. It excludes 'on-site' recycling.

(d) This is a subset of Self-extracted water use.

(e) Water consumption = Self-extracted use + Distributed water use + Reuse water use - Distributed water supplied to other users - In-stream water use - Distributed water used by the environment.

(f) The majority of water used by this industry is 'in-stream' and is often used again downstream by other water users.

(g) Includes losses as well as water used by the Water supply, sewerage and drainage services industry.

2.22 WATER SUPPLY AND USE, South Australia—2000–01

	SUPPLY			
	Self-extracted(a)	*Distributed*(b)	*Reuse*(c)	*Regulated discharge*(d)
	ML	ML	ML	ML
Agriculture				
Dairy farming	—	—	—	na
Vegetables	—	—	—	na
Sugar	—	—	—	na
Fruit	—	—	—	na
Grapes	—	—	—	na
Cotton	—	—	—	na
Rice	—	—	—	na
Livestock, pasture, grains & other	—	—	—	na
Total	—	—	—	na
Services to agriculture; hunting & trapping	—	—	—	na
Forestry & fishing	—	—	—	1 004
Mining				
Coal mining	—	—	—	na
Oil & gas extraction	—	—	—	13 144
Metal ore mining	—	—	—	na
Other mining	—	—	—	4
Total	—	—	—	*13 148*
Manufacturing				
Food, beverage & tobacco	—	—	—	na
Textile, clothing, footwear & leather	—	—	—	na
Wood & paper products	—	—	—	na
Printing, publishing & recorded media	—	—	—	na
Petroleum, coal, chemical & associated product	—	—	720	na
Non-metallic mineral products	—	—	—	na
Metal products	—	—	—	na
Machinery & equipment	—	—	—	na
Other manufacturing	—	—	—	na
Total	—	—	*720*	na
Electricity & gas(e)	—	362	1 177	301
Water supply, sewerage & drainage services(f)	—	516 766	15 675	84 006
Other industries	—	—	—	na
Household	—	—	—	na
Environment	1 380 165	—	—	na
Total	**1 380 165**	**517 128**	**17 572**	**98 459**

— nil or rounded to zero (including null cells)

na not available

(a) Includes water extracted directly from the environment for use.

(b) Includes water supplied to a user usually through a non-natural network (piped/open channel or other carrier) where an economic transaction has occurred for the exchange of water regardless of method of delivery. Distributed water is a subset of the Self-extracted total.

(c) Refers to waste or drainage water that may have been treated to some extent and supplied for use.

(d) Refers to water discharged after use where that discharge does not match the natural flow regime of the receiving water body.

(e) The majority of water used by this industry is 'in-stream' and is often used again downstream by other water users.

(f) Includes losses as well as water used by the Water supply, sewerage and drainage services industry.

2.22 WATER SUPPLY AND USE, South Australia—2000–01 *continued*

USE

	Self-extracted(a)	*Distributed*(b)	*Reuse*(c)	*In-stream*(d)	*Consumption*(e)
	ML	ML	ML	ML	ML
Agriculture					
Dairy farming	121 762	—	—	—	121 762
Vegetables	100 307	9 229	10 372	—	119 908
Sugar	—	—	—	—	—
Fruit	56 335	78 245	—	—	134 579
Grapes	59 734	126 542	1 701	—	187 977
Cotton	—	—	—	—	—
Rice	—	—	—	—	—
Livestock, pasture, grains & other	452 163	7 129	—	—	459 292
Total	*790 301*	*221 145*	*12 073*	—	*1 023 518*
Services to agriculture; hunting & trapping	227	73	—	—	300
Forestry & fishing	1 004	484	44	1 004	528
Mining					
Coal mining	371	19	—	—	390
Oil & gas extraction	14 171	1	—	13 144	1 028
Metal ore mining	10 933	183	—	—	11 116
Other mining	3 555	516	—	—	4 070
Total	*29 030*	*719*	—	*13 144*	*16 605*
Manufacturing					
Food, beverage & tobacco	1 639	12 948	—	—	14 587
Textile, clothing, footwear & leather	416	629	—	—	1 045
Wood & paper products	238	1 053	—	—	1 291
Printing, publishing & recorded media	1	234	—	—	236
Petroleum, coal, chemical & associated product	18	1 093	1 177	—	2 288
Non-metallic mineral products	37	1 014	—	—	1 052
Metal products	25 891	5 671	—	—	31 562
Machinery & equipment	4	2 338	—	—	2 342
Other manufacturing	—	66	—	—	66
Total	*28 245*	*25 048*	*1 177*	—	*54 470*
Electricity & gas(f)	603	813	720	—	1 774
Water supply, sewerage & drainage services(g)	516 766	67 897	938	—	68 835
Other industries	7 020	40 862	2 619	—	50 500
Household	6 969	159 215	—	—	166 184
Environment	—	873	—	—	—
Total	**1 380 165**	**517 128**	**17 571**	**14 148**	**1 382 715**

— nil or rounded to zero (including null cells)

(a) Includes water extracted directly from the environment for use.

(b) Includes water supplied to a user usually through a non-natural network (piped/open channel or other carrier) where an economic transaction has occurred for the exchange of water regardless of method of delivery.

(c) Refers to waste or drainage water that may have been treated to some extent before being used. It excludes 'on-site' recycling.

(d) This is a subset of Self-extracted water use.

(e) Water consumption = Self-extracted use + Distributed water use + Reuse water use - Distributed water supplied to other users - In-stream water use - Distributed water used by the environment.

(f) The majority of water used by this industry is 'in-stream' and is often used again downstream by other water users.

(g) Includes losses as well as water used by the Water supply, sewerage and drainage services industry.

2.23 WATER SUPPLY AND USE, Western Australia—2000–01

	SUPPLY			
	Self-extracted(a)	*Distributed*(b)	*Reuse*(c)	*Regulated discharge*(d)
	ML	ML	ML	ML
Agriculture				
Dairy farming	—	—	—	na
Vegetables	—	—	—	na
Sugar	—	—	—	na
Fruit	—	—	—	na
Grapes	—	—	—	na
Cotton	—	—	—	na
Rice	—	—	—	na
Livestock, pasture, grains & other	—	—	—	na
Total	—	—	—	na
Services to agriculture; hunting & trapping	—	—	—	na
Forestry & fishing	—	—	—	6 507
Mining				
Coal mining	—	—	—	1 662
Oil & gas extraction	—	—	—	161
Metal ore mining	—	2 144	—	54 667
Other mining	—	—	—	2 149
Total	—	*2 144*	—	*58 639*
Manufacturing				
Food, beverage & tobacco	—	—	—	na
Textile, clothing, footwear & leather	—	—	—	na
Wood & paper products	—	—	—	na
Printing, publishing & recorded media	—	—	—	na
Petroleum, coal, chemical & associated product	—	—	—	na
Non-metallic mineral products	—	—	—	na
Metal products	—	—	—	na
Machinery & equipment	—	—	—	na
Other manufacturing	—	—	—	na
Total	—	—	—	na
Electricity & gas(e)	—	3	584	1 699 485
Water supply, sewerage & drainage services(f)	—	762 757	8 568	138 474
Other industries	—	—	—	na
Household	—	—	—	na
Environment	3 089 153	—	—	na
Total	**3 089 153**	**764 904**	**9 152**	**1 903 105**

— nil or rounded to zero (including null cells)

na not available

(a) Includes water extracted directly from the environment for use.

(b) Includes water supplied to a user usually through a non-natural network (piped/open channel or other carrier) where an economic transaction has occurred for the exchange of water regardless of method of delivery. Distributed water is a subset of the Self-extracted total.

(c) Refers to waste or drainage water that may have been treated to some extent and supplied for use.

(d) Refers to water discharged after use where that discharge does not match the natural flow regime of the receiving water body.

(e) The majority of water used by this industry is 'in-stream' and is often used again downstream by other water users.

(f) Includes losses as well as water used by the Water supply, sewerage and drainage services industry.

2.23 WATER SUPPLY AND USE, Western Australia—2000–01 *continued*

USE

	Self-extracted(a)	*Distributed*(b)	*Reuse*(c)	*In-stream*(d)	*Consumption*(e)
	ML	ML	ML	ML	ML
Agriculture					
Dairy farming	3 176	56 943	—	—	60 119
Vegetables	49 386	8 233	—	—	57 619
Sugar	—	123 574	100	—	123 674
Fruit	16 316	22 789	—	—	39 105
Grapes	9 389	769	56	—	10 214
Cotton	1 969	—	—	—	1 969
Rice	—	—	—	—	—
Livestock, pasture, grains & other	127 792	52 103	—	—	179 895
Total	*208 028*	*264 412*	*156*	—	*472 596*
Services to agriculture; hunting & trapping	712	53	—	—	765
Forestry & fishing	9 389	19 793	2 959	6 507	25 634
Mining					
Coal mining	12 198	886	—	—	13 084
Oil & gas extraction	5 103	357	—	—	5 461
Metal ore mining	101 873	6 057	—	23 849	81 937
Other mining	22 086	7 130	—	16 013	13 203
Total	*141 260*	*14 431*	—	*39 862*	*113 685*
Manufacturing					
Food, beverage & tobacco	735	15 748	—	—	16 482
Textile, clothing, footwear & leather	2	549	—	—	552
Wood & paper products	560	1 451	—	—	2 011
Printing, publishing & recorded media	4	337	—	—	340
Petroleum, coal, chemical & associated product	5 868	1 577	—	—	7 445
Non-metallic mineral products	4 781	1 160	233	—	6 174
Metal products	25 713	2 311	—	—	28 024
Machinery & equipment	6	714	234	—	954
Other manufacturing	—	107	—	—	108
Total	*37 670*	*23 955*	*467*	—	*62 091*
Electricity & gas(f)	1 711 684	1 791	—	1 699 055	14 417
Water supply, sewerage & drainage services(g)	762 757	116 318	—	—	116 318
Other industries	94 899	83 510	5 570	—	183 979
Household	122 753	240 642	—	—	363 395
Environment	—	—	—	—	—
Total	**3 089 153**	**764 904**	**9 152**	**1 745 424**	**1 352 881**

— nil or rounded to zero (including null cells)

(a) Includes water extracted directly from the environment for use.

(b) Includes water supplied to a user usually through a non-natural network (piped/open channel or other carrier) where an economic transaction has occurred for the exchange of water regardless of method of delivery.

(c) Refers to waste or drainage water that may have been treated to some extent before being used. It excludes 'on-site' recycling.

(d) This is a subset of Self-extracted water use.

(e) Water consumption = Self-extracted use + Distributed water use + Reuse water use - Distributed water supplied to other users - In-stream water use - Distributed water used by the environment.

(f) The majority of water used by this industry is 'in-stream' and is often used again downstream by other water users.

(g) Includes losses as well as water used by the Water supply, sewerage and drainage services industry.

2.24 WATER SUPPLY AND USE, Tasmania—2000–01

	SUPPLY			
	Self-extracted(a)	*Distributed*(b)	*Reuse*(c)	*Regulated discharge*(d)
	ML	ML	ML	ML
Agriculture				
Dairy farming	—	—	—	na
Vegetables	—	—	—	na
Sugar	—	—	—	na
Fruit	—	—	—	na
Grapes	—	—	—	na
Cotton	—	—	—	na
Rice	—	—	—	na
Livestock, pasture, grains & other	—	—	—	na
Total	—	—	—	na
Services to agriculture; hunting & trapping	—	—	—	na
Forestry & fishing	—	—	—	352 554
Mining				
Coal mining	—	—	—	na
Oil & gas extraction	—	—	—	na
Metal ore mining	—	—	—	10 517
Other mining	—	—	—	50
Total	—	—	—	*10 567*
Manufacturing				
Food, beverage & tobacco	—	—	—	na
Textile, clothing, footwear & leather	—	—	—	na
Wood & paper products	—	—	—	8 353
Printing, publishing & recorded media	—	—	—	na
Petroleum, coal, chemical & associated product	—	—	—	na
Non-metallic mineral products	—	—	—	na
Metal products	—	—	—	na
Machinery & equipment	—	—	—	na
Other manufacturing	—	—	—	na
Total	—	—	—	*8 353*
Electricity & gas(e)	—	—	—	37 404 500
Water supply, sewerage & drainage services(f)	—	118 542	1 551	37 564
Other industries	—	—	—	na
Household	—	—	—	na
Environment	38 169 476	—	—	na
Total	**38 169 476**	**118 542**	**1 551**	**37 813 538**

— nil or rounded to zero (including null cells)
na not available
(a) Includes water extracted directly from the environment for use.
(b) Includes water supplied to a user usually through a non-natural network (piped/open channel or other carrier) where an economic transaction has occurred for the exchange of water regardless of method of delivery. Distributed water is a subset of the Self-extracted total.
(c) Refers to waste or drainage water that may have been treated to some extent and supplied for use.
(d) Refers to water discharged after use where that discharge does not match the natural flow regime of the receiving water body.
(e) The majority of water used by this industry is 'in-stream' and is often used again downstream by other water users.
(f) Includes losses as well as water used by the Water supply, sewerage and drainage services industry.

2.24 WATER SUPPLY AND USE, Tasmania—2000–01 *continued*

	USE				
	Self-extracted(a)	*Distributed*(b)	*Reuse*(c)	*In-stream*(d)	*Consumption*(e)
	ML	ML	ML	ML	ML
Agriculture					
Dairy farming	71 184	2 775	—	—	73 959
Vegetables	48 704	3 388	—	—	52 092
Sugar	—	—	—	—	—
Fruit	8 486	291	—	—	8 777
Grapes	542	175	—	—	717
Cotton	—	—	—	—	—
Rice	—	—	—	—	—
Livestock, pasture, grains & other	82 202	7 717	650	—	90 569
Total	*211 118*	*14 347*	*650*	—	*226 115*
Services to agriculture; hunting & trapping	222	78	—	—	300
Forestry & fishing	352 554	2 671	—	352 554	2 671
Mining					
Coal mining	380	3	—	—	383
Oil & gas extraction	—	—	—	—	—
Metal ore mining	20 199	8	—	5 327	14 880
Other mining	891	14	—	50	855
Total	*21 469*	*26*	—	*5 377*	*16 118*
Manufacturing					
Food, beverage & tobacco	2 985	7 605	—	—	10 590
Textile, clothing, footwear & leather	101	157	—	—	258
Wood & paper products	46 882	602	—	—	47 485
Printing, publishing & recorded media	—	67	—	—	67
Petroleum, coal, chemical & associated product	2	252	—	—	254
Non-metallic mineral products	8	588	—	—	596
Metal products	1	4 583	—	—	4 584
Machinery & equipment	1	233	—	—	234
Other manufacturing	—	9	—	—	9
Total	*49 980*	*14 097*	—	—	*64 077*
Electricity & gas(f)	37 404 500	36	—	37 404 500	36
Water supply, sewerage & drainage services(g)	118 542	16 534	758	—	17 292
Other industries	5 129	17 180	143	—	22 452
Household	5 963	53 216	—	—	59 179
Environment	—	358	—	—	—
Total	**38 169 476**	**118 542**	**1 551**	**37 762 431**	**408 238**

— nil or rounded to zero (including null cells)

(a) Includes water extracted directly from the environment for use.

(b) Includes water supplied to a user usually through a non-natural network (piped/open channel or other carrier) where an economic transaction has occurred for the exchange of water regardless of method of delivery.

(c) Refers to waste or drainage water that may have been treated to some extent before being used. It excludes 'on-site' recycling.

(d) This is a subset of Self-extracted water use.

(e) Water consumption = Self-extracted use + Distributed water use + Reuse water use - Distributed water supplied to other users - In-stream water use - Distributed water used by the environment.

(f) The majority of water used by this industry is 'in-stream' and is often used again downstream by other water users.

(g) Includes losses as well as water used by the Water supply, sewerage and drainage services industry.

2.25 WATER SUPPLY AND USE, Northern Territory—2000–01

	SUPPLY			
	Self-extracted(a)	*Distributed*(b)	*Reuse*(c)	*Regulated discharge*(d)
	ML	ML	ML	ML
Agriculture				
Dairy farming	—	—	—	na
Vegetables	—	—	—	na
Sugar	—	—	—	na
Fruit	—	—	—	na
Grapes	—	—	—	na
Cotton	—	—	—	na
Rice	—	—	—	na
Livestock, pasture, grains & other	—	—	—	na
Total	—	—	—	na
Services to agriculture; hunting & trapping	—	—	—	na
Forestry & fishing	—	—	—	4 349
Mining				
Coal mining	—	—	—	na
Oil & gas extraction	—	—	—	na
Metal ore mining	—	1 829	—	4 087
Other mining	—	—	—	na
Total	—	*1 829*	—	*4 087*
Manufacturing				
Food, beverage & tobacco	—	—	—	na
Textile, clothing, footwear & leather	—	—	—	na
Wood & paper products	—	—	—	na
Printing, publishing & recorded media	—	—	—	na
Petroleum, coal, chemical & associated product	—	—	—	na
Non-metallic mineral products	—	—	—	na
Metal products	—	—	—	na
Machinery & equipment	—	—	—	na
Other manufacturing	—	—	—	na
Total	—	—	—	na
Electricity & gas(e)	—	—	—	na
Water supply, sewerage & drainage services(f)	—	53 522	1 154	18 598
Other industries	—	—	—	na
Household	—	—	—	na
Environment	137 080	—	—	na
Total	**137 080**	**55 351**	**1 154**	**27 034**

— nil or rounded to zero (including null cells)
na not available
(a) Includes water extracted directly from the environment for use.
(b) Includes water supplied to a user usually through a non-natural network (piped/open channel or other carrier) where an economic transaction has occurred for the exchange of water regardless of method of delivery. Distributed water is a subset of the Self-extracted total.
(c) Refers to waste or drainage water that may have been treated to some extent and supplied for use.
(d) Refers to water discharged after use where that discharge does not match the natural flow regime of the receiving water body.
(e) The majority of water used by this industry is 'in-stream' and is often used again downstream by other water users.
(f) Includes losses as well as water used by the Water supply, sewerage and drainage services industry.

2.25 WATER SUPPLY AND USE, Northern Territory—2000–01 *continued*

USE

	Self-extracted(a)	*Distributed*(b)	*Reuse*(c)	*In-stream*(d)	*Consumption*(e)
	ML	ML	ML	ML	ML
Agriculture					
Dairy farming	27	—	—	—	27
Vegetables	468	—	—	—	468
Sugar	—	—	—	—	—
Fruit	9 674	—	—	—	9 674
Grapes	1 966	—	—	—	1 966
Cotton	—	—	—	—	—
Rice	—	—	—	—	—
Livestock, pasture, grains & other	26 313	—	—	—	26 313
Total	*38 448*	—	—	—	*38 448*
Services to agriculture; hunting & trapping	—	45	—	—	45
Forestry & fishing	4 590	—	241	4 349	482
Mining					
Coal mining	—	—	—	—	—
Oil & gas extraction	33	1	—	13	21
Metal ore mining	12 946	2 973	—	—	14 090
Other mining	232	81	—	—	313
Total	*13 211*	*3 054*	—	*13*	*14 424*
Manufacturing					
Food, beverage & tobacco	2	291	—	—	293
Textile, clothing, footwear & leather	—	15	—	—	16
Wood & paper products	—	—	—	—	—
Printing, publishing & recorded media	—	27	—	—	27
Petroleum, coal, chemical & associated product	—	6	—	—	6
Non-metallic mineral products	1	77	—	—	77
Metal products	7 407	75	—	—	7 482
Machinery & equipment	4	54	—	—	58
Other manufacturing	—	1	—	—	1
Total	*7 415*	*546*	—	—	*7 961*
Electricity & gas(f)	661	—	—	—	661
Water supply, sewerage & drainage services(g)	53 522	9 031	94	—	9 125
Other industries	11 424	18 534	818	—	30 776
Household	7 808	24 141	—	—	31 949
Environment	—	—	—	—	—
Total	**137 080**	**55 351**	**1 153**	**4 362**	**133 871**

— nil or rounded to zero (including null cells)

(a) Includes water extracted directly from the environment for use.

(b) Includes water supplied to a user usually through a non-natural network (piped/open channel or other carrier) where an economic transaction has occurred for the exchange of water regardless of method of delivery.

(c) Refers to waste or drainage water that may have been treated to some extent before being used. It excludes 'on-site' recycling.

(d) This is a subset of Self-extracted water use.

(e) Water consumption = Self-extracted use + Distributed water use + Reuse water use - Distributed water supplied to other users - In-stream water use - Distributed water used by the environment.

(f) The majority of water used by this industry is 'in-stream' and is often used again downstream by other water users.

(g) Includes losses as well as water used by the Water supply, sewerage and drainage services industry.

CHAPTER 3 WATER SUPPLY, SEWERAGE AND DRAINAGE .....

INTRODUCTION

This chapter presents information on the WATER SUPPLY, SEWERAGE AND DRAINAGE SERVICES industry (here after shortened to the WATER SUPPLY industry) as well as on the supply of distributed and reuse water in Australia for 2004–05. Data are also presented on distribution losses, environmental provisions, regulated discharges, bulk water supplied, number of water providers and the origins of distributed (i.e. surface water, groundwater) and reuse water (i.e. waste water, drainage water and storm water).

MAIN FINDINGS

The main findings in this chapter are:

- In 2004–05 there were 413 water providers in Australia, collectively supplying 11,337 GL of distributed water. This volume was 12% lower than in 2000–01 when it was 12,934 GL.
- Nearly all (11,160 GL or 98%) of distributed water was supplied by the WATER SUPPLY industry. Of this the majority (6,637 GL or 59%) was supplied by Irrigation/rural water providers.
- Distributed water represented 14% of self-extracted water in Australia in 2004–05. The remainder of self-extracted water was directly extracted by other industry and Household users.
- Surface water is by far the greatest source of water for the WATER SUPPLY industry, with 10,712 GL or 96% of total distributed water originating from this source in 2004–05.
- In 2004–05, the highest proportion of distributed water originating from groundwater was in the Northern Territory where it was 21 GL or 33% of its distributed water. This was followed by Western Australia where 32% (229 GL) of its distributed supply originated from groundwater.
- In 2004–05, desalination provided 231 ML of the distributed water in Australia.
- Reuse water made up 425 GL of water supplied or used by water providers in 2004–05, a 16% decrease from 2000–01 when it was 507 GL. In both reference years, reuse water represented just under 4% of total water supplied by water providers. This compares to 134 GL and 1% in 1996–97.
- The decline in the use of reuse water use between 2000–01 and 2004–05 is mostly due to a reduction in the AGRICULTURE industry (from 423 GL to 280 GL) which is largely a reflection of the decrease in the availability of water.
- Between 2000–01 and 2004–05 there was an increase in the volume of reuse water use by the MANUFACTURING (7,474 ML to 13,035 ML) and MINING (5,409 ML to 7,268 ML) industries.
- Households experienced a ten-fold increase in the use of reuse water (167 ML to 1,767 ML), but the volumes used were small.
- Distribution losses reported by the WATER SUPPLY industry were 2,022 GL representing 18% of total supply in 2004–05.

MAIN FINDINGS
continued

- Losses were the highest for Irrigation/rural water providers representing 23% of their total distributed supply in 2004–05. Non-major urban water providers reported losses of 15%, while Major urban water providers reported losses of 11%.
- The WATER SUPPLY industry had regulated discharges of 1,809 GL in 2004–05.
- Most water discharged by the WATER SUPPLY industry was into the ocean with 1,232 GL or 68% of regulated discharge.

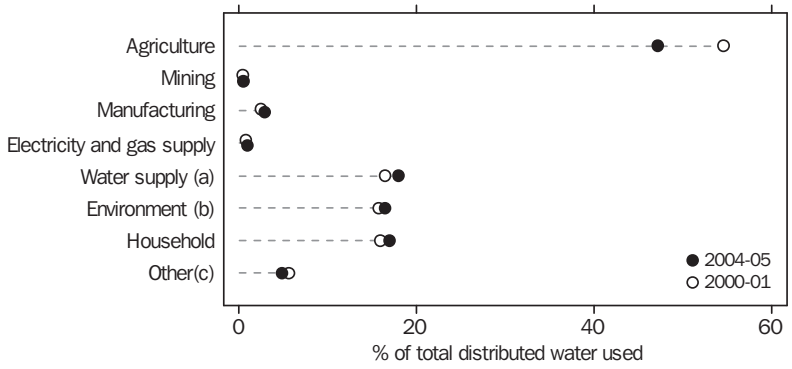
DISTRIBUTED WATER

In 2004–05, water providers in Australia supplied 11,337 GL of distributed water (Table 3.10). Of this 11,160 GL (98%) was supplied by the WATER SUPPLY industry, a decrease of 14% from 12,915 GL in 2000–01.

Collectively other industries (eg. MINING, MANUFACTURING, and ELECTRICITY AND GAS SUPPLY) supplied 177 GL (or 2%) of all distributed water. Distributed water represents 14% of self-extracted water in Australia (Table 3.10). The percentage varies from 1% in Tasmania to 92% in the Australian Capital Territory. In 2004–05 nearly half (47% or 5,329 GL) of distributed water was supplied to AGRICULTURE (Table 3.12).

The quantity of distributed water supplied decreased 12% between 2000–01 and 2004–05. This was mostly due to a decrease of 1,704 GL or 24% in AGRICULTURE (Graph 3.1, Table 3.12). Significant periods of below average rainfall and drought have occurred over this time, causing a reduction in allocations to Irrigation/rural water providers, therefore reducing the quantity of water available for supply to customers.

3.1 DISTRIBUTED WATER USE, Australia—2000–01 and 2004–05



(a) Water supply, sewerage and drainage services industry.
(b) Environmental provisions made by Water supply and Other industries.
(c) Includes Forestry and fishing, Services and Administrative industries.

The distributed water supplied to the MINING industry increased between 2000–01 and 2004–05 from 63 to 72 GL. The largest percentage increase in the MINING industry was in Queensland (27%) (Table 3.12).

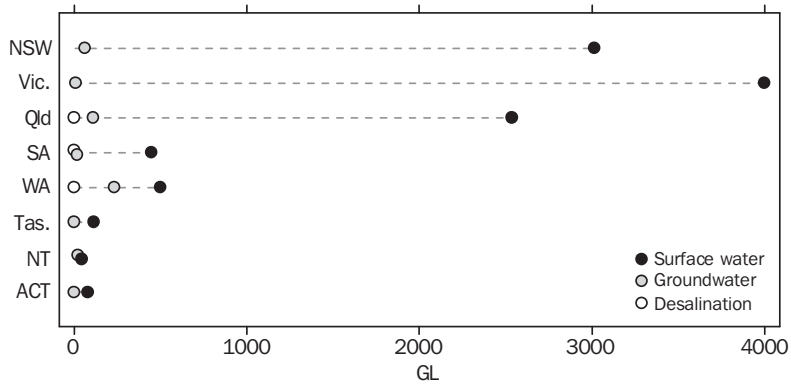
In 2004–05, Australian households were supplied with 1,874 GL of distributed water, a 9% decrease from 2000–01 when it was 2,056 GL. Just under 19.3 million or 95% of the Australian population were supplied with distributed water in 2004–05 (Table 3.13). New South Wales reported the largest number of people supplied with distributed water with 6,458,214, followed by Victoria with 4,825,021 and Queensland with 3,669,091.

Origin of Distributed Water

The origin of the distributed water supplied by the WATER SUPPLY industry is presented in Table 3.14 and Graph 3.2. The majority of the 11,160 GL distributed by the WATER SUPPLY industry originated from inland surface water (10,712 GL or 96%). Groundwater accounted for 448 GL (4%) of the total water extracted in Australia, just over half (229 GL) of which was in Western Australia. Desalination accounted for the remainder.

Desalination is a process where salt is removed from water, usually sea water or brackish surface water but also saline groundwater, to make it suitable for human consumption and for industrial purposes. In 2004–05, 231 ML was obtained from the desalination of sea water. Desalination occurred in Queensland, South Australia and Western Australia (Table 3.14). While producing and distributing freshwater by desalinating sea water is currently a small part of water supply in Australia, additional desalination plants are being built or are planned to be built eg. in Western Australia and Queensland.

3.2 ORIGIN OF DISTRIBUTED WATER(a)—2004–05



(a) For Water supply, sewerage and drainage services industry only.

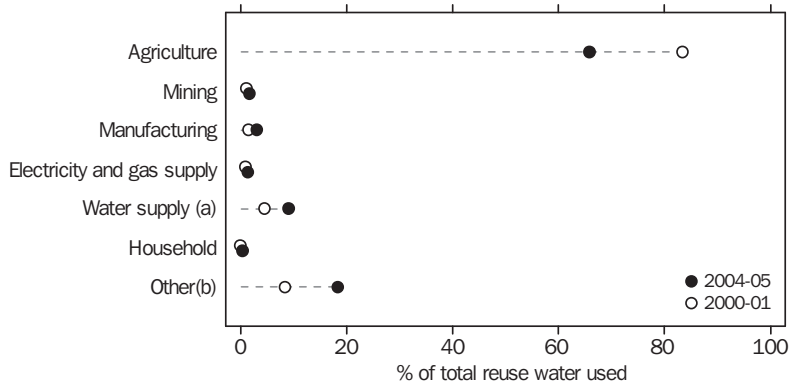
REUSE WATER

Reuse or recycled water is considered an important option for securing water supply into the future (AWA 2005). There is an increasing investment in infrastructure related to the supply of reuse water, and as such there is considerable interest in the volumes of reuse water supplied and used. In addition, water management authorities are interested in whether reuse water is reducing the demand for distributed water or self-extracted water.

Between 1996–97 and 2000–01, the supply of reuse water increased from under 1% of total supply to nearly 4%. From 2000–01 to 2004–05 it decreased slightly but was still around 4% (Table 3.15). The slight decrease in percentage terms was largely due to the decrease in drainage water supplied as reuse water by Irrigation/rural water providers brought about by lower water availability due to below average levels of rainfall. The decline in the use of reuse water between 2000–01 and 2004–05 is mostly due to a reduction in AGRICULTURE (from 423 GL to 280 GL) (Table 3.16).

REUSE WATER *continued*

3.3 USE OF REUSE WATER, Australia—2000–01 and 2004–05



(a) Water supply, sewerage and drainage services industry.
(b) Includes Forestry and fishing, Services and Administrative industries.

The use of reuse water is presented in Table 3.16 and Graph 3.3. The AGRICULTURE industry used the majority of reuse water (280 GL or 66% of total reuse), followed by OTHER industries, which includes parks, gardens and sporting fields (14%) and the WATER SUPPLY industry (9%). In 2000–01, AGRICULTURE also used the majority of reuse water (83%), followed by OTHER industries (8%) and the WATER SUPPLY industry (5%).

While there was an overall decrease in the use of reuse water, MINING, MANUFACTURING and Households experienced increases between 2000–01 and 2004–05. For MANUFACTURING the increase was 7,474 ML to 13,035 ML and MINING 5,409 ML to 7,268 ML. The quantity of reuse water supplied to Households increased more than 10-fold between 2000–01 and 2004–05, from 167 to 1,767 ML, but the volumes involved were small. Reuse water is currently only supplied to Households in New South Wales.

The use of reuse water supplied by urban water providers is presented in Table 3.17. Major users of urban reuse include AGRICULTURE, parks and gardens and the WATER SUPPLY industry.

Origin of Reuse water

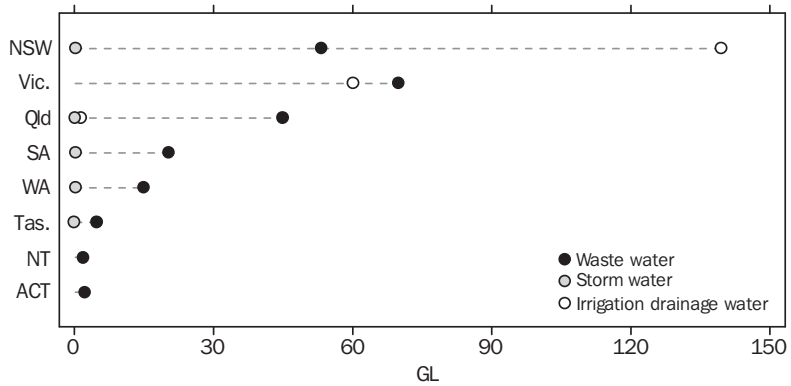
There are a variety of water sources that may be supplied as reuse water, including waste water (from sewerage systems), drainage water, storm water or other water providers (i.e. a 'bulk' reuse water supply). Sewerage systems collect and treat waste water to primary, secondary or tertiary levels. Storm water may also be collected using infrastructure separate to sewerage systems and, depending on its intended use, may or may not be treated before being supplied as reuse water. Drainage water is collected in regional collection drains managed by Irrigation/rural water providers. This water may be supplied as reuse water to customers or discharged to the environment. This process is analogous to urban reuse systems, however typically in urban systems the water is treated before supply.

The volume of waste, storm and drainage water collected by water providers for supply as reuse was 414 GL in 2004–05 (Table 3.18). Of this, waste water amounted to 212 GL (or 51%), and drainage water, 201 GL (or 49%). Water providers in New South Wales collected the most waste, storm and drainage water (193 GL or 47%), followed by Victoria (130 GL or 31%) and Queensland (46 GL or 11%). During 2004–05, urban water providers treated 213 GL of waste and storm water, with Major urban water providers

Origin of Reuse water continued

accounting for over half (59%) of this amount (Table 3.18). Urban water providers in Victoria treated the most waste and storm water for own use or supply with 69 GL (or 32% of the Australian total) followed by New South Wales with 53 GL (24%) (Graph 3.4).

3.4 ORIGIN OF REUSE WATER(a)—2004–05



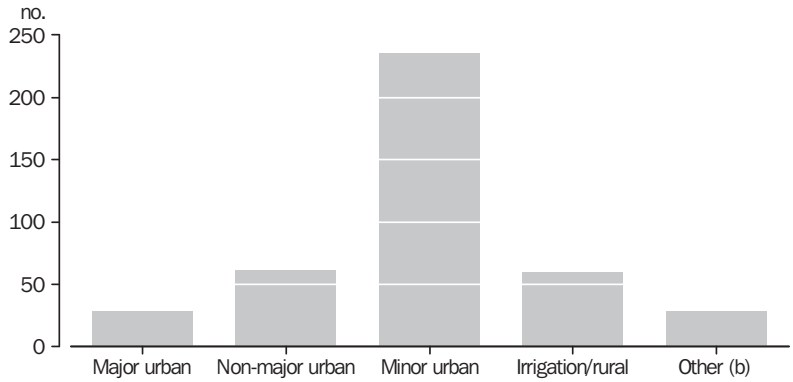
(a) For Water supply, sewerage and drainage services industry only.

WATER SUPPLY INDUSTRY

In 2004–05 there were 413 water providers, of which 384 businesses were in the WATER SUPPLY industry (Table 3.19). Water providers typically provide more than one type of service. In 2004–05, of the 413 water providers, 387 supplied distributed water, while 316 provided sewerage services (Table 3.20). Reuse water was supplied by 161 water providers, bulk distributed water by 97, and irrigation drainage services by 31.

There has been a decrease in the number of water providers from 479 in 2000–01 to 413 in 2004–05 (Table 3.19). This is due to amalgamations of water providers. The greatest decrease in the number of providers was in New South Wales and Queensland.

3.5 NUMBER OF WATER PROVIDERS, by type of water provider—2004–05



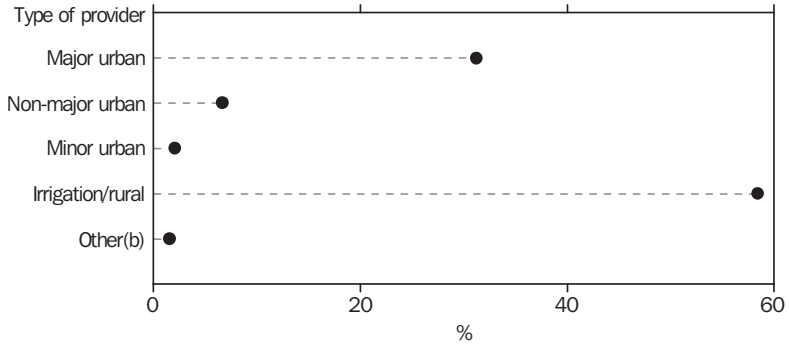
(a) Includes businesses mainly involved in Mining, Manufacturing and Electricity and gas supply industries that supply water.

WATER SUPPLY INDUSTRY *continued*

Water providers are generally grouped according to the number of connections or customers served. In general, the provision of water from a water main to a customer meter constitutes a water service connection. Of the 384 water providers in the WATER SUPPLY industry, 235 were Minor urban (less than 10,000 connections), 61 were Non-major urban (between 10,000 and 50,000 connections), 29 were Major urban (greater than 50,000 connections) and 59 were Irrigation/rural (businesses that supply predominantly to AGRICULTURE) (Graph 3.5, Table 3.19). There were also 29 businesses that supplied water, sewerage and/or drainage services but whose main economic activity was other than supplying water (for example, businesses in the MINING, MANUFACTURING, ELECTRICITY AND GAS SUPPLY industries).

Irrigation/rural water providers were the main suppliers of distributed water in 2004–05 accounting for 6,637 GL or 59% (Graph 3.6, Table 3.21) of the total distributed water supply. Major urban water providers supplied 3,517 GL (or 31%). Distributed water supply data, split by provider type, represents gross (unreconciled) water supply, including bulk transfers to other water provider types. Water supplied from one water provider to another is recorded against the original water provider. Net Water Supply (discussed later) records the water against the final provider and only records the water supplied to customers.

3.6 PROPORTION OF DISTRIBUTED WATER SUPPLY(a), by type of water provider—2004–05



(a) Calculated against gross (unreconciled) water supply. Includes bulk transfers to other water providers.
(b) Includes businesses mainly involved in Mining, Manufacturing and Electricity and gas supply industries that supply water.

Bulk Water

Bulk water is water supplied from one water provider to another. Many bulk water providers also provide distributed water directly to customers. In 2004–05, 2,303 GL of bulk distributed water was supplied by 97 water providers. Queensland water providers supplied the most bulk water (35% of the Australian total), followed by New South Wales (24%) and Victoria (23%) (Table 3.22).

The bulk supply of reuse water is a relatively new activity conducted by water providers. In 2004–05, there were seven water providers that supplied almost 3 GL of bulk reuse water. The majority of bulk reuse water supply occurs in Melbourne, Victoria (76% of the Australian total).

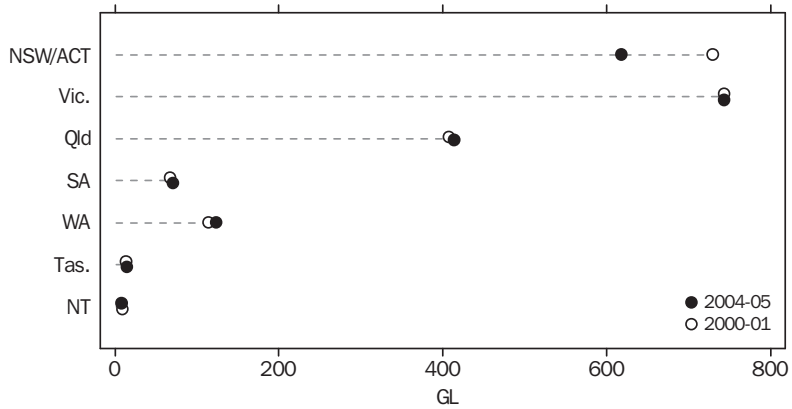
Water Losses

The definition of water losses varies between water providers. It can include water lost through the supply infrastructure (resulting from leakages from underground pipes, evaporation from open channels and rivers, or burst mains), theft and customer meter errors.

In 2004–05, the total volume of water reported to be lost from the water delivery infrastructure, including meter errors where identified, was 2,022 GL. This is a 4% decrease since 2000–01. The majority (1,500 GL or 74%) of losses was incurred by Irrigation/rural water providers, as many use open channels and natural water courses to deliver water. As a proportion of total distributed water supplied, Irrigation/rural water providers had the highest losses (23%) while Major urban water providers had the lowest losses (11%) (Table 3.23).

Losses represented 18% of total distributed water supply (Table 3.23). Of the States and Territories, New South Wales (20%), Victoria (19%), and South Australia (15%) have the highest proportion of losses (Graph 3.7). Between 2000–01 and 2004–05 losses decreased from 2,117 GL to 2,022 GL, with most of the decrease occurring in New South Wales (Graph 3.7). These loss proportions were calculated using the denominator of gross (unreconciled) water supply including bulk transfers to other water provider types. In this, water supplied from one water provider to another is recorded against the original water provider. Net Water Supply (Table 3.25) records the water against the final provider and only records the water supplied to customers. Losses may also be calculated as a proportion of Net Water Supply.

3.7 DISTRIBUTION LOSSES(a)—2000–01 and 2004–05



(a) Water supply, sewerage and drainage services industry only.

Environmental Provisions

Water allocated to the environment, or provided for environmental purposes, are generally known as environmental flows (Quinn and Thoms 2002). The provision of water for environmental purposes is aimed at increasing the ecological and economic sustainability of Australia's water industry, and is largely the result of the COAG Water Reform Framework developed in 1994. Implementation of water management planning in States and Territories throughout Australia have required significant involvement from water providers because they often have responsibility for the provision of environmental flows. Methods for allocating water to the environment vary considerably

Environmental Provisions continued

across Australia, and are often not on a volumetric basis. More information on environmental flows is included in Appendix 2.

Almost all of the water supplied to the environment is provided by the WATER SUPPLY and ELECTRICITY AND GAS SUPPLY industries. These are not environmental flows. Rather they are presented in the supply and use tables as a supply of distributed water from the economy for use by the environment. In the future, the ABS may modify its treatment and the terminology of these flows to reflect Australian standards for measuring and accounting that are currently being developed as part of the NWI.

In 2004–05, 1,005 GL of water was supplied to the environment by water providers (Table 3.24). This is an increase of 119% across Australia since 2000–01. States with large increases were Queensland, Victoria and Tasmania. The majority of water supplied for environmental purposes was by the WATER SUPPLY industry (842 GL) while other industries supplied 163 GL. Water providers in Queensland released 384 GL or 38% of all the water supplied for environmental purposes by water providers. Victorian water providers supplied 374 GL (37%), and Tasmanian water providers supplied 119 GL (12%).

Net Water Supply

In the supply and use tables presented in Chapter 2, the distributed water supplied by the WATER SUPPLY industry excludes bulk transfers between water suppliers. However, the supply and use tables do include water supplied to the environment, and attribute the water used directly by the WATER SUPPLY industry as well as distribution water losses to the WATER SUPPLY industry.

Net water supply is the quantity of water actually supplied to users in the economy. Net water supply excludes transfers of bulk water, losses, environmental provisions and own use. In 2004–05, net distributed water supply was 8,289 GL (Table 3.25).

SEWERAGE, DRAINAGE AND REGULATED DISCHARGE

The water discharged from the economy to the environment may be regulated or unregulated. Regulated discharge refers to water discharged after use where that discharge does not match the natural flow regime of the receiving water body. For example, the waste water discharged by sewerage service providers is a regulated discharge. The water discharged by the ELECTRICITY AND GAS SUPPLY industry after use in hydro-electric power generation is also regulated discharge.

The water discharged by Households and other industries to sewerage or drainage systems is not regulated discharge as the water is not discharged directly to the environment. Discharges from non-point sources, such as those from the AGRICULTURE industry, are not included in this publication and are therefore represented in the supply and use tables as "not available".

In Australia, regulated discharge of water to the environment in 2004–05 was 62,455 GL (Chapter 2). The ELECTRICITY AND GAS SUPPLY industry discharged 59,924 GL or 96% of regulated discharges. This is due to the large amount of water used in hydro-electric power generation. This was followed by the WATER SUPPLY industry, which accounted for 1,809 GL or 3% of regulated discharges. Of this, 660 GL (36%) was from New South Wales, followed by Victoria with 528 GL (or 29%) discharged.

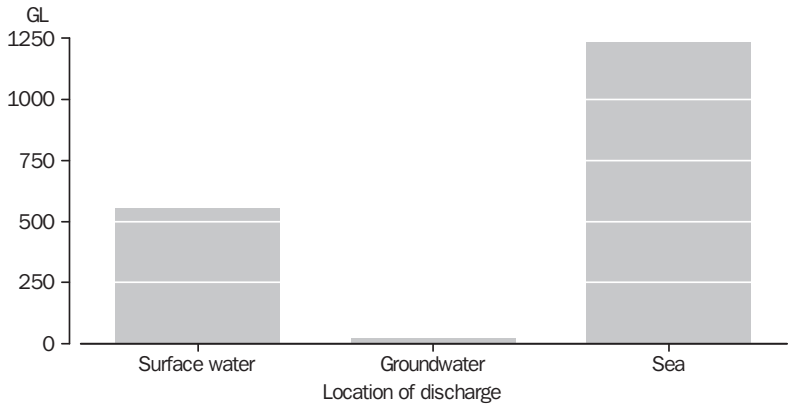
SEWERAGE, DRAINAGE AND REGULATED DISCHARGE *continued*

It is likely that drainage water from Irrigation/rural water providers makes a significant contribution to regulated discharge, but this is mostly unmeasured. Currently, the regulated discharge recorded for Irrigation/rural water providers is only 10% of the regulated discharge of the WATER SUPPLY industry.

Destination of Discharges

Of the 1,809 GL discharged by the WATER SUPPLY industry, 68% was discharged to the sea, 31% was discharged to inland surface water, with the remaining 1% discharged to groundwater (Table 3.26, Graph 3.8).

3.8 REGULATED DISCHARGE(a), Water supply industry, by receiving body—2004–05



(a) Includes waste and drainage water discharged.

Treatment Level

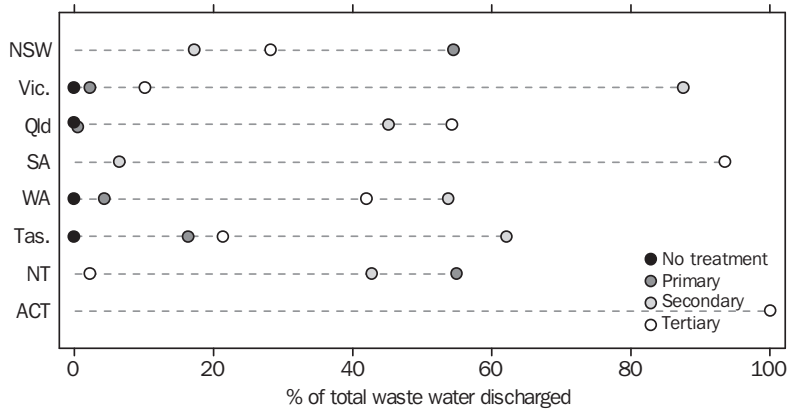
The majority (77%) of the waste water discharged by the WATER SUPPLY industry was treated to secondary or tertiary level. The treatment level of waste water varies significantly between State and Territories (Table 3.27, Graph 3.9). In the Australian Capital Territory, all waste water is treated to tertiary level, and in South Australia waste water is treated to secondary or tertiary level. In New South Wales less than half (45%) is treated to secondary level or higher.

AQUIFER STORAGE AND RECOVERY

Aquifer storage and recovery (ASR) is increasingly gaining consideration as an alternative water supply system by water managers and providers (Pratt Water 2004). ASR is the process of injecting water into a suitable underground aquifer for storage and re-supply, and it is one way of artificially recharging depleted underground water supplies. Aquifers can store large quantities of water without losses from evaporation and with reduced risk of contamination, both of which are problems associated with surface water storage areas such as reservoirs (City of Salisbury, 2006). However, ASR relies on suitable geologic formations which are relatively large, permeable and shallow to moderately deep (Sydney Coastal Councils Group, 2006).

AQUIFER STORAGE AND RECOVERY *continued*

3.9 WASTE WATER DISCHARGED (a), by treatment level—2004–05



(a) By Sewerage service providers only.

The Department of Primary Industries and Resources South Australia (PIRSA) and the City of Salisbury in conjunction with the CSIRO have pioneered ASR in South Australia over the past 10 years. During the high rainfall period in winter, excess storm water, filtered and cleaned by the wetlands, is pumped into the aquifer, 164 metres below the ground. During the dry summer, the water is recovered as needed to irrigate sports fields and turf areas. This eliminates the demand on distributed water for irrigation, conserving water and reducing costs (City of Salisbury, 2006).

Within the *System of Environmental and Economic Accounting for Water* (SEEAW 2006) framework, ASR is considered to be a regulated discharge from the economy, through the provision of treated waste or storm water, to the environment represented in this case by groundwater. The ASR extraction of groundwater is considered to be 'new' water rather than 'reuse' because the water is being extracted from the environment, and is thereafter supplied as distributed water. Data describing ASR resides within volumes of regulated discharge and self-extracted water (supply table) and distributed water (in the use table).

The only water provider in Australia identified by the ABS to be actively engaged in ASR is the City of Salisbury in South Australia. In 2004–05, this water provider collected and naturally treated storm water in a wetland which was subsequently injected into the aquifer. Then, groundwater was extracted for supply to a nursery. Other water providers discharge to and extract from groundwater in similar geographic areas, however, this isn't necessarily considered ASR as the discharge may not be to the same aquifer that the extraction was from. For example, the discharge could be to an unconsolidated aquifer close to the ground surface, with the extraction from a consolidated aquifer located deeper underground.

3.10 WATER SUPPLY, by water type—1996–97, 2000–01 and 2004–05

	NSW(a)	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*(a)	*Australia*
	ML	ML	ML	ML	ML	ML	ML	ML	ML
2004–05									
Self-extracted(b)	16 528 356	11 212 653	7 964 348	1 352 255	3 452 284	39 080 691	144 982	83 611	79 819 179
Distributed	3 111 812	4 003 891	2 651 558	461 157	736 268	229 102	66 091	77 112	11 336 992
Reuse	193 866	130 574	51 582	22 186	17 508	4 858	1 852	2 189	424 615
2000–01									
Self-extracted(b)	16 704 779	11 448 221	5 739 474	1 260 165	3 089 153	38 169 476	137 080	na	76 508 754
Distributed	4 832 019	4 268 425	2 377 937	517 128	764 904	118 542	55 351	na	12 934 306
Reuse	266 964	186 712	23 818	17 572	9 152	1 551	1 154	na	506 923
1996–97									
Self-extracted(b)	11 055 337	9 928 992	4 364 473	1 261 434	1 612 754	40 376 994	103 385	na	68 703 370
Distributed	4 274 510	4 816 461	1 367 844	336 931	572 585	108 953	48 249	na	11 525 533
Reuse	24 342	32 509	39 545	8 375	24 036	1 124	4 492	na	134 424

na not available

(a) NSW and ACT were combined for 1996-97 and 2000-01.

(b) Total water self-extracted by all industries.

3.11 DISTRIBUTED WATER SUPPLY, by industry—1996–97, 2000–01 and 2004–05

	NSW	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*	*Australia*
	ML	ML	ML	ML	ML	ML	ML	ML	ML
2004–05									
Water supply industry(a)	3 073 847	4 003 846	2 641 619	461 155	726 384	112 325	63 520	77 112	11 159 809
Other industries(b)	37 965	45	9 939	2	9 884	116 777	2 571	—	177 183
Total	**3 111 812**	**4 003 891**	**2 651 558**	**461 157**	**736 268**	**229 102**	**66 091**	**77 112**	**11 336 992**
2000–01									
Water supply industry(a)	4 823 032	4 268 289	2 372 496	516 766	762 757	118 542	53 522	na	12 915 404
Other Industries(b)	8 987	136	5 441	362	2 147	—	1 829	na	18 902
Total	**4 832 019**	**4 268 425**	**2 377 937**	**517 128**	**764 904**	**118 542**	**55 351**	na	**12 934 306**
1996–97									
Water Supply Industry(a)	4 274 510	4 816 461	1 362 939	336 931	572 302	96 084	48 249	na	11 507 477
Other Industries(b)	—	—	4 905	—	282	12 869	—	na	18 056
Total	**4 274 510**	**4 816 461**	**1 367 844**	**336 931**	**572 585**	**108 953**	**48 249**	na	**11 525 533**

— nil or rounded to zero (including null cells)

na not available

(a) Includes Sewerage and drainage services.

(b) Other industries include the Mining, Manufacturing and Electricity and gas supply industries.

3.12 USE OF DISTRIBUTED WATER, by industry—2000–01 and 2004–05

	NSW(a)	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*(a)	*Australia*
	ML	ML	ML	ML	ML	ML	ML	ML	ML
2004–05									
Agriculture	1 584 192	2 228 353	1 044 275	194 820	262 698	14 674	—	—	5 329 012
Forestry and fishing(b)	6 446	721	302	29	15 444	1 408	91	33	24 474
Mining	6 586	3 742	42 015	756	15 783	24	3 297	—	72 203
Manufacturing	103 971	102 769	69 303	23 960	28 343	11 617	724	621	341 308
Electricity and gas supply	7 839	21 759	77 459	1 036	6 511	102	14	—	114 720
Water supply(c)(d)	621 052	777 848	419 673	71 331	125 212	17 666	8 026	3 720	2 044 529
Other industries(e)	139 314	105 779	157 008	26 232	56 107	7 989	27 441	11 549	531 419
Household	545 423	388 991	457 916	142 279	226 151	56 905	25 396	30 989	1 874 050
Environment	96 990	373 929	383 606	713	18	118 718	1 103	30 200	1 005 277
Total	**3 111 812**	**4 003 891**	**2 651 558**	**461 157**	**736 268**	**229 102**	**66 091**	**77 112**	**11 336 992**
2000–01									
Agriculture	2 889 687	2 536 996	1 106 552	221 145	264 412	14 347	—	na	7 033 139
Forestry and fishing(b)	1 274	793	3 034	557	19 846	2 749	45	na	28 298
Mining	7 288	4 620	33 056	719	14 431	26	—	na	63 194
Manufacturing	93 724	101 399	69 159	25 048	23 955	14 097	3 054	na	327 927
Electricity and gas supply	9 550	20 687	72 601	813	1 791	36	546	na	105 478
Water supply(c)(d)	740 876	778 759	412 722	67 897	116 318	16 534	—	na	2 142 137
Other industries(e)	251 337	126 262	180 601	40 862	83 510	17 180	24 141	na	718 286
Household	637 754	445 739	495 749	159 215	240 642	53 216	9 031	na	2 056 455
Environment	200 528	253 172	4 462	873	—	358	18 534	na	459 393
Total	**4 832 019**	**4 268 425**	**2 377 937**	**517 128**	**764 904**	**118 542**	**55 351**	na	**12 934 306**

— nil or rounded to zero (including null cells)
na not available
(a) NSW and ACT were combined in 2000-01.
(b) Includes Services to agriculture; hunting & trapping.
(c) Includes Sewerage and drainage services.
(d) Includes water losses.
(e) Includes mainly Services and Administrative industries.

3.13 POPULATION SUPPLIED WITH DISTRIBUTED WATER AND SEWERAGE SERVICES—2004–05

	NSW	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*	*Australia*
Distributed water									
Population supplied (no.)	6 458 214	4 825 021	3 669 091	1 518 958	1 936 491	395 911	165 540	325 161	19 294 387
Proportion supplied (%)	95	96	93	99	96	82	82	100	95
Sewerage services									
Population supplied (no.)	6 213 436	4 545 059	3 263 477	1 214 705	1 646 453	376 000	160 279	325 161	17 744 570
Proportion supplied (%)	92	91	82	79	82	78	79	100	87
Total population(a)	6 774 249	5 022 346	3 963 968	1 542 033	2 010 113	485 263	202 793	325 161	20 325 926

(a) ABS 2006a.

3.14 ORIGIN OF DISTRIBUTED WATER—2004–05(a)

	NSW	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*	*Australia*
	ML	ML	ML	ML	ML	ML	ML	ML	ML
Surface water	3 012 717	3 994 520	2 532 418	444 240	496 838	111 882	42 182	77 112	10 711 910
Groundwater	61 130	9 326	109 116	16 854	229 461	443	21 338	—	447 668
Desalinated water(b)	—	—	85	61	85	—	—	—	231
Total	**3 073 847**	**4 003 846**	**2 641 619**	**461 155**	**726 384**	**112 325**	**63 520**	**77 112**	**11 159 809**

— nil or rounded to zero (including null cells)

(a) Water supply, sewerage and drainage industry only, excludes water provided by other industries.

(b) Includes sea water only.

3.15 REUSE WATER SUPPLY, by industry—1996–97, 2000–01 and 2004–05

	NSW(a)	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*(a)	*Australia*
	ML	ML	ML	ML	ML	ML	ML	ML	ML
2004–05									
Water supply industry(b)	192 951	130 029	46 461	20 497	15 278	4 858	1 852	2 189	414 115
Other industries(c)	915	545	5 121	1 689	2 230	—	—	—	10 500
Total	**193 866**	**130 574**	**51 582**	**22 186**	**17 508**	**4 858**	**1 852**	**2 189**	**424 615**
2000–01									
Water supply industry(b)	266 964	183 967	23 818	15 675	8 568	1 551	1 154	na	501 697
Other industries(c)	—	2 745	—	1 897	584	—	—	na	5 226
Total	**266 964**	**186 712**	**23 818**	**17 572**	**9 152**	**1 551**	**1 154**	na	**506 923**
1996–97									
Water supply industry(b)	17 589	20 444	24 782	6 968	10 926	151	1 579	na	82 438
Other industries(c)	6 753	12 065	14 763	1 407	13 110	973	2 913	na	51 986
Total	**24 342**	**32 509**	**39 545**	**8 375**	**24 036**	**1 124**	**4 492**	na	**134 424**

— nil or rounded to zero (including null cells)

na not available

(a) NSW and ACT were combined for 1996-97 and 2000-01.

(b) Includes Sewerage and drainage services.

(c) Other industries include the Mining, Manufacturing and Electricity and gas supply industries.

3.16 USE OF REUSE WATER, by industry—2000–01 and 2004–05

	NSW(a)	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*(a)	*Australia*
	ML	ML	ML	ML	ML	ML	ML	ML	ML
2004–05									
Agriculture	160 103	86 855	12 318	18 139	54	1 904	552	—	279 925
Forestry and fishing	3 219	5 869	2 106	32	5 946	110	200	—	17 483
Mining	6 098	—	1 142	—	29	—	—	—	7 268
Manufacturing	169	—	8 567	1 196	3 102	—	—	—	13 035
Electricity and gas supply	1 318	—	3 361	1 223	100	—	—	—	6 002
Water supply(b)	10 311	15 370	6 418	—	2 825	1 956	—	1 634	38 514
Other industries(c)	10 882	22 480	17 670	1 596	5 452	888	1 100	555	60 621
Household	1 767	—	—	—	—	—	—	—	1 767
Total	**193 866**	**130 574**	**51 582**	**22 186**	**17 508**	**4 858**	**1 852**	**2 189**	**424 615**
2000–01									
Agriculture	240 393	165 193	4 800	12 073	156	650	—	na	423 265
Forestry and fishing	2 517	1 355	28	44	2 959	—	241	na	7 144
Mining	5 405	4	—	—	—	—	—	na	5 409
Manufacturing	10	1 082	4 738	1 177	467	—	—	na	7 474
Electricity and gas supply	1 210	2 766	106	720	—	—	—	na	4 802
Water supply(b)	9 689	8 211	3 367	938	—	758	94	na	23 057
Other industries(c)	7 574	8 101	10 778	2 619	5 570	143	818	na	35 603
Household	167	—	—	—	—	—	—	na	167
Total	**266 964**	**186 712**	**23 817**	**17 571**	**9 152**	**1 551**	**1 153**	na	**506 920**

— nil or rounded to zero (including null cells)
na not available
(a) NSW and ACT were combined in 2000-01.
(b) Includes Sewerage and drainage services.
(c) Includes mainly Services and Administrative industries.

3.17 URBAN USE OF REUSE WATER—2004–05(a)

	NSW	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*	*Australia*
	ML	ML	ML	ML	ML	ML	ML	ML	ML
Agriculture	19 204	25 945	10 232	18 139	54	1 846	276	—	75 696
Forestry	1 639	2 860	650	23	3 749	28	243	—	9 192
Mining	5 695	—	—	—	26	—	—	—	5 721
Manufacturing	410	509	7 589	—	1 887	—	—	—	10 395
Water supply(b)	10 080	15 370	6 418	—	2 825	1 956	—	1 634	38 283
Households	1 370	—	—	—	—	—	—	—	1 370
Parks etc.(c)	9 756	24 295	15 669	1 484	6 621	451	1 333	555	60 164
Other(d)	1 594	672	4 189	845	101	1	—	—	7 402
Total	**49 748**	**69 651**	**44 747**	**20 491**	**15 263**	**4 282**	**1 852**	**2 189**	**208 223**

— nil or rounded to zero (including null cells)
(a) Includes reuse supplied or used by Major, Non-major and Minor urban water providers.
(b) Includes Sewerage and drainage services.
(c) Includes gardens, race tracks, sporting fields.
(d) Includes electricity generation, construction, aquaculture, firefighting, education activities.

3.18 WASTE, STORM AND DRAINAGE WATER COLLECTED FOR REUSE—2004–05(a)

	NSW	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*	*Australia*
	ML	ML	ML	ML	ML	ML	ML	ML	ML
Waste water									
Major urban	20 800	52 335	15 339	20 093	13 677	—	1 852	2 189	126 285
Non-major urban	18 603	17 172	11 168	—	908	2 042	—	—	49 893
Minor urban	13 877	392	18 414	171	458	2 804	—	—	36 116
Irrigation/rural	—	—	—	—	—	—	—	—	—
Total	*53 280*	*69 899*	*44 921*	*20 264*	*15 043*	*4 846*	*1 852*	*2 189*	*212 294*
Storm water									
Major urban	—	—	—	—	—	—	—	—	—
Non-major urban	5	—	—	—	82	—	—	—	87
Minor urban	225	—	49	233	153	12	—	—	672
Irrigation/rural	—	—	—	—	—	—	—	—	—
Total	*230*	—	*49*	*233*	*235*	*12*	—	—	*759*
Drainage water									
Major urban	—	—	—	—	—	—	—	—	—
Non-major urban	—	300	—	—	—	—	—	—	300
Minor urban	—	—	—	—	—	—	—	—	—
Irrigation/rural	139 441	59 830	1 491	—	—	—	—	—	200 762
Total	*139 441*	*60 130*	*1 491*	—	—	—	—	—	*201 062*
Total									
Major urban	20 800	52 335	15 339	20 093	13 677	—	1 852	2 189	126 285
Non-major urban	18 608	17 472	11 168	—	990	2 042	—	—	50 280
Minor urban	14 102	392	18 463	404	611	2 816	—	—	36 788
Irrigation/rural	139 441	59 830	1 491	—	—	—	—	—	200 762
Total	**192 951**	**130 029**	**46 461**	**20 497**	**15 278**	**4 858**	**1 852**	**2 189**	**414 115**

— nil or rounded to zero (including null cells)

(a) Reuse collected may be either supplied to customers or used by the Water supply industry.

3.19 WATER PROVIDERS, by type of water provider—2000–01 and 2004–05

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Australia
	no.	no.	no.	no.	no.	no.	no.	no.	no.
2004–05									
Major urban	5	9	8	1	1	3	1	1	29
Non-major urban	25	8	18	—	5	5	—	—	61
Minor urban	72	2	131	3	4	23	—	—	235
Irrigation/rural	9	3	33	8	4	2	—	—	59
Other(a)	3	4	10	3	7	—	2	—	29
Total	**114**	**26**	**200**	**15**	**21**	**33**	**3**	**1**	**413**
2000–01									
Major urban	4	9	5	1	1	2	1	1	24
Non-major urban	126	10	162	—	32	31	—	—	361
Minor urban(b)	—	—	—	—	—	—	—	—	—
Irrigation/rural	6	6	50	9	2	4	—	—	77
Other(a)	2	3	4	3	2	1	2	—	17
Total	**138**	**28**	**221**	**13**	**37**	**38**	**3**	**1**	**479**

— nil or rounded to zero (including null cells)

(a) Includes water supplied by other industries including the Mining, Manufacturing and Electricity and gas supply industries.

(b) Minor urban category incorporated into Non major urban in 2000-01.

3.20 WATER PROVIDERS(a), by type of service provided—2004–05

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Australia
	no.	no.	no.	no.	no.	no.	no.	no.	no.
Distributed supply(b)	111	23	190	12	14	33	3	1	387
Bulk distributed supply	40	8	35	3	1	9	—	1	97
Reuse supply	54	21	63	5	7	9	1	1	161
Bulk reuse supply	1	3	—	2	1	—	—	—	7
Sewerage services	104	19	140	3	19	27	3	1	316
Drainage services	4	4	19	1	2	1	—	—	31
Total water service providers	**114**	**26**	**200**	**15**	**21**	**33**	**3**	**1**	**413**

— nil or rounded to zero (including null cells)

(a) Water providers may provide more than one type of service.

(b) Excluding bulk services.

3.21 TOTAL DISTRIBUTED AND REUSE WATER SUPPLY(a)(b), by type of water provider—2004–05

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Australia
	ML	ML	ML	ML	ML	ML	ML	ML	ML
Distributed water									
Major urban	747 072	768 880	803 183	255 738	721 602	79 759	63 520	77 112	3 516 867
Non-major urban	176 894	418 909	163 669	—	2 963	—	—	—	762 436
Minor urban	91 330	5 578	129 204	1 550	1 819	14 468	—	—	243 949
Irrigation/rural	2 058 552	2 810 479	1 545 563	203 867	—	18 098	—	—	6 636 557
Other(c)	37 965	45	9 939	2	9 884	116 777	2 571	—	177 183
Total	*3 111 812*	*4 003 891*	*2 651 558*	*461 157*	*736 268*	*229 102*	*66 091*	*77 112*	*11 336 992*
Reuse water									
Major urban	20 800	52 335	15 339	20 093	13 677	—	1 852	2 189	126 285
Non-major urban	18 608	17 472	11 168	—	990	2 042	—	—	50 280
Minor urban	14 102	392	18 463	404	611	2 816	—	—	36 788
Irrigation/rural	139 441	59 830	1 491	—	—	—	—	—	200 762
Other(c)	915	545	5 121	1 689	2 230	—	—	—	10 500
Total	*193 866*	*130 574*	*51 582*	*22 186*	*17 508*	*4 858*	*1 852*	*2 189*	*424 615*
Total									
Major urban	767 872	821 215	818 522	275 831	735 279	79 759	65 372	79 301	3 643 152
Non-major urban	195 502	436 381	174 837	—	3 953	2 042	—	—	812 716
Minor urban	105 432	5 970	147 667	1 954	2 430	17 284	—	—	280 737
Irrigation/rural	2 197 993	2 870 309	1 547 054	203 867	—	18 098	—	—	6 837 319
Other(c)	38 880	590	15 060	1 691	12 114	116 777	2 571	—	187 683
Total	**3 305 678**	**4 134 465**	**2 703 140**	**483 343**	**753 776**	**233 960**	**67 943**	**79 301**	**11 761 607**

— nil or rounded to zero (including null cells)

(a) Data represents gross (unreconciled) water supply including water supplied to to other water providers and customers, losses, own use by water providers, and environmental provisions.

(b) Water supplied from one water provider to another is recorded against the original water provider. See commentary in Chapter 3 for more information.

(c) Includes water supplied by other industries including the Mining, Manufacturing and Electricity and gas supply industries.

3.22 BULK WATER SUPPLIED(a), by water type—2004–05

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Australia
	ML	ML	ML	ML	ML	ML	ML	ML	ML
Distributed	565 967	536 592	805 611	5 514	318 845	66 538	—	4 235	2 303 302
Reuse	705	2 267	—	16	10	—	—	—	2 998
Total	**566 672**	**538 859**	**805 611**	**5 530**	**318 855**	**66 538**	—	**4 235**	**2 306 300**

— nil or rounded to zero (including null cells)

(a) Water supplied from one water provider to another.

3.23 DISTRIBUTION LOSSES, by type of water provider—2004–05

	AUSTRALIA		2004-05							
	2000-01	*2004-05*	*NSW*	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*
Losses by volume										
Major urban (ML)	—	371 823	130 074	60 160	89 040	30 600	47 987	2 518	7 813	3 631
Non-major urban (ML)	—	110 846	19 926	49 679	34 545	—	862	5 835	—	—
Minor urban (ML)	—	39 257	13 574	699	20 864	289	423	3 407	—	—
Irrigation/rural (ML)	—	1 500 142	450 532	663 077	269 201	40 373	73 402	3 557	—	—
Total (ML)	**2 117 009**	**2 022 068**	**614 105**	**773 615**	**413 651**	**71 262**	**122 674**	**15 316**	**7 813**	**3 631**
Losses as proportion of distributed water supply(a)										
Major urban (%)	—	11	17	8	11	12	7	3	12	5
Non-major urban (%)	—	15	11	12	21	—	29	—	—	—
Minor urban (%)	—	16	15	13	16	19	23	24	—	—
Irrigation/rural (%)	—	23	22	24	17	20	—	20	—	—
Total (%)	**16**	**18**	**20**	**19**	**16**	**15**	**17**	**7**	**12**	**5**

— nil or rounded to zero (including null cells)

(a) Calculated against gross (unreconciled) water supply including water supplied to to other water providers and customers, losses, own use by water providers, and environmental provisions. See commentary in Chapter 3 for more information.

3.24 ENVIRONMENTAL PROVISIONS, by industry—2000–01 and 2004–05

	NSW(a)	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*(a)	*Australia*
	ML	ML	ML	ML	ML	ML	ML	ML	ML
2004–05									
Water supply industry(b)	60 165	370 347	377 779	713	18	1 941	1 103	30 200	842 266
Other industries(c)	36 825	3 582	5 827	—	—	116 777	—	—	163 011
Total	**96 990**	**373 929**	**383 606**	**713**	**18**	**118 718**	**1 103**	**30 200**	**1 005 277**
2000–01									
Total	**200 528**	**253 172**	**4 462**	**873**	—	**358**	—	na	**459 393**

— nil or rounded to zero (including null cells)

na not available

(a) NSW and ACT were combined for 2000-01.

(b) Includes Sewerage and drainage services.

(c) Other industries including the Mining, Manufacturing and Electricity and gas supply industries.

3.25 NET DISTRIBUTED AND REUSE WATER SUPPLY(a), by type of water provider—2004–05

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Australia
	ML	ML	ML	ML	ML	ML	ML	ML	ML
Distributed water									
Major urban	560 419	544 301	316 181	221 114	348 987	5 970	54 391	43 192	2 094 555
Non-major urban	136 174	376 456	207 922	—	5 956	39 416	—	—	765 925
Minor urban	102 469	5 703	144 553	1 642	3 489	34 083	—	—	291 939
Irrigation/rural	1 593 568	1 929 190	1 175 511	166 356	242 722	13 249	—	—	5 120 595
Other(b)	1 140	25	4 112	1	8 161	—	2 571	—	16 000
Total	*2 393 770*	*2 855 676*	*1 848 279*	*389 112*	*609 315*	*92 718*	*56 962*	*43 192*	*8 289 014*
Reuse water									
Major urban	10 790	37 399	10 197	20 093	10 872	—	1 852	555	91 758
Non-major urban	18 526	17 038	10 231	—	990	86	—	—	46 871
Minor urban	13 883	392	18 124	404	591	2 816	—	—	36 410
Irrigation/rural	139 441	59 830	1 491	—	—	—	—	—	200 762
Other(b)	715	545	4 871	1 196	2 230	—	—	—	9 557
Total	*183 355*	*115 204*	*44 914*	*21 693*	*14 683*	*2 902*	*1 852*	*555*	*385 358*
Total									
Major urban	571 209	581 700	326 378	241 207	359 859	5 970	56 243	43 747	2 186 313
Non-major urban	154 700	393 494	218 153	—	6 946	39 502	—	—	812 796
Minor urban	116 352	6 095	162 677	2 046	4 080	36 899	—	—	328 349
Irrigation/rural	1 733 009	1 989 020	1 177 002	166 356	242 722	13 249	—	—	5 321 357
Other(b)	1 855	570	8 983	1 197	10 391	—	2 571	—	25 557
Total	**2 577 125**	**2 970 880**	**1 893 193**	**410 805**	**623 998**	**95 620**	**58 814**	**43 747**	**8 674 372**

— nil or rounded to zero (including null cells)

(a) Net water supply includes all water supplied to customers, but excludes transfers of water between water providers, losses, own use by water providers, and environmental provisions.

(b) Includes water supplied by other industries including the Mining, Manufacturing and Electricity and gas supply industries.

3.26 REGULATED DISCHARGE(a), Water supply industry, by receiving body—2004–05

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Australia
	ML	ML	ML	ML	ML	ML	ML	ML	ML
Surface water	172 960	176 768	137 548	3 137	10 141	21 491	4 023	27 293	553 361
Groundwater	5 194	6 441	3 145	780	7 928	7	—	—	23 495
Sea water	481 914	344 891	168 765	80 398	112 785	36 105	7 118	—	1 231 976
Total	**660 068**	**528 100**	**309 458**	**84 315**	**130 854**	**57 603**	**11 141**	**27 293**	**1 808 832**

— nil or rounded to zero (including null cells)

(a) Includes waste and drainage water discharged.

3.27 WASTE WATER DISCHARGED(a), by treatment level—2004–05

	NSW	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*	*Australia*
	ML	ML	ML	ML	ML	ML	ML	ML	ML
Tertiary	178 853	39 111	168 164	78 818	52 086	12 344	301	27 293	556 970
Secondary	109 319	336 816	139 859	5 497	66 642	35 794	5 523	—	699 450
Primary	345 344	8 976	1 533	—	5 318	9 464	7 079	—	377 714
No Treatment	—	89	2	—	8	1	—	—	100
Total	**633 516**	**384 992**	**309 558**	**84 315**	**124 054**	**57 603**	**12 903**	**27 293**	**1 634 234**

— nil or rounded to zero (including null cells)

(a) For sewerage service providers only.

CHAPTER 4 AGRICULTURE

INTRODUCTION

This chapter examines the use of water within the AGRICULTURE industry in Australia. Water used by this industry includes stock drinking water and water applied through irrigation to crops and pastures. Water can be directly extracted from the environment by farmers (e.g. from bores, on-farm dams, rivers) or supplied by water providers (e.g. irrigation authorities). The use of rainwater is not included in this chapter. Since the AGRICULTURE industry does not use water in-stream, or supply water to other users, total water use is equal to water consumption.

To calculate the amount of water used by the AGRICULTURE industry, the ABS has used information collected from irrigation authorities, data on water use, irrigated area and livestock numbers from the ABS 2004–05 Agricultural Survey, as well as additional information available from State and Territory agricultural departments and research institutions. Additional detail on the methodology is found in the Explanatory Notes. The data presented in this publication are similar but slightly different to those data presented in *Water Use on Australian Farms, 2004–05* (cat. no. 4618.0) (ABS 2006e). This is because of the multiple data sources used in the 2004-05 Water Account, compared to single source of ABS survey data used for Water Use on Australian Farms, 2004–05.

Water use comparisons with revised figures from the 2000–01 Water Account have been included in this chapter. Water use by the AGRICULTURE industry is very much influenced by climatic conditions (see Appendix 1) and this must be taken into account when assessing changes in water use. In Australia (particularly eastern Australia), El Niño events contributed to 2004–05 being a period of below average rainfall over much of the continent, particularly in the north and south-west. In comparison, for much of 2000–01, the period of the last Water Account, Australia was under the influence of La Nina. Consistent with the weather patterns associated with La Nina, many areas of Australia had a wet year, particularly in the north of the continent.

MAIN FINDINGS

The main findings of this chapter are:

- Water consumption by the AGRICULTURE industry was 12,191 GL in 2004–05, a 23% decrease from 2000–01 when it was 14,989 GL.
- The AGRICULTURE industry accounted for 65% of total Australian water consumption in 2004–05, which is less than 2000–01, when it accounted for 69%.
- Livestock, pasture, grains and other agriculture (4,374 GL or 36%) had the highest water consumption within the AGRICULTURE industry in 2004–05, followed by Dairy farming (2,276 GL or 19%), Cotton (1,822 GL or 15%) and Sugar (1,269 GL or 10%).
- Self-extracted water use by the AGRICULTURE industry was 6,582 GL, distributed water use (e.g. supplied by irrigation authorities) was 5,329 GL, and reuse water use was 280 GL.

MAIN FINDINGS *continued*

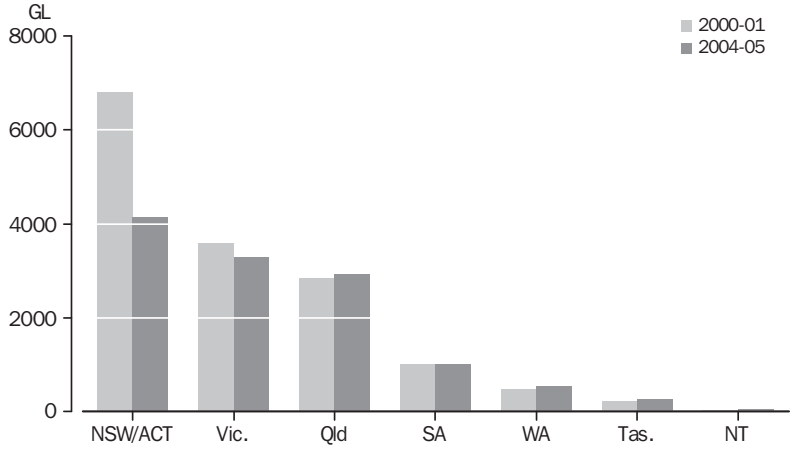
- The area of irrigated agricultural land in 2004–05 was 2.4 million hectares, an 8% decrease from 2000–01 when it was 2.6 million hectares. Irrigated land represents 0.5% of all agricultural land.
- The gross value of irrigated agricultural production amounted to $9.1 billion in 2004–05, a fall from $9.6 billion in 2000-01. (Note: Gross value is not a proxy for the highest value water use).
- Irrigated agricultural production contributed 23% of the total gross value of agricultural commodities produced in 2004–05.

AGRICULTURE

Water Consumption

Water consumption by the AGRICULTURE industry was 12,191 GL in 2004–05 (Table 4.9), accounting for 65% of total water consumption in Australia during that period. Water consumption varied between crops and between States and Territories. New South Wales and the Australian Capital Territory combined had the highest water consumption for the AGRICULTURE industry in 2004–05, with 4,133 GL or 34% of total agricultural water consumption (Graph 4.1), notwithstanding a 39% decrease in New South Wales and the Australian Capital Territory combined compared to 2000–01.

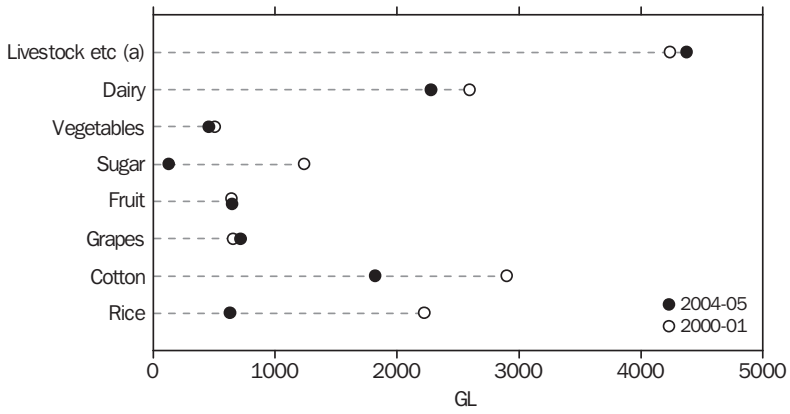
4.1 TOTAL WATER USE, Agriculture—2000–01 and 2004–05



In 2004–05, the Livestock, pasture, grains and other agriculture commodities had the highest water consumption within the AGRICULTURE industry, with 4,374 GL (or 36%). This was followed by Dairy farming (2,276 GL or 19%), Cotton (1,822 GL or 15%) and Sugar (1,269 GL or 10%) (Graph 4.2). Livestock, pasture, grains and other agriculture includes cut flowers, nurseries, turf growing and other commodities. Dairy farming includes livestock and irrigated pastures and grains for dairy farming purposes. Within the Livestock, pasture, grains and other agriculture commodities, the highest water consumption was for pasture other than for dairy (1,928 GL) and grain crops (1,162 GL) (Table 4.9).

Water Consumption continued

4.2 TOTAL WATER USE, Agriculture, by activity—2000–01 and 2004–05



(a) Includes Livestock, pasture, grains and other agriculture (excluding Dairy farming).

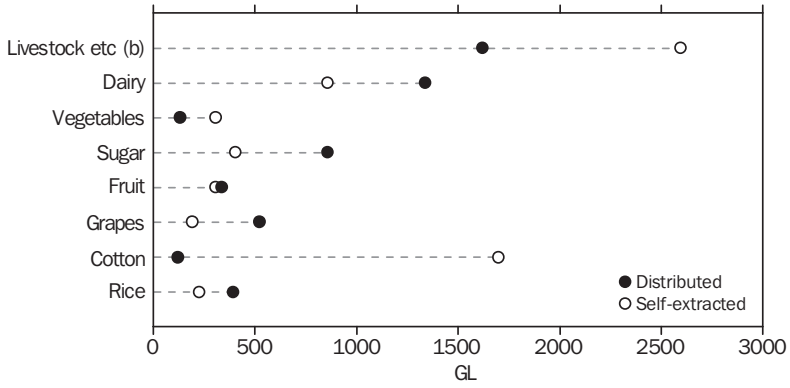
The largest percentage decreases in water consumption from 2000–01 to 2004–05 were in Rice (72%) and Cotton (37%). This is due to a decrease in the irrigated area of these crops (Table 4.13) and the dry conditions experienced in New South Wales (see Appendix 1).

Water Source

The majority of the water consumed by the AGRICULTURE industry in 2004–05 was self-extracted water (6,582 GL or 54%), with distributed water (5,329 GL or 44%) and reuse water (280 GL or 2%) accounting for the remainder (Table 4.10). This compares to 2000–01, where 50% was self-extracted water and 48% was distributed water.

The highest self-extracted water use within the AGRICULTURE industry in 2004–05 was by Livestock, pasture, grains and other agriculture (2,594 GL) and in Cotton (1,697 GL) (Graph 4.3 and Table 4.11). The main commodities that used more distributed water than self-extracted water include Dairy farming, Sugar and Grapes.

4.3 WATER USE, Agriculture, by activity and water type(a)—2004–05

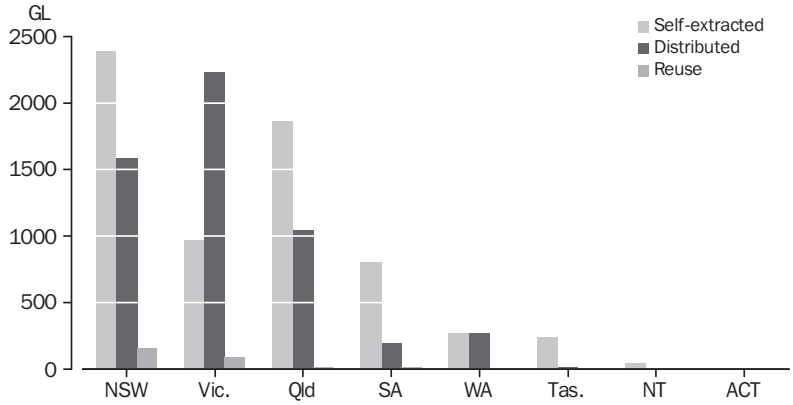


(a) Excludes reuse water.
(b) Includes livestock, pasture, grains and other agriculture (excluding Dairy farming).

Water Source continued

Self-extracted water use was higher than distributed water use for the AGRICULTURE industry in every State and Territory in 2004–05, with the exception of Victoria (Graph 4.4). New South Wales (2,388 GL) had the highest self-extracted water use, followed by Queensland (1,860 GL) and Victoria (966 GL) (Table 4.11). Victoria had the highest distributed water use, with 2,228 GL.

4.4 WATER USE, Agriculture, by water type—2004–05

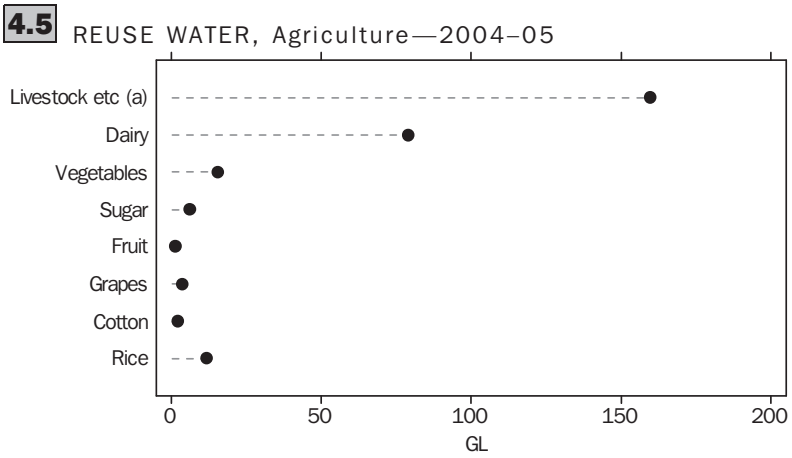


Note: ACT figures too low to appear on graph. See Table 4.11.

Reuse Water

Reuse water by the AGRICULTURE industry in 2004–05 was 280 GL, or 2% of total water consumption in the AGRICULTURE industry (Table 4.10). This is lower than 2000–01, when reuse water use was 423 GL compared to 3% of total water consumption. Reuse water accounted for 4% of total agricultural water consumption in New South Wales, and 3% in Victoria. Use of reuse water by the AGRICULTURE industry includes water from regional reuse schemes, but does not include on-farm reuse or recycling (see Glossary). The highest use of reuse water within the AGRICULTURE industry in 2004–05 was by Livestock, pasture, grains and other agriculture industry (160 GL), followed by Dairy farming (79 GL), Vegetables (16 GL) and Rice (12 GL) (Graph 4.5 and Table 4.11). Within Livestock, pasture, grains and other agriculture, most reuse water was used to irrigate grain crops (118 GL).

4.5 REUSE WATER, Agriculture—2004–05



(a) Includes Livestock, pasture, grains and other agriculture (excluding Dairy farming).

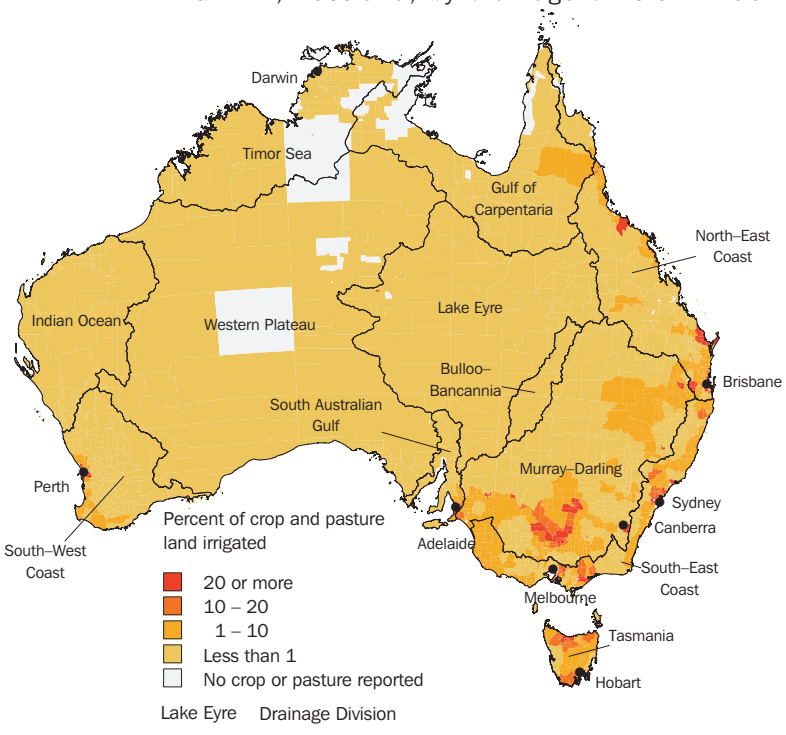
Origin of Water

The majority of self-extracted water use by the AGRICULTURE industry in 2004–05 originated from surface water (74%), while groundwater accounted for 23% (Table 4.12). The largest percentage extracted from surface water sources was Tasmania (92%), Victoria (84%) and Queensland (76%). Groundwater accounted for a significant percentage of agricultural water use in the Northern Territory (82%), South Australia (46%), Western Australia (26%), New South Wales (25%) and Queensland (23%).

Irrigated Land

Map 4.6 shows irrigated crops and pastures as a percentage of total land use in Australia, by drainage division. The majority of intensive crop and pasture irrigation occurs in the Murray-Darling drainage division. Table 4.13 shows the area irrigated by crop type for each State and Territory. New South Wales had the largest area irrigated with 910,000 hectares or 38% of the total irrigated area. The Australian Capital Territory contains the smallest area of irrigated land (156 hectares).

4.6 AREA IRRIGATED, Australia, by drainage division—2004–05



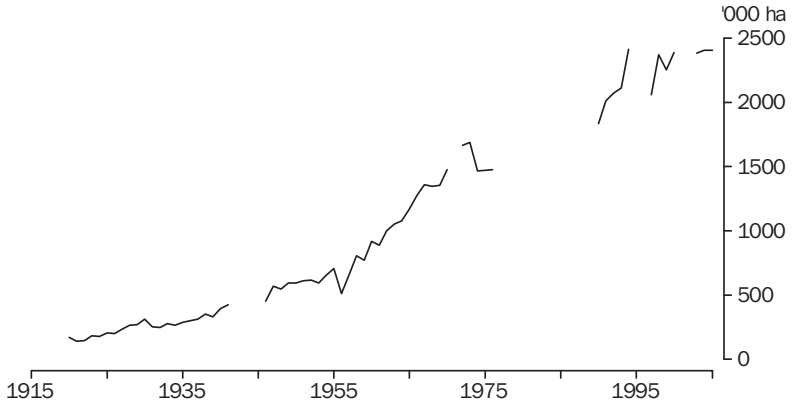
Source: Geoscience Australia 2004, Australian Bureau of Statistics 2006

The area of irrigated land decreased from 2.6 million hectares in 2000–01 to 2.4 million hectares in 2004–05 (Table 4.13), an 8% decrease in irrigated agricultural land. There were increases in the area irrigated for Livestock, Sugar, Fruit and Grapes and decreases in the area irrigated for Dairy farming, Vegetables, Cotton and Rice. The largest absolute increase in the area of irrigated land was in the Livestock, pasture, grains and other agriculture, from 930,875 hectares in 2000–01 to 1,045,500 hectares in 2004–05, consistent with an increase in water use. The largest absolute decrease in the area of land irrigated was in Cotton, from 437,378 hectares in 2000–01 to 269,677 hectares in 2004–05. In percentage terms, the largest decrease was a 71% decrease in the area of irrigated Rice, from 178,965 hectares to 51,216 hectares.

Irrigated Land continued

Graph 4.7 shows historically the increases in area irrigated in Australia from 1920 to 2005. There are some gaps in the data series, however, it can be seen that the area irrigated has increased dramatically since 1955.

4.7 AREA IRRIGATED, Australia—1920–2005



Source: ABS unpublished data

Irrigation Methods

Graph 4.8 shows the different types of irrigation methods used by percent of area irrigated for the years 2002–03 and 2004–05. More detailed information on irrigation methods for the years 2002–03 to 2004–05 are shown in Table 4.14. The greater detail for 2002–03 to 2004–05 is due to more detailed questions being asked on ABS surveys in those years. Surface irrigation refers to the controlled flooding of paddocks or irrigation bays, whereas sprinkler irrigation is applied from various forms of overhead sprays. Drip (or trickle) irrigation refers to the technique of applying water directly to individual plants or rows of crops.

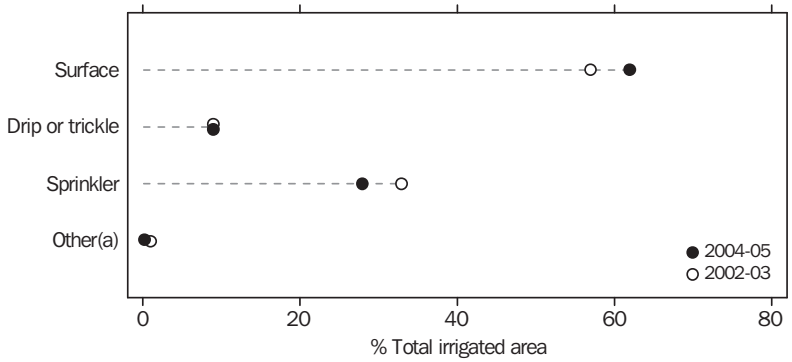
Between 2002–03 and 2004–05, there was a shift towards the use of more efficient irrigation methods. Surface irrigation remains the most preferred method of irrigation with 62% of irrigated area irrigated by this means in 2004–05, a 5% increase from 2002-03. Sprinkler systems, which include microspray, portable and hose irrigators, large mobile machines and solid set, were the next preferred method in 2004–05 (28%), although this is a 5% decrease in the percentage of area irrigated by sprinkler irrigation from 2002–03.

Value of Irrigated Agricultural Production

Estimating the value of agricultural production that results from irrigation is difficult. This is because water used by crops comes from a variety of sources. In particular, rainwater, which is not included in the Water Account, is usually a component of the water used by irrigated crops, and the timing and location of rainfalls affect the amount of irrigation water required. Other factors such as evaporation also affect irrigation water requirements. These factors contribute to regional and temporal variations in the use of water for irrigation.

Value of Irrigated Agricultural Production continued

4.8 IRRIGATION METHODS, Area irrigated, by method—2002–03 and 2004–05



(a) Estimate has a relative standard error of 10% to less than 25% and should be used with caution.

Source: ABS 2006e

In addition, water is not the only input to agricultural production from irrigated land. Land, fertiliser, labour, machinery and other inputs are also used. To separate the contribution that these factors make to total production is practically impossible with current data. Therefore, the estimates of the gross value of irrigated agricultural production presented in Table 4.15 attribute all of the gross value of production from irrigated land to irrigated agricultural production.

The gross value of irrigated production should not be used as a proxy for determining the highest value water uses. Gross value of irrigated agricultural production are derived from agricultural commodity values in *Value of Agricultural Commodities Produced, Australia 2004–05* (ABS 2006c). Further details on the methods used to derive the estimates are presented in the Explanatory Notes. The method used in the Water Account is similar to that used in the joint ABS–Productivity Commission publication *Characteristics of Australia's Irrigated Farms 2000–01 to 2003-04* (ABS 2006b).

The total gross value of irrigated agricultural production in 2004–05 was $9,076 million (Table 4.15) compared to $9,618 million in 2000–01. The decrease in gross value of irrigated production mainly occurred in New South Wales and Australian Capital Territory combined, from $2,371 million in 2000–01 to $1,867 million in 2004–05. Between 2000–01 and 2004–05 there were significant reductions in the value of irrigated production of cotton (from $1,222 million to $908 million) and rice (from $350 million to $102 million).

Irrigated production contributed 23% to the total gross value of agricultural commodities produced in 2004–05. Fruit was the largest contributor to the value ($1,777 million or 20%), followed by vegetables ($1,761 million or 20%) and dairy farming ($1,632 million or 18%).

4.9 WATER CONSUMPTION, Agriculture, by activity—2000–01 and 2004–05

	AUSTRALIA		2004-05							
	2000-01	*2004-05*	*NSW*	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*
	ML	ML	ML	ML	ML	ML	ML	ML	ML	ML
Dairy farming	2 592 769	2 275 603	262 547	1 710 433	68 964	94 592	54 458	84 610	—	—
Vegetables	506 579	455 373	68 692	84 356	102 833	94 874	51 609	51 782	1 226	1
Sugar	1 234 519	1 269 012	531	—	1 116 041	—	152 440	—	—	—
Fruit	645 244	647 662	133 540	197 625	115 949	143 808	39 124	10 173	7 422	21
Grapes	655 780	717 047	171 450	320 166	7 860	203 992	8 982	1 600	2 819	178
Cotton	2 895 821	1 821 509	964 306	—	857 203	—	—	—	—	—
Rice	2 222 801	630 872	624 422	6 450	—	—	—	—	—	—
Livestock, pasture, grains & other										
Livestock	na	1 035 474	259 177	155 810	293 572	118 554	156 050	19 590	32 354	367
Pasture(a)	na	1 927 892	693 508	622 364	171 449	336 720	39 449	62 917	1 484	—
Grains	na	1 162 268	838 321	153 940	135 750	12 413	12 865	8 979	—	—
Other	na	248 659	116 042	30 245	46 515	14 888	20 335	18 169	1 800	664
Total	*4 235 296*	*4 374 293*	*1 907 048*	*962 359*	*647 287*	*482 576*	*228 699*	*109 655*	*35 638*	*1 031*
Total	**14 988 809**	**12 191 372**	**4 132 537**	**3 281 389**	**2 916 138**	**1 019 841**	**535 312**	**257 819**	**47 105**	**1 231**

— nil or rounded to zero (including null cells)
na not available
(a) Excludes pasture for Dairy farming.

4.10 WATER CONSUMPTION, Agriculture, by water type—2000–01 and 2004–05

	AUSTRALIA		2004-05							
	2000-01	*2004-05*	*NSW*	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*
	ML	ML	ML	ML	ML	ML	ML	ML	ML	ML
Self-extracted	7 532 405	6 582 435	2 388 242	966 181	1 859 545	806 882	272 560	241 241	46 553	1 231
Distributed	7 033 139	5 329 012	1 584 192	2 228 353	1 044 275	194 820	262 698	14 674	—	—
Reuse	423 265	279 925	160 103	86 855	12 318	18 139	54	1 904	552	—
Total	**14 988 809**	**12 191 372**	**4 132 537**	**3 281 389**	**2 916 138**	**1 019 841**	**535 312**	**257 819**	**47 105**	**1 231**

— nil or rounded to zero (including null cells)

4.11 WATER CONSUMPTION, Agriculture, by water type and activity—2004–05

	Self-extracted	*Distributed*	*Reuse*	*Total*
	ML	ML	ML	ML
Dairy farming	856 993	1 339 473	79 136	2 275 603
Vegetables	307 033	132 544	15 796	455 373
Sugar	404 068	858 767	6 177	1 269 012
Fruit	306 978	339 315	1 370	647 662
Grapes	191 363	522 029	3 655	717 047
Cotton	1 697 245	122 071	2 194	1 821 509
Rice	224 806	394 158	11 908	630 872
Livestock, pasture, grains & other				
Livestock	935 396	100 078	—	1 035 474
Pasture(a)	1 000 850	887 144	39 898	1 927 892
Grains	461 815	582 098	118 356	1 162 268
Other	195 887	51 337	1 436	248 659
Total	*2 593 948*	*1 620 656*	*159 689*	*4 374 293*
Total	**6 582 435**	**5 329 012**	**279 925**	**12 191 372**

— nil or rounded to zero (including null cells)

(a) Excludes pasture for Dairy farming.

4.12 ORIGIN OF AGRICULTURAL WATER—2004–05

	Surface water	*Groundwater*	*Other*(a)	*Total all sources*
	%	%	%	ML
NSW(b)	73	25	2	4 133 768
Vic.	84	12	4	3 281 389
Qld	76	23	2	2 916 138
SA	45	46	9	1 019 841
WA	69	26	15	535 312
Tas.	92	6	2	257 819
NT	18	82	—	47 105
Australia	**74**	**23**	**3**	**12 191 372**

— nil or rounded to zero (including null cells)

(a) Includes town or country distributed supply, recycled or re-used water from off farm sources and other.

(b) Includes the Australian Capital Territory.

4.13 AREA IRRIGATED CROPS AND PASTURES, by activity—2000–01 and 2004–05

	AUSTRALIA		2004-05							
	2000-01	*2004-05*	*NSW*	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*
	'000 ha	'000 ha	'000 ha	'000 ha	'000 ha	'000 ha	'000 ha	'000 ha	'000 ha	'000 ha
Dairy farming	479.4	443.7	66.6	319.7	15.5	17.1	5.2	19.7	—	—
Vegetables	116.0	114.4	16.2	25.0	31.3	16.3	7.7	17.2	0.3	—
Sugar	211.5	215.1	0.1	—	209.2	—	5.8	—	—	—
Fruit	116.2	121.8	25.6	30.0	31.1	18.8	9.5	4.4	2.5	—
Grapes	133.1	146.7	36.4	36.3	3.6	61.2	7.5	1.2	0.4	0.1
Cotton	437.4	269.7	145.6	—	124.1	—	—	—	—	—
Rice	179.0	51.2	50.7	0.5	—	—	—	—	—	—
Livestock, pasture, grains & other										
Livestock(a)	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .
Pasture(b)	546.5	581.0	261.4	175.6	54.2	59.3	4.7	25.7	0.2	—
Cereal	290.1	361.5	261.8	32.7	52.1	5.5	3.2	6.2	—	—
Other	94.2	103.0	45.6	16.1	20.9	5.4	3.0	11.6	0.2	0.1
Total	*930.9*	*1 019.5*	*557.3*	*220.8*	*121.6*	*68.9*	*10.8*	*39.8*	*0.4*	—
Total irrigated land	**2 603.4**	**2 408.2**	**910.0**	**636.0**	**542.0**	**184.0**	**46.4**	**86.0**	**3.6**	**0.2**
Total agricultural land(c)	455 723	445 149.0	64 404.0	13 920.0	143 797.0	54 107.0	104 646.0	1 803.0	62 473.0	—

. . not applicable
— nil or rounded to zero (including null cells)
na not available
(a) No irrigation area applicable as water is used for stock drinking.
(b) Excludes pasture for Dairy farming.
(c) New South Wales total includes the Australian Capital Territory.
Source: ABS 2006e

4.14 IRRIGATION METHODS(a), 2002–03 to 2004–05

	AUSTRALIA			2004-05						
	2002-03	*2003-04*	*2004-05*	*NSW*(b)	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*
	%	%	%	%	%	%	%	%	%	%
Surface	57	58	62	77	72	50	^ 19	33	np	np
Drip or trickle										
Above ground	8	8	8	^ 5	^ 7	^ 5	32	^ 33	^ 5	30
Subsurface	1	1	^ 1	^ 1	^ 1	^ 2	* 1	^ 2	—	—
Sprinkler										
Microspray	3	3	3	^ 1	3	4	10	^ 9	^ 1	59
Portable irrigators	5	5	4	^ 4	^ 3	^ 5	^ 2	np	14	np
Hose irrigators	12	12	9	^ 4	^ 4	22	^ 3	** 7	39	—
Large mobile machines	9	10	9	^ 7	^ 6	^ 9	26	np	31	np
Solid set	4	3	3	^ 1	^ 4	^ 3	^ 8	7	^ 2	—
Other	^ 1	* <1	^ <1	* <1	* <1	* <1	—	—	np	np
Total Area ('000 ha)	**2 343**	**2 387**	**2 382**	**898**	**632**	**536**	**183**	**46**	**82**	**4**

^ estimate has a relative standard error of 10% to less than 25% and should be used with caution
* estimate has a relative standard error of 25% to 50% and should be used with caution
** estimate has a relative standard error greater than 50% and is considered too unreliable for general use
— nil or rounded to zero (including null cells)
np not available for publication but included in totals where applicable, unless otherwise indicated
(a) Areas reported as being irrigated by more than one method are shown against each method reported and hence may add to more than 100.
(b) Includes the Australian Capital Territory.
Source: ABS 2006e

4.15 GROSS VALUE OF IRRIGATED AGRICULTURAL PRODUCTION, 2000–01 and 2004–05

	AUSTRALIA		2004-05							
	2000-01	*2004-05*	*NSW*	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*
	$m	$m	$m	$m	$m	$m	$m	$m	$m	$m
Dairy farming	1 499	1 632	204	1 090	108	88	71	70	—	—
Vegetables	1 817	1 761	207	411	561	266	165	147	4	—
Sugar	284	477	1	—	471	—	5	—	—	—
Fruit	1 590	1 777	296	524	494	263	118	49	32	—
Grapes	1 355	1 314	252	336	16	600	89	12	8	1
Cotton	1 222	908	513	—	395	—	—	—	—	—
Rice	350	102	100	1	—	—	—	—	—	—
Nurseries, cut flowers & turf	763	737	160	244	173	44	95	14	4	3
Livestock, pasture, grains & other	737	367	130	71	129	22	3	12	—	—
Total	**9 618**	**9 076**	**1 864**	**2 677**	**2 349**	**1 284**	**545**	**304**	**49**	**3**

— nil or rounded to zero (including null cells)

CHAPTER 5 MINING AND MANUFACTURING

INTRODUCTION

This chapter presents data on water use in the MINING and MANUFACTURING industries. These industries use water for cleaning, cooling, product movement, dust suppression and as a raw material. The MINING and MANUFACTURING industries use water from both distributed supply and self-extracted sources. In addition, there is a growing use of reuse water in both of these industries. For the MINING and MANUFACTURING industries total water use does not equal water consumption, as some businesses use water in-stream or supply water to other users.

Information in this chapter is based on data obtained through surveys of businesses in the MINING and MANUFACTURING industries (ANZSIC 1101–2949) as well as other publicly available data, such as that found in annual reports. As a result, the 2004–05 Water Account is better than the previous estimates. In the first edition of the Water Account (1996–97), water use estimates were derived for these industries using limited data. The 2000–01 data on water use for MINING and MANUFACTURING have been revised.

On-site reuse was included as reuse water in the first edition of the Water Account, but not subsequent editions. On-site reuse volumes are significant within the MINING and MANUFACTURING industries, but only reuse water that has been supplied (e.g. from sewage treatment plants) to these industries is reported for 2000–01 and 2004–05.

MAIN FINDINGS

Mining

- In 2004–05, total water use by the MINING industry was 608,575 ML, a 35% increase from 2000–01 when it was 452,468 ML. This increase has been associated with rising levels of production in this industry.
- Water consumption by the MINING industry was 413,266 ML in 2004–05, or 2% of total water consumption in Australia. This was 29% higher than the water consumed by the MINING industry in 2000–01 (320,848 ML).
- The METAL ORE MINING industry had the highest total water use within the MINING industry in 2004–05 (364,998 ML), followed by the COAL MINING (154,972 ML) and OTHER MINING (56,895 ML) industries.
- The State or Territory with the highest total water use within the MINING industry was Western Australia (281,418 ML), followed by Queensland (138,976 ML), New South Wales (86,770 ML), and Victoria (33,568 ML).
- In Western Australia, there was an 81% increase in total water use by the MINING industry between 2000–01 and 2004–05, primarily in the METAL ORE MINING industry.
- Distributed water use by the MINING industry in 2004–05 was 72,203 ML and self-extracted water use was 529,103 ML.
- Reuse water use by the MINING industry in 2004–05 was 7,268 ML, a 34% increase from 2000–01 when it was 5,409 ML.
- The MINING industry supplied 11,902 ML of distributed water to other users in 2004–05.

Manufacturing

- In 2004–05, total water use by the MANUFACTURING industry was 600,505 ML, a 9% increase from 2000–01 when it was 548,887 ML.
- Water consumption by the MANUFACTURING industry was 589,333 ML in 2004–05, or 3% of total water consumption in Australia. This was 7% higher than the water consumed by the MANUFACTURING industry in 2000–01 (548,887 ML).
- Within the MANUFACTURING industry in 2004–05, the FOOD, BEVERAGE AND TOBACCO industry (215,029 ML) had the highest total water use, followed by the METAL PRODUCTS (157,370 ML) and WOOD AND PAPER PRODUCTS (99,238 ML) industries.
- The State or Territory with the highest total water use within the MANUFACTURING industry was Queensland (163,581 ML) followed by New South Wales (127,135 ML), Victoria (113,609 ML) and Western Australia (82,812 ML).
- Distributed water use by the MANUFACTURING industry in 2004–05 was 341,308 ML and self-extracted water use was 246,162 ML.
- Reuse water use by the MANUFACTURING industry in 2004–05 was 13,035 ML, a 74% increase from 2000–01 when it was 7,474 ML.
- The MANUFACTURING industry supplied 11,172 ML of distributed water to other users in 2004–05.

MINING

The MINING industry consists of five subdivisions; COAL MINING, OIL AND GAS EXTRACTION, METAL ORE MINING, OTHER MINING, and SERVICES TO MINING. The SERVICES TO MINING industry accounts for a very small proportion of water use and is incorporated into the OTHER MINING subdivision with CONSTRUCTION MATERIAL MINING and MINING EXPLORATION.

Most water used in the MINING industry is from self-extracted sources. Water is often obtained from mine dewatering, which occurs when water is collected through the process of mining and mineral extraction, or rainfall, run-off and water infiltration, and is later discharged. Mine dewatering is considered to be a self-extracted water source for the MINING industry in the Water Account. Mine dewatering that is extracted from the mine site and discharged without being used in the production process is considered to be in-stream use. Total water use does not equal water consumption for the MINING industry, due to in-stream water use associated with mine dewatering and the supply of distributed water to other users.

Produced formation water (PFW) is the naturally occurring water that exists within oil and gas reservoirs (APPEA, 2006). PFW is often extracted along with oil or gas in the production process. This water is separated from the oil or gas, treated, and discharged. Comprehensive estimates of the PFW extracted are not available and are not included in this publication.

An enlarged survey program and improvements in reporting of mine dewatering by the MINING industry has resulted in more accurate data for 2004–05 compared to the first and second editions of the Water Account. As such, changes between 2000–01 and 2004–05 should be interpreted with caution.

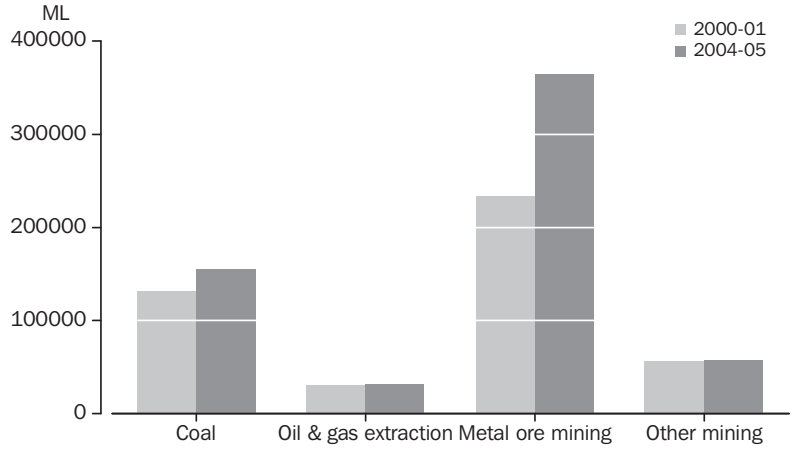
Water Use

Total water use in the MINING industry was 608,575 ML in 2004–05, a 34% increase from 2000–01 when it was 452,468 ML (Table 5.10). In 2004–05, the METAL ORE MINING industry had the highest total water use within the MINING industry (364,998 ML), followed by the COAL MINING (154,972 ML), OTHER MINING (56,895 ML), and OIL AND GAS EXTRACTION (31,709 ML)

Water Use continued

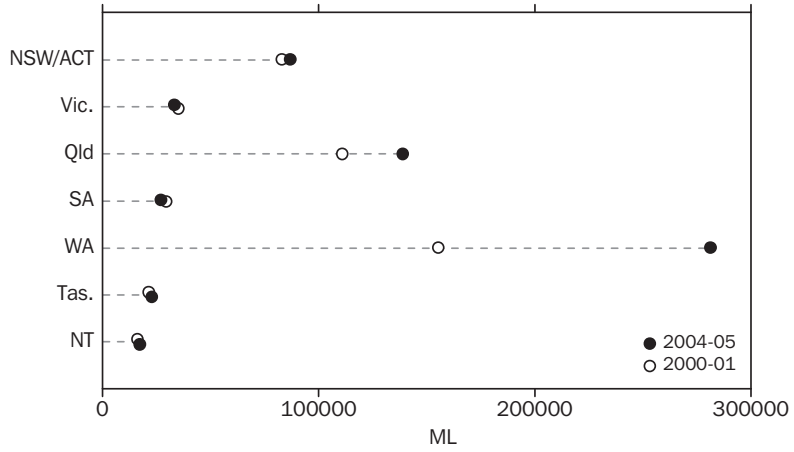
industries (Graph 5.1). The increase in water use is associated with increased levels of production in this industry and improvements in business record keeping and reporting.

5.1 WATER USE, Mining, by industry—2000–01 and 2004–05



Graph 5.2 shows water use in the MINING industry by State and Territory for 2000–01 and 2004–05. The State or Territory with the highest water use within the MINING industry in 2004–05 was Western Australia (281,418 ML or 46%), followed by Queensland (138,976 ML), New South Wales (86,770 ML), and Victoria (33,568 ML). The greatest percentage increase in total water use from 2000–01 to 2004–05 was 81% in Western Australia, mainly due to an increase in water use by the METAL ORE MINING industry (Table 5.10).

5.2 WATER USE, Mining—2000–01 and 2004–05



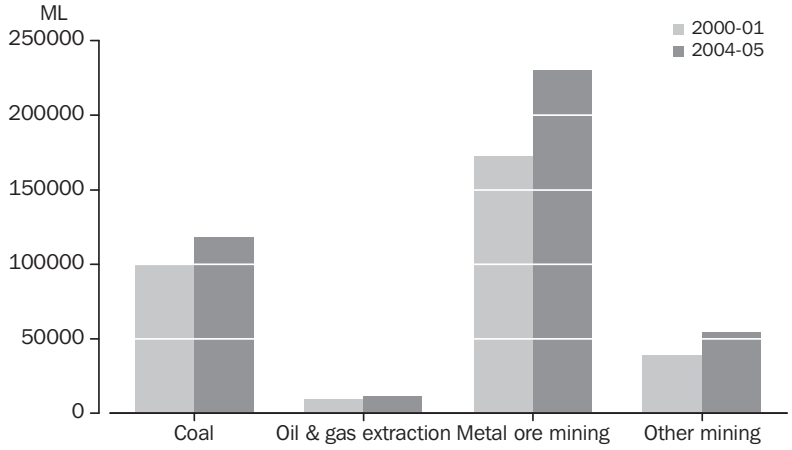
Water Consumption

Graph 5.3 shows water consumption by the MINING industry in 2000–01 and 2004–05. In the MINING industry, water consumption excludes in-stream use of water associated with mine dewatering and the supply of distributed water to other users. Water consumption by the MINING industry was 413,266 ML in 2004–05, or 2% of total water consumption in Australia during this period. The METAL ORE MINING industry had the highest water

Water Consumption continued

consumption (229,791 ML), followed by the COAL MINING (117,803 ML) and OTHER MINING (53,716 ML) industries.

5.3 WATER CONSUMPTION, Mining, by industry—2000–01 and 2004–05

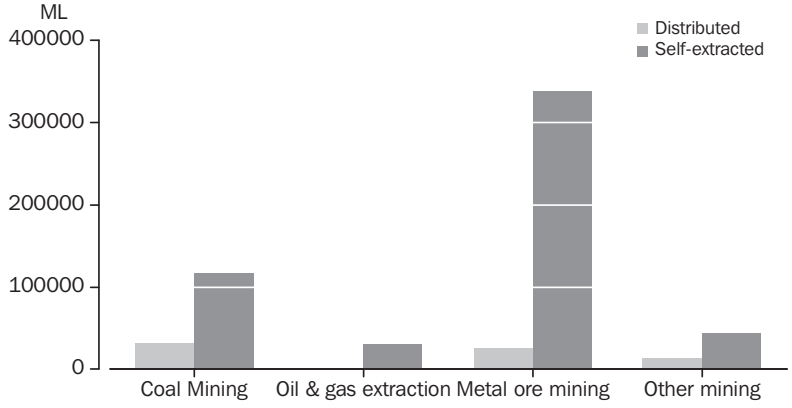


Water Source

In 2004–05, the use of self-extracted water accounted for 529,103 ML (or 87%) of total water use by the MINING industry (Table 5.11). Use of distributed water was 72,203 ML for the same period.

The highest user of self-extracted water within the MINING industry in 2004–05 was the METAL ORE MINING industry (337,512 ML), followed by the COAL MINING (117,503 ML) and OTHER MINING (43,944 ML) (Graph 5.4). The highest user of distributed water was the COAL MINING industry (31,537 ML), followed by the METAL ORE MINING (26,150 ML) and OTHER MINING (12,951 ML). The OIL AND GAS EXTRACTION industry had the lowest use of self-extracted water (30,144 ML) and distributed water (1,565 ML).

5.4 WATER USE, Mining, by industry and water type—2004–05



Note: Oil & gas extraction distributed water is too low to appear on graph. See Table 5.10.

Reuse Water

Reuse water use by the MINING industry in 2004–05 was 7,268 ML, a 34% increase from 2000–01 when it was 5,409 ML. In 2004–05, the COAL MINING industry used 5,933 ML of reuse water and the METAL ORE MINING industry used 1,335 ML of reuse water (Table 5.11).

Reuse Water continued

The COAL MINING industry increased the use of reuse water by 123% from 2000–01 to 2004–05 and the METAL ORE MINING industry had a 52% decrease in reuse water use over the same period. These volumes include only the reuse water supplied to the MINING industry (for example from sewage treatment plants) and do not include on-site recirculation of water.

Water Supply

The MINING industry supplied 11,902 ML of distributed water to other users in 2004–05 (Table 5.10). While this is a very small fraction of the total distributed water supplied in Australia in 2004–05 (0.1%), it is an important source of water in several remote communities servicing mining operations. Mining operations in Queensland, Western Australia and the Northern Territory supplied water to other users (mainly households).

Water Discharge

Water discharged by the MINING industry was 226,748 ML in 2004–05 (Table 5.10). A high proportion of water discharged by the mining industry is associated with the mine dewatering process, although it is not possible to separately quantify the amount of water discharged from mine dewatering. The highest volume of water discharged within the MINING industry was in Western Australia (105,391 ML). This was followed by Queensland (54,534 ML), New South Wales (37,132 ML), Tasmania (14,499 ML), South Australia (7,954 ML), the Northern Territory (3,619 ML) and Victoria (3,618 ML).

MANUFACTURING

The MANUFACTURING industry consists of nine subdivisions. Water use varies considerably between these subdivisions due to the different nature of the products manufactured. Total water use does not equal water consumption for the MANUFACTURING industry, due to the supply of distributed water by this industry to other users.

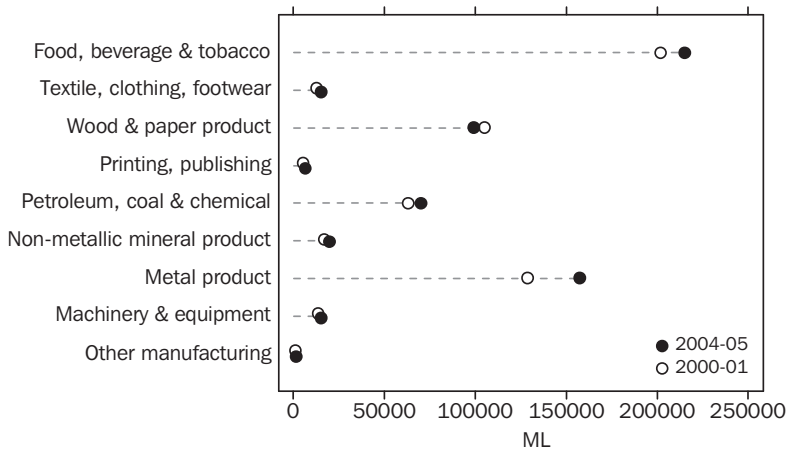
Comprehensive and reliable estimates of regulated discharge are not available for the entire MANUFACTURING industry; therefore, the estimates of regulated discharge presented are likely to be underestimated. This will result in an over estimation of the level of water consumption, especially for the parts of the manufacturing industry where there are large volumes of regulated discharge, e.g. sugar mills and pulp and paper mills. This overstated water consumption will be reflected in the States and/or Territories where such activities occur, e.g. sugar mills in Queensland, and pulp and paper mills in Tasmania. Generally these activities occur in rural areas where water is discharged directly into the environment and made available to users downstream. In urban areas, manufacturing waste water is generally collected by sewerage systems and treated in sewage treatment plants rather than being discharged directly into the environment.

Water Use

Total water use in the MANUFACTURING industry was 600,505 ML in 2004–05, a 9% increase from 2000–01 when it was 548,887 ML (Table 5.12). In 2004–05, the FOOD, BEVERAGE AND TOBACCO industry had the highest water use within the MANUFACTURING industry (215,029 ML), followed by the METAL PRODUCTS (157,370 ML), WOOD AND PAPER PRODUCTS (99,238 ML), and PETROLEUM, COAL, CHEMICAL AND ASSOCIATED PRODUCTS (70,324 ML) industries (Graph 5.5).

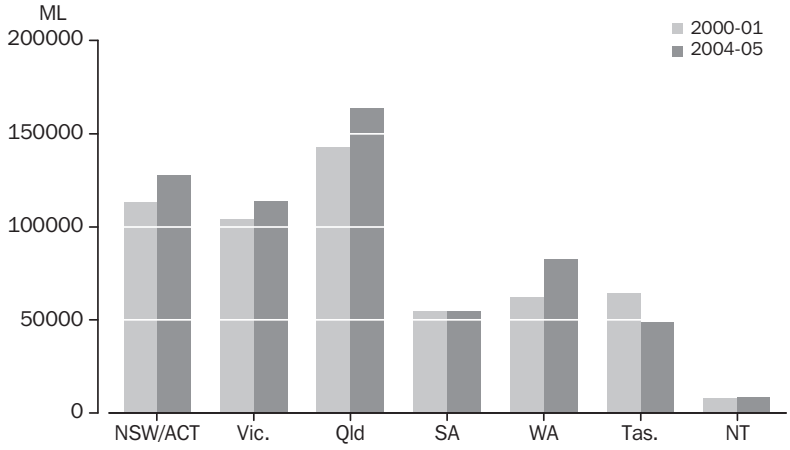
Water Use continued

5.5 WATER USE, Manufacturing, by industry—2000–01 and 2004–05



Graph 5.6 shows total water use in the MANUFACTURING industry by State and Territory for 2000–01 and 2004–05. All States and Territories with the exception of Tasmania increased their total water use over 2000–01 to 2004–05 within the MANUFACTURING industry. Queensland had the highest total water use within the MANUFACTURING industry in 2004–05 with 163,581 ML. This was followed by New South Wales (127,135 ML), Victoria (113,609 ML) and Western Australia (82,812 ML). The MANUFACTURING industry in the Australian Capital Territory has the lowest water use with 639 ML.

5.6 WATER USE, Manufacturing—2000–01 and 2004–05



Water Consumption

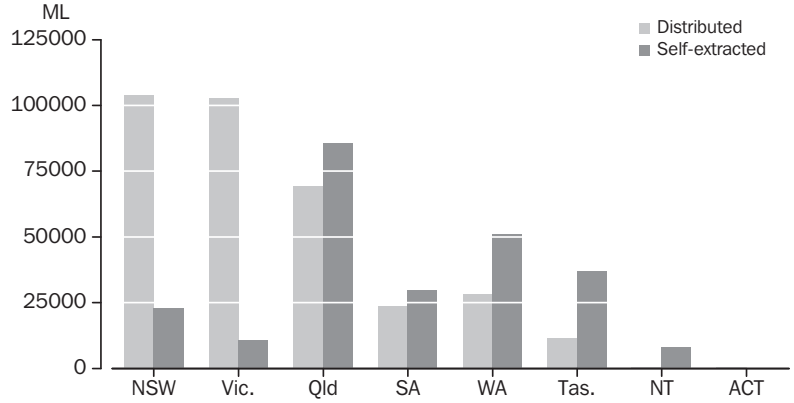
Water consumption by the MANUFACTURING industry was 589,333 ML in 2004–05, or 3% of total water consumption in Australia during this period. This was 7% higher than the water consumed by the MANUFACTURING industry in 2000–01 (548,887 ML) (Table 5.12). In the MANUFACTURING industry, water consumption excludes the supply of distributed water by this industry to other users. The FOOD, BEVERAGE AND TOBACCO industry had the highest water consumption (215,029 ML), followed by the METAL PRODUCTS (146,218 ML), and WOOD AND PAPER PRODUCTS (99,238 ML) industries.

Water Source

In 2004–05, the use of distributed water accounted for 341,308 ML (or 57%) of total water use by the MANUFACTURING industry (Table 5.13). Use of self-extracted water was 246,162 ML (or 41%) for the same period. This is similar to 2000–01, where distributed water accounted for 59% and self-extracted water accounted for 39%.

The reliance on distributed water by the MANUFACTURING industry varied by State and Territory (Graph 5.7). The Australian Capital Territory (97%), Victoria (90%), and New South Wales (82%) had the highest reliance on distributed water. In contrast, distributed water accounted for 24% of the total water used by the MANUFACTURING industry in Tasmania. The difference in the use of self-extracted and distributed water between States and Territories is due to varying structure and types of MANUFACTURING industries occurring within jurisdictions, as well as the availability of different water sources.

5.7 WATER USE, Manufacturing, by water type—2004–05



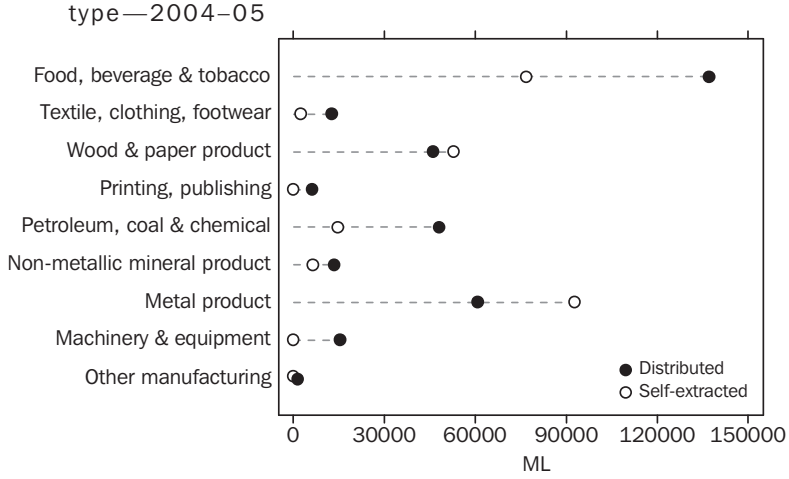
Note: The ACT is too low to appear on graph. See Table 5.11.

Graph 5.8 shows the FOOD, BEVERAGE AND TOBACCO (137,039 ML) and the METAL PRODUCTS (60,743 ML) industries used the highest volumes of distributed water. However, the OTHER MANUFACTURING; PRINTING, PUBLISHING AND RECORDED MEDIA; and TEXTILE, CLOTHING, FOOTWEAR AND LEATHER industries had the highest percentage use of distributed water, with distributed water accounting for 99%, 98% and 84% respectively of water used by these industries.

The METAL PRODUCTS (92,742 ML) and the FOOD, BEVERAGE AND TOBACCO (76,645 ML) industries had the highest volumes of self-extracted water use (Graph 5.8). The METAL PRODUCTS and the WOOD AND PAPER PRODUCTS industries had the highest percentage use of self-extracted water, with self extracted water accounting for 59% and 53% respectively of total water use by these industries.

Water Source continued

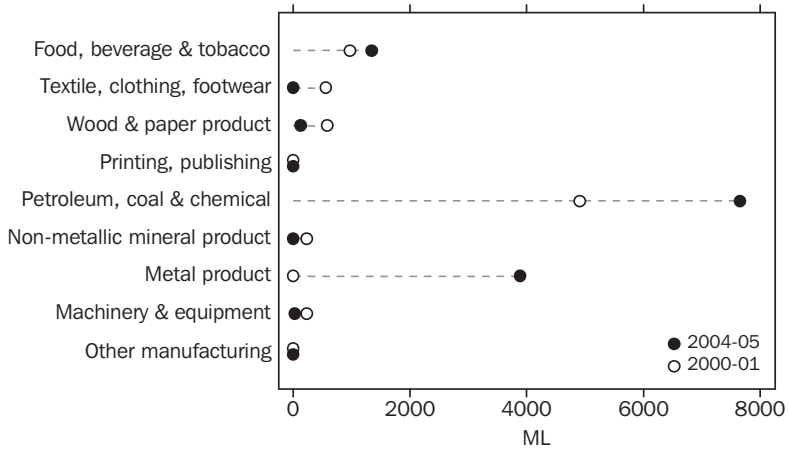
5.8 WATER USE, Manufacturing, by industry and water type—2004–05



Reuse Water

Reuse water use by the MANUFACTURING industry in 2004–05 was 13,035 ML. The use of reuse water has increased from 1% to 2% of total water use by the MANUFACTURING industry since 2000–01 (Table 5.13). In 2004–05, of the PETROLEUM, COAL, CHEMICAL AND ASSOCIATED PRODUCTS industry had the highest use of reuse water within the MANUFACTURING industry in 2004–05 with 7,649 ML (Graph 5.9). This was followed by the METAL PRODUCTS (3,885 ML) and the FOOD, BEVERAGE AND TOBACCO (1,345 ML) industries. Minor users of reuse water included the WOOD AND PAPER PRODUCTS (129 ML), MACHINERY AND EQUIPMENT (24 ML), and PRINTING, PUBLISHING AND RECORDED MEDIA (3 ML) industries. These volumes only include reuse water reported to have been supplied to the MANUFACTURING industry (for example from sewage treatment plants), and do not include on-site reuse or recycling of water.

5.9 USE OF REUSE WATER, Manufacturing—2000–01 and 2004–05



Water Supply

The MANUFACTURING industry supplied 11,172 ML of distributed water to other users in 2004–05 or 0.1% of total water distributed water supplied in Australia during this period (Table 5.12). The METAL PRODUCTS industry supplied almost all of the distributed water supplied by the MANUFACTURING industry in 2004–05 (11,152 ML), supplying water in Queensland (5,827 ML), the Northern Territory (2,462 ML), Western Australia (1,723 ML)

Water Supply continued

and New South Wales (1,140 ML). The remaining 20 ML was supplied by the PETROLEUM, COAL, CHEMICAL AND ASSOCIATED PRODUCTS industry in Victoria.

Regulated Discharge

Water discharge to the environment by the MANUFACTURING industry was 109,875 ML in 2004–05 (Table 5.12). The highest volume of water discharged within the MANUFACTURING industry was in Queensland (54,038 ML). This was followed by New South Wales (33,058 ML), Tasmania (13,532 ML), Victoria (5,000 ML), Western Australia (4,171 ML) and South Australia (76 ML). There was no regulated discharge by this industry reported in the Northern Territory or the Australian Capital Territory. The WOOD AND PAPER PRODUCTS and the FOOD, BEVERAGE AND TOBACCO industries were the only industries to report regulated discharge within the MANUFACTURING industry in 2004–05 (see Chapter 2 supply and use tables).

5.10 WATER USE, SUPPLY AND DISCHARGE, Mining—2000–01 and 2004–05

	AUSTRALIA		2004-05							
	2000-01	*2004-05*	*NSW*	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*
	ML	ML	ML	ML	ML	ML	ML	ML	ML	ML
Water use										
Self-extracted	383 866	529 103	74 087	29 826	95 818	26 429	265 606	22 996	14 224	118
Distributed	63 194	72 203	6 586	3 742	42 015	756	15 783	24	3 297	—
Reuse	5 409	7 268	6 098	—	1 142	—	29	—	—	—
Total	*452 468*	*608 575*	*86 770*	*33 568*	*138 976*	*27 185*	*281 418*	*23 020*	*17 520*	*118*
Water consumption	320 848	413 266	62 868	31 736	83 057	19 230	182 552	16 294	17 411	118
Distributed water supplied	6 220	11 902	—	—	3 634	—	8 159	—	109	—
Regulated discharge	165 581	226 748	37 132	3 618	54 534	7 954	105 391	14 499	3 619	—
In-stream use	125 400	183 406	23 902	1 832	52 285	7 954	90 707	6 725	—	—

— nil or rounded to zero (including null cells)

5.11 WATER USE, Mining, by industry—2000–01 and 2004–05

	Self-extracted	*Distributed*	*Reuse*	*Total use*	*Consumption*
	ML	ML	ML	ML	ML
2004–05					
Coal mining	117 503	31 537	5 933	154 972	117 803
Oil & gas extraction	30 144	1 565	—	31 709	11 956
Metal ore mining	337 512	26 150	1 335	364 998	229 791
Other mining	43 944	12 951	—	56 895	53 716
Total	**529 103**	**72 203**	**7 268**	**608 575**	**413 266**
2000–01					
Total	**383 866**	**63 194**	**5 409**	**452 468**	**320 848**

— nil or rounded to zero (including null cells)

5.12 WATER USE, SUPPLY AND DISCHARGE, Manufacturing—2000–01 and 2004–05

	AUSTRALIA		2004-05							
	2000-01	*2004-05*	*NSW*	*Vic.*	*Qld*	*SA*	*WA*	*Tas*	*NT*	*ACT*
	ML	ML	ML	ML	ML	ML	ML	ML	ML	ML
Water use										
Self-extracted	215 216	246 162	22 995	10 840	85 710	29 847	51 366	37 323	8 062	18
Distributed	326 197	341 308	103 971	102 769	69 303	23 960	28 343	11 617	724	621
Reuse	7 474	13 035	169	—	8 567	1 196	3 102	—	—	—
Total	*548 887*	*600 505*	*127 135*	*113 609*	*163 581*	*55 004*	*82 812*	*48 940*	*8 786*	*639*
Water consumption	548 887	589 333	125 995	113 589	157 754	55 004	81 089	48 940	6 324	639
Distributed water supplied	—	11 172	1 140	20	5 827	—	1 723	—	2 462	—
Regulated discharge	65 425	109 875	33 058	5 000	54 038	76	4 171	13 532	—	—

— nil or rounded to zero (including null cells)

5.13 WATER USE, Manufacturing, by industry—2000–01 and 2004–05

	Self-extracted	*Distributed*	*Reuse*	*Total use*	*Consumption*
	ML	ML	ML	ML	ML
2004–05					
Food, beverage & tobacco	76 645	137 039	1 345	215 029	215 029
Textile, clothing, footwear & leather	2 451	12 793	—	15 244	15 244
Wood & paper products	52 933	46 176	129	99 238	99 238
Printing, publishing & recorded media	92	6 320	3	6 416	6 416
Petroleum, coal, chemical & associated products	14 700	47 974	7 649	70 324	70 304
Non-metallic mineral products	6 490	13 403	—	19 893	19 893
Metal products	92 742	60 743	3 885	157 370	146 218
Machinery & equipment	101	15 345	24	15 469	15 469
Other manufacturing	7	1 515	—	1 522	1 522
Total	**246 162**	**341 308**	**13 035**	**600 505**	**589 333**
2000–01					
Total	**215 216**	**326 197**	**7 474**	**548 887**	**548 887**

— nil or rounded to zero (including null cells)

CHAPTER 6 ELECTRICITY GENERATORS

INTRODUCTION

Electricity generators are a significant user of water. Most of the water is used for hydro-electricity power generation, but coal-fired power stations also use considerable amounts of water in their boilers and cooling towers. Water used for hydro-electricity power generation is not a consumptive use as the water extracted passes through turbines to generate electricity and is discharged and made available to downstream users. Therefore water use for hydro-electricity power generation is treated differently from other water uses and is called in-stream use. Water consumption by electricity generation is largely due to evaporation from cooling towers.

Information in this chapter is based on data obtained from an ABS census of electricity generators. The data in the supply and use tables in Chapter 2 are for the ELECTRICITY AND GAS SUPPLY industry. The figures in this chapter are only for water used by electricity generators and therefore do not exactly match the totals for the ELECTRICITY AND GAS SUPPLY industry presented. In addition, a change in accounting treatment has occurred, whereby water discharged to holding ponds and then re-extracted is now treated as recycled water, and not as multiple self-extractions and unmeasured discharges.

MAIN FINDINGS

The main findings of this chapter are:

- Total water use by electricity generators in 2004–05 was 60,292 GL. This is 10% higher than 2000–01 where total water use was 54,787 GL.
- Water consumption in 2004–05 by electricity generators was 271 GL, or 1% of total water consumption in Australia. This represents a 6% increase from 2000–01 where water consumption was 255 GL.
- Total water use by electricity generators was greatest in Tasmania where 38,279 GL were used. The next largest users were New South Wales (10,790 GL) and Victoria (6,073 GL).
- Self-extracted water accounted for practically all total water use (60,172 GL or 99.8%) by electricity generators in 2004–05.
- Regulated discharge (which includes in-stream use) by electricity generators was 59,924 GL.

ELECTRICITY GENERATORS

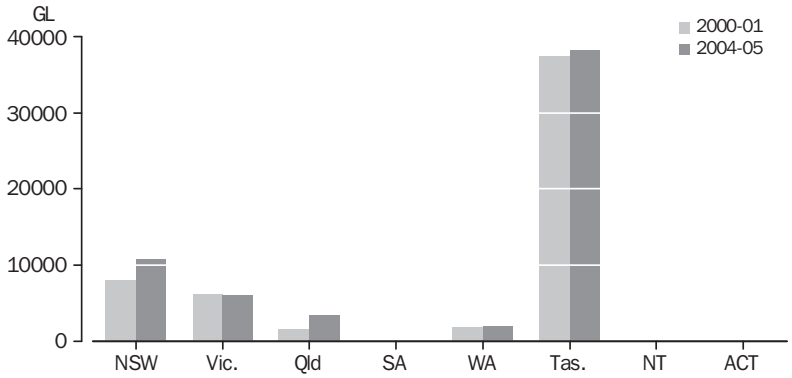
Water Use

Total water use by electricity generators was 60,292 GL, a 10% increase since 2000–01 (54,787 GL) (Table 6.5). This volume excludes sea water which is important to the operations of some businesses in this industry — only freshwater is in scope for the supply and use tables in Chapter 2 (see Explanatory Notes). Some information on the volume of sea water used in electricity generation is included in Table 6.9.

Graph 6.1 shows total water use by electricity generators by State and Territory for 2004–05. The largest user was Tasmania, which used a total of 38,279 GL in 2004–05. The next largest users were New South Wales (10,790 GL) and Victoria (6,073 GL).

Water Use continued

6.1 WATER USE(a), Electricity generators—2000–01 and 2004–05



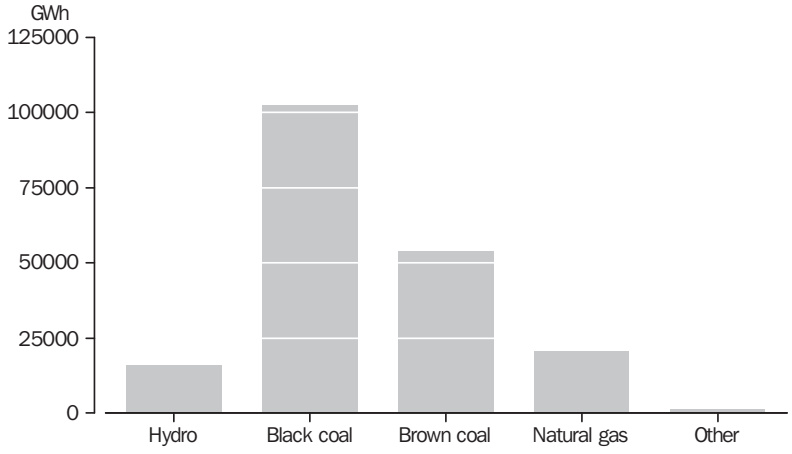
(a) Including in-stream use.

Note: Values for SA, NT and ACT are too low to show on graph. See Table 6.7.

Total water use by electricity generators by fuel type is presented in Table 6.6. Hydro-electricity power stations used the greatest volume of water at 59,867 GL in 2004–05 (99.6%) with black coal power stations using 153 GL, brown coal power stations using 82 GL, and gas-fired power stations using 12 GL.

Graph 6.2 shows the amount of electricity generated by different fuel types for Australia. These data are included to allow for comparisons of the water used per GWh of electricity generated by different fuel types. The majority of electricity generated in Australia is by black coal (102,180 GWh), followed by brown coal (54,041 GWh), natural gas (20,876 GWh) and hydro-electricity generation (15,991 GWh). The most electricity generated by all fuel types is in New South Wales (60,829 GWh), followed by Victoria (51,314 GWh) and Queensland (43,492 GWh) (Table 6.8). No electricity is generated in the Australian Capital Territory.

6.2 ELECTRICITY GENERATED, by fuel type—2004–05



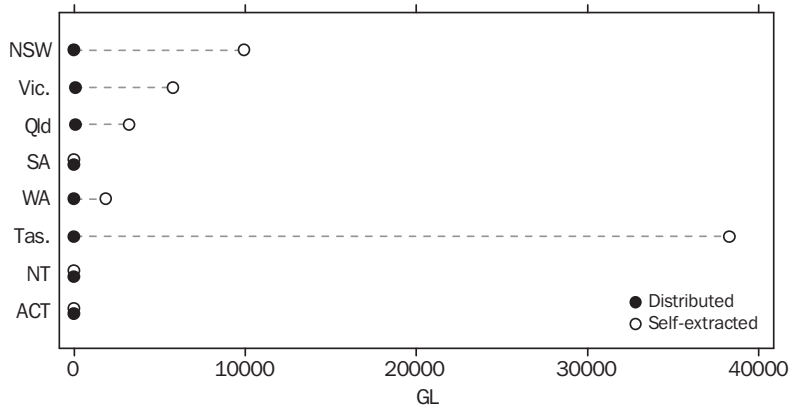
Water Use continued

Unsurprisingly, hydro-electricity generation uses the greatest amount of water per GWh of electricity generated (ML/GWh) at an average of 3,744 ML/GWh compared to brown coal (1.52 ML/GWh), black coal (1.50 ML/GWh) and gas (0.56 ML/GWh) (Table 6.8). However, practically all of the water used to produce hydro-electricity is in-stream use and is not consumed.

Water Sources

Graph 6.3 shows that virtually all of the water used by electricity generators was from a self-extracted source (60,172 GL or 99.8% of total water use). Distributed water accounted for only 115 GL or 0.2% of total water use. Tasmania used the most self-extracted water (38,279 GL), followed by New South Wales and (10,781 GL) and Victoria (6,051 GL).

6.3 WATER USE(a), Electricity generators, by water type—2004–05



(a) Includes in-stream use.

Sea water is also used as a source of water by electricity generators although is out of scope for the supply and use tables presented in Chapter 2. Table 6.9 shows the use of sea water contributes 9% of the water used (freshwater and sea water, including in-stream use) for electricity generation in Australia. New South Wales reported the greatest use of sea water (4,065 GL) followed by Queensland (725 GL).

Reuse Water

Electricity generators used 6,002 ML of reuse water in 2004–05; an increase of 20% since 2000–01 (4,802 ML, Table 6.9). Of this volume, 3,361 ML was used in Queensland; 1,318 ML in New South Wales; 1,223 ML in South Australia; and 100 ML in Western Australia. The other States and Territories reported no use of reuse water. These volumes only include reuse reported to have been supplied to electricity generators (for example from sewage treatment plants or the mining industry), and do not include on-site reuse or recycling of water.

Water Supply

In 2004–05 electricity generators supplied a small amount of distributed and reuse water to other users (Table 6.10). Distributed water supplied by electricity generators was 154,109 ML in 2004–05 of which 153,602 ML were for environmental purposes. Tasmanian electricity generators supplied the greatest volume of water for environmental purposes (116,777 ML) followed by New South Wales (36,825 ML). Electricity generators also supplied reuse water to other users (7,471 ML) in 2004–05, an

Water Supply continued

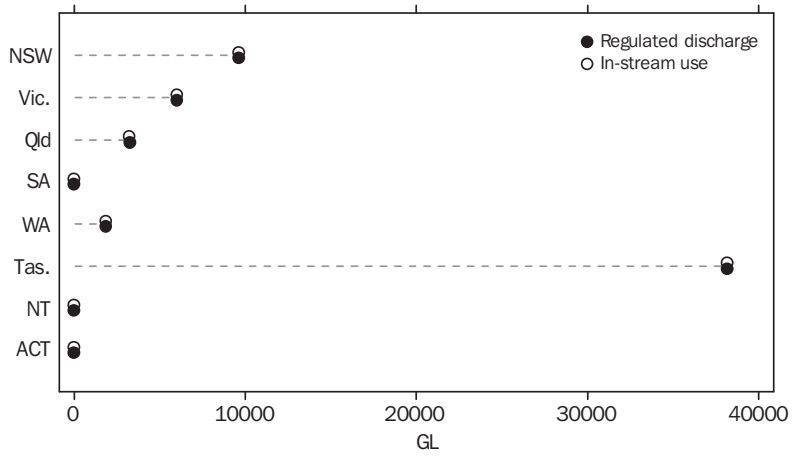
increase of 66% from 2000–01 (4,506 ML). Of this volume, electricity generators in Queensland supplied 4,081 ML, or 55% of total reuse supplied to other users.

Regulated Discharge and In-stream Use

Graph 6.4 and Table 6.11 show regulated discharge and in-stream use by State and Territory for 2004–05. Water used in-stream by electricity generators is a component of water discharge. The total volume of water discharged was 59,924 GL in 2004–05, an increase of 10% since 2000–01 (54,578 GL). In-stream use made up 59,867 GL or practically all (99.8%) of total discharge in 2004–05.

Electricity generators in Tasmania discharged 38,162 GL in 2004–05, the highest volume of any of the States and Territories, and in-stream use accounted for all (100%) of the total water discharged. New South Wales discharged 10,682 GL (in-stream use 10,678 GL). Victoria discharged 6,003 GL (in-stream use 5,974 GL). The lowest volume of water discharged was by the Northern Territory (31 ML). Regulated discharge that is not in-stream use includes water that has been extracted by coal and gas power stations, used for electricity generation, and then discharged. The location and quality of the discharged water may be different from that at the extraction point.

6.4 REGULATED DISCHARGE AND IN-STREAM USE, Electricity generators—2004–05



6.5 WATER USE AND WATER CONSUMPTION, Electricity generators—2000–01 and 2004–05

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Australia
	ML	ML	ML	ML	ML	ML	ML	ML	ML
2004–05									
Self-extracted	10 781 364	6 051 163	3 217 027	285	1 841 998	38 278 873	1 124	—	60 171 834
Distributed	7 764	21 714	77 459	1 011	6 476	97	14	—	114 535
Reuse	1 318	—	3 361	1 223	100	—	—	—	6 002
Total water use (including in-stream)	10 790 446	6 072 877	3 297 847	2 519	1 848 574	38 278 970	1 138	—	60 292 371
Total water use (excluding in-stream)	112 039	98 782	80 984	2 519	12 808	116 874	1 138	—	425 144
Water consumption	75 214	98 757	80 506	2 517	12 806	97	1 138	—	271 035
2000–01									
Self-extracted	8 023 412	6 087 306	1 448 997	595	1 711 684	37 404 500	661	—	54 677 155
Distributed	9 330	20 642	72 551	756	1 746	36	—	—	105 060
Reuse	1 210	2 766	106	720	—	—	—	—	4 802
Total water use (including in-stream)	8 033 952	6 110 714	1 521 654	2 071	1 713 430	37 404 536	661	—	54 787 017
Total water use (excluding in-stream)	68 187	107 903	74 049	2 071	14 375	36	661	—	267 282
Water consumption	59 200	107 767	70 855	1 709	14 372	36	661	—	254 600

— nil or rounded to zero (including null cells)

6.6 WATER USE(a), Electricity generators, by fuel type—2004–05

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Australia
	ML	ML	ML	ML	ML	ML	ML	ML	ML
Hydro	10 678 407	5 974 095	3 216 863	—	1 835 766	38 162 096	—	—	59 867 227
Black coal	68 772	—	74 162	—	10 087	—	—	—	153 021
Brown coal	—	81 057	—	830	—	—	—	—	81 887
Gas	1 195	74	5 729	1 058	2 349	97	1 104	—	11 606
Other	32	—	744	—	—	—	34	—	810
Total	**10 748 406**	**6 055 226**	**3 297 498**	**1 888**	**1 848 202**	**38 162 193**	**1 138**	—	**60 114 551**

— nil or rounded to zero (including null cells)

(a) Includes in-stream use.

6.7 ELECTRICITY GENERATION, by fuel type—2004–05

	NSW	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*	*Australia*
	GWh	GWh	GWh	GWh	GWh	GWh	GWh	GWh	GWh
Hydro	4 596	794	826	—	215	9 560	—	—	15 991
Black coal	54 231	—	38 290	—	9 659	—	—	—	102 180
Brown coal	—	49 341	—	4 700	—	—	—	—	54 041
Gas	1 182	1 179	4 145	5 401	6 117	934	1 828	—	20 786
Other	820	—	231	38	110	226	48	—	1 473
Total	**60 829**	**51 314**	**43 492**	**10 139**	**16 101**	**10 720**	**1 876**	—	**194 471**

— nil or rounded to zero (including null cells)

6.8 WATER USE PER GWH OF ELECTRICITY GENERATED(a), by fuel type—2004–05

	NSW	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*	*Australia*
	ML/GWh	ML/GWh	ML/GWh	ML/GWh	ML/GWh	ML/GWh	ML/GWh	ML/GWh	ML/GWh
Hydro	2 323.0	7 524.0	3 895.0	—	8 538.0	3 992.0	—	—	3 744.0
Brown coal	—	1.6	—	0.2	—	—	—	—	1.5
Black coal	1.3	—	1.9	—	1.0	—	—	—	1.5
Gas	1.0	0.1	1.4	0.2	0.4	0.1	0.6	—	0.6
Other	—	—	3.2	—	—	—	0.7	—	0.6

— nil or rounded to zero (including null cells)

(a) Includes in-stream use.

6.9 SOURCES OF WATER, Electricity generators—2004–05

	NSW	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*	*Australia*
	ML	ML	ML	ML	ML	ML	ML	ML	ML
Self-extracted	10 781 364	6 051 163	3 217 027	285	1 841 998	38 278 873	1 124	—	60 171 834
Distributed	7 764	21 714	77 459	1 011	6 476	97	14	—	114 535
Reuse	1 318	—	3 361	1 223	100	—	—	—	6 002
Total	*10 790 446*	*6 072 877*	*3 297 847*	*2 519*	*1 848 574*	*38 278 970*	*1 138*	—	*60 292 371*
Sea water	4 064 609	198 463	725 000	627 392	312 296	—	—	—	5 927 760
Total including sea water	**14 855 055**	**6 271 340**	**4 022 847**	**629 911**	**2 160 870**	**38 278 970**	**1 138**	—	**66 220 131**

— nil or rounded to zero (including null cells)

6.10 WATER SUPPLY, Electricity generators—2004–05

	NSW	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*	*Australia*
	ML	ML	ML	ML	ML	ML	ML	ML	ML
Distributed water supply									
Supplied to customers	—	25	478	2	2	—	—	—	507
Environmental provisions	36 825	—	—	—	—	116 777	—	—	153 602
Total	*36 825*	*25*	*478*	*2*	*2*	*116 777*	—	—	*154 109*
Reuse water supply	129	—	4 081	1 196	2 065	—	—	—	7 471
Total	**36 954**	**25**	**4 559**	**1 198**	**2 067**	**116 777**	—	—	**161 580**

— nil or rounded to zero (including null cells)

6.11 REGULATED DISCHARGE AND IN-STREAM USE, Electricity generators—2000–01 and 2004–05

	AUSTRALIA		2004-05							
	2000-01	*2004-05*	*NSW*	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*
	ML	ML	ML	ML	ML	ML	ML	ML	ML	ML
Regulated discharge	54 578 294	59 924 125	10 682 173	6 002 735	3 239 028	892	1 837 170	38 162 096	31	—
In-stream use	54 519 736	59 867 227	10 678 407	5 974 095	3 216 863	—	1 835 766	38 162 096	—	—

— nil or rounded to zero (including null cells)

CHAPTER 7 HOUSEHOLDS

INTRODUCTION

This chapter presents data on water use by Australian Households, also referred to as domestic water use. For the purpose of the Water Account, water used by Households is defined as any water that is used for human consumption (such as for drinking and cooking) as well as water used by Households for cleaning or outdoors (such as water for gardens and swimming pools).

Since Households do not use water in-stream, or supply water to other users, total water use is equal to water consumption. The information in this chapter is based on data obtained by the ABS through direct surveys of water providers and Households. Information on the methodology can be found in the Explanatory Notes.

This chapter also includes a section that discusses the prevalence of rainwater tanks, based on data collected in ABS Household surveys and first presented in the ABS publication *Environmental Issues: People's Views and Practices, 2004* (cat. no. 4602.0) (ABS 2004b). Additional information is also available for South Australia in 2004 in *Domestic Use of Water and Energy, South Australia October, 2004* (cat. no. 4618.4) (ABS 2005a) and for Western Australia in 2003 in *Domestic Water Use, Western Australia October, 2003* (cat. no. 4616.5.55.00) (ABS 2004a).

MAIN FINDINGS

The main findings of this chapter are:

- Water consumption by Households was 2,108,263 ML in 2004–05, accounting for 11% of water consumption in Australia. This compares with 2,278,173 ML in 2000–01 where it accounted for 10% of water consumption.
- Water consumption by Households decreased 8% in 2004–05 compared to 2000–01.
- Of the total volume of water consumed by Households, New South Wales Households consumed the most water (572,711 ML), followed by Queensland (492,908 ML) and Victoria (404,632 ML). Australian Capital Territory Households consumed the least amount of water (30,989 ML).
- The largest percentage decrease in water consumption by Households from 2000–01 to 2004–05 was in the Australian Capital Territory (15%).
- Western Australia had the highest average Household water consumption per capita (180 kL/capita), followed by Northern Territory (153 kL/capita) and Tasmania (143 kL/capita). Victoria had the lowest average Household water consumption per capita (81 kL/capita).

HOUSEHOLDS

Water Consumption

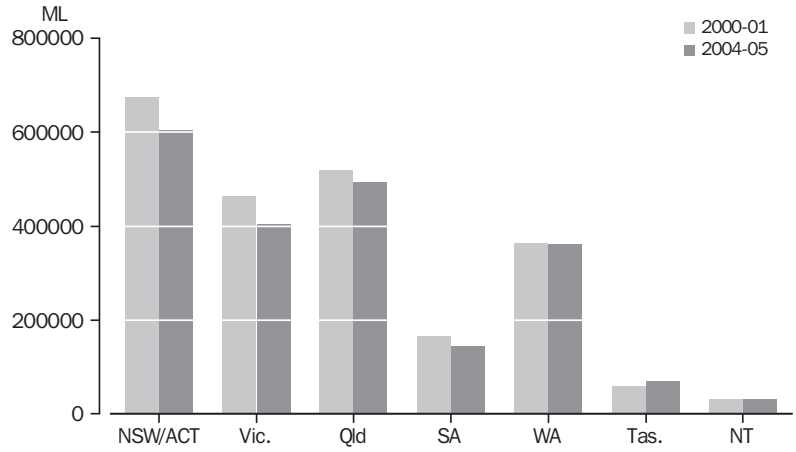
Data on water consumption by Households over the period 2004–05 are presented in Tables 7.6–7.8. Table 7.6 summarises water consumption by Households by State and Territory for 2000–01 and 2004–05. In 2004–05, water consumption by Households was 2,108,263 ML, representing a decrease of 7% since 2000–01 (2,278,173 ML). The decrease may be attributed in part to mandatory water restrictions in most States and Territories since 2002. Climate also plays a significant role in Household water consumption, and

Water Consumption continued

explains some differences in per capita Household water consumption between States and Territories (eg. hotter, drier States and Territories generally use more water than cooler, wetter States and Territories).

Graph 7.1 shows that New South Wales consumed the largest volume of water for Household use (572,711 ML) followed by Queensland (492,908 ML) and Victoria (404,632 ML), broadly in line with population for the States and Territories. Total Household water consumption decreased in all States and Territories from 2000–01 to 2004–05 with the exception of Tasmania, which showed an increase of 17% in total Household water consumption. The largest percentage decrease in total Household water consumption was in the Australian Capital Territory (15%) followed by South Australia (13%).

7.1 WATER CONSUMPTION, Households—2000–01 and 2004–05



Water Source

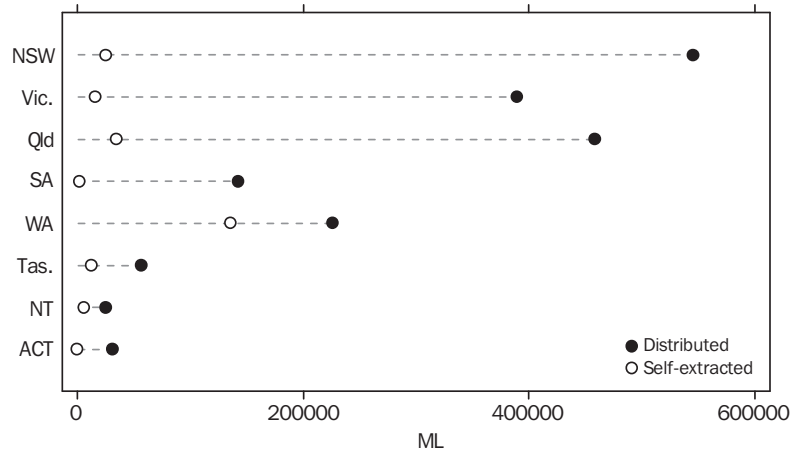
Of the total water consumed by Households in 2004–05, 89% was distributed water and 11% was water from a self-extracted source (i.e. rainwater tanks and direct extraction from surface or groundwater). In 2000–01 Households sourced a similar proportion of total water consumption from distributed water (90%).

Graph 7.2 shows that South Australia and the Australian Capital Territory reported using little self-extracted water during 2004–05. Western Australia had the highest percentage of use of a self-extracted source (38%) followed by the Northern Territory (18%).

Self-extracted water from groundwater sources such as urban garden bores are not monitored at a national level. Reliable estimates of unlicensed water use from urban and country garden bores were provided by Western Australia and have been included in the self-extracted component of water use. Data for other jurisdictions, however, were not available for 2004–05. This may result in the underreporting of the self-extracted component for some States and Territories where the use of garden bores occurs. In future editions of the Water Account, the ABS will endeavour to include the self-extracted use of water from groundwater sources by Households across Australia.

Water Source continued

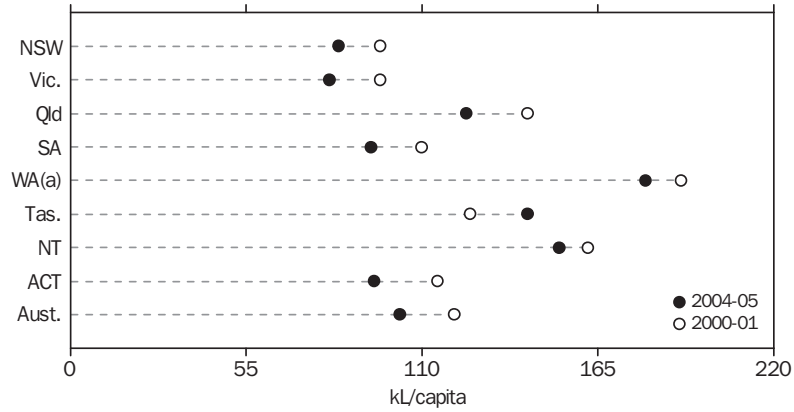
7.2 HOUSEHOLD WATER CONSUMPTION, by water type—2004–05



Average Water Use

Australians on average consumed 103 kL/capita during 2004–05 compared to 2000–01 where average water consumption per capita was 120 kL/capita (Graph 7.3). Western Australia reported the highest Household water consumption per capita (180 kL/capita), followed by Northern Territory (153 kL/capita), Tasmania (143 kL/capita) and Queensland (124 kL/capita). Victoria had the lowest average Household water consumption per capita (81 kL/capita) followed by New South Wales (84 kL/capita), South Australia (94 kL/capita) and the Australian Capital Territory (95 kL/capita) (Table 7.7).

7.3 HOUSEHOLD WATER CONSUMPTION, per capita—2000–01 and 2004–05



(a) Includes unlicensed water use from garden bores.

Australian Households consumed on average 268 kL of water per household in 2004–05 (Table 7.8), with an average of 2.6 persons per household (ABS 2002). Western Australia had the highest water consumption per household (468 kL per household) in 2004–05. This was followed by the Northern Territory (399 kL per household) and Tasmania (372 kL per household). Victoria had the lowest average water consumption per household (209 kL per household) followed by New South Wales (219 kL per household) and South Australia (244 kL per household).

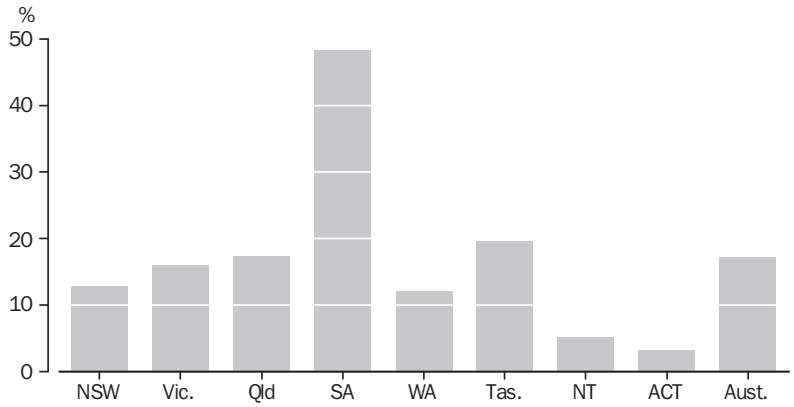
Rainwater Tanks

Information in this section is based on data collected in the ABS Household surveys and first presented in the publication *Environmental Issues: People's views and practices, 2004* (cat. no. 4602.0) (ABS 2004b).

New South Wales had the highest number of rainwater tanks in March 2004 (329,900). Victoria had the next highest number of rainwater tanks (305,400) followed by South Australia (305,000) and Queensland (261,000), as shown in Table 7.9. The lowest number of rainwater tanks were in the Northern Territory (2,900) and the Australian Capital Territory (4,000). All States and Territories have recorded an increase in the number of rainwater tanks since 2001. Mandatory water restrictions in Sydney, Melbourne, Perth, Hobart and Canberra from 2002 to 2004 and rebate schemes for the installation of rainwater tanks in NSW, Victoria, Queensland, Tasmania and Australian Capital Territory has most likely influenced this increase.

Graph 7.4 shows the proportion of Households with rainwater tanks. South Australia had the highest proportion of rainwater tanks in March 2004 with 48% of Households reporting they had rainwater tanks. South Australia also report the greatest dissatisfaction with distributed water supply (ABS 2004b). This was followed by Tasmania (20%) and Queensland (17%). The lowest proportion of Households with rainwater tanks was in the Australian Capital Territory (3%). With the exception of South Australia and Queensland, all States and Territories have reported an increase in the proportion of Households that source water from rainwater tanks since March 2001 (ABS 2004b).

7.4 PROPORTION OF HOUSEHOLDS WITH RAINWATER TANKS—2004



Source: ABS 2004b

The actual volume of water used by Households from rainwater tanks in Australia is poorly understood. For the purpose of the Water Account, water use from rainwater tanks was estimated and is included in the self-extracted component of water use.

Reuse Water

Use of reuse water by Households is only just beginning in Australia. Current health legislation, the absence of infrastructure and community acceptance are among the reasons for limited distributed supply of reuse water to Households. However, some examples do exist of the use of reclaimed water in residential areas using a 'third pipe' system. For instance, Rouse Hill in Sydney NSW, supplies around 12,000 Households in Sydney's north west. Other schemes in the development stages include Mawson Lakes,

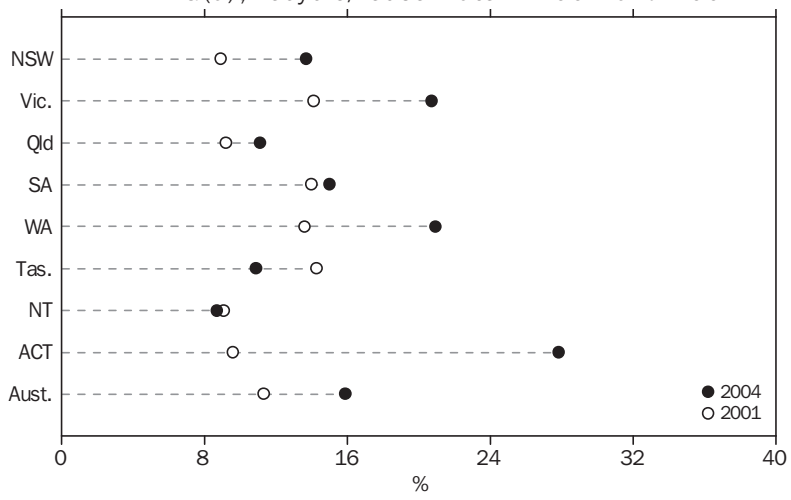
Reuse Water continued

South Australia (up to 3,500 Households), Springfield, Queensland (16 Households but potentially 18,000 Households) and Epping North, Victoria (ultimately 8,000 Households) (EPA Victoria, 2003). Reclaimed water is restricted in use to gardens and toilet flushing.

There are several examples of houses that have on-site grey water recycling capabilities in Australia, which is supported by a number of management strategies (ATSE, 2004; EPA Queensland, 2003). As on-site recycling and reuse is out of scope for this edition of the Water Account, these volumes have not been reported in this publication. However, the ABS publication, *Environmental issues: People's views and practices, 2004* (ABS 2004b) asked questions in relation to people's conservation practices inside and around their dwellings, including the use of recycled or reuse water by Households.

The proportion of Households using recycled or reuse water within and around their dwellings from 2001 to 2004 has increased in most States and Territories (Graph 7.5). The Australian Capital Territory has the highest proportion of Households recycling or reusing water inside and around the dwelling (28%) followed by Western Australia (21%) and Victoria (21%). Tasmania and the Northern Territory decreased in the proportion of Households recycling or reusing water in comparison to other conservation measures (ABS 2004b). The proportional increase in Households use of recycled or reuse water around the home is likely to be influenced by drought conditions in Australia and a greater awareness of conservation of water resources.

7.5 WATER CONSERVATION PRACTICES INSIDE AND AROUND DWELLING(a), recycle/reuse water—2001 and 2004



(a) Excludes water conservation practices in the garden.
Source: ABS 2004b

7.6 HOUSEHOLD WATER CONSUMPTION, by water type—2000–01 and 2004–05

	AUSTRALIA		2004-05							
	2000-01	*2004-05*	*NSW*	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*
	ML	ML	ML	ML	ML	ML	ML	ML	ML	ML
Self-extracted	221 550	232 446	25 521	15 641	34 992	2 161	135 890	12 526	5 715	—
Distributed	2 056 455	1 874 050	545 423	388 991	457 916	142 279	226 151	56 905	25 396	30 989
Reuse	167	1 767	1 767	—	—	—	—	—	—	—
Total	**2 278 173**	**2 108 263**	**572 711**	**404 632**	**492 908**	**144 440**	**362 041**	**69 431**	**31 111**	**30 989**

— nil or rounded to zero (including null cells)

Note: Sums may not necessarily equal totals due to rounding.

7.7 HOUSEHOLD WATER CONSUMPTION, per capita—2000–01 and 2004–05

	NSW	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*	*Australia*
	kL/capita	kL/capita	kL/capita	kL/capita	kL/capita	kL/capita	kL/capita	kL/capita	kL/capita
2004–05	84	81	124	94	180	143	153	95	103
2000–01	97	97	143	110	191	125	162	115	120

Source: ABS 2006a

7.8 HOUSEHOLD WATER CONSUMPTION, per household—2000–01 and 2004–05

	NSW	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*	*Australia*
	kL/household	kL/household	kL/household	kL/household	kL/household	kL/household	kL/household	kL/household	kL/household
2004–05	219	209	323	244	468	372	399	248	268
2000–01	252	251	372	286	497	326	420	298	312

Source: ABS 2002

7.9 RAINWATER TANKS, March 2004

	NSW	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*	*Australia*
Number ('000)	329.9	305.4	261.0	305.0	94.3	38.7	2.9	4.0	1 340.7
Proportion of households with rainwater tanks (%)	12.8	16.0	17.4	48.2	12.1	19.6	5.3	3.2	17.2

Source: ABS 2004b

CHAPTER 8 WATER ACCESS ENTITLEMENTS, ALLOCATIONS AND TRADING

INTRODUCTION

This chapter presents a summary on the number of water access entitlements, the volume of water allocated to water access entitlements, and water trading in Australia in 2004–05. All data have been provided by the relevant Government agencies in each State and Territory, or obtained from publicly available sources. Detailed data at the State, Territory and water management area level are presented in the publication *Water Access Entitlements, Allocations and Trading, Australia, 2004–05* (cat. no. 4610.0.55.003).

Water access entitlements, allocations and trading have been key elements of recent water reforms in Australia. Achieving nationally-compatible water access entitlements, returning over-allocated systems to environmentally-sustainable levels of extraction, and removing barriers to trade in water to facilitate the broadening and deepening of the water market are all objectives of the 2004 Intergovernmental Agreement on a National Water Initiative (NWI).

The rights to control and use water are vested in State and Territory Governments. While the institutional and regulatory frameworks that govern the allocation and use of water resources address similar issues across jurisdictions, the nature of water access entitlements varies considerably between jurisdictions. In particular, there are differences in the terminology used and the extent to which water access entitlements are bundled with water allocations. It is important to understand these differences in order to interpret the data presented in this chapter.

Because of differences in terminology, legislative arrangements and administrative systems, the data need to be interpreted with caution, particularly when making comparisons between jurisdictions. For further information please refer to *Water Access Entitlements, Allocations and Trading, Australia, 2004–05* (cat. no. 4610.0.55.003).

MAIN FINDINGS

The main findings of this chapter are:

- There were 223,556 water access entitlements in Australia with a total entitlement volume of 29,831 GL in 2004–05.
- Surface water access entitlements accounted for 76,625 (or 34%) of all water access entitlements and 22,814 GL (or 76%) of the total entitlement volume in Australia.
- Groundwater access entitlements accounted for 146,185 (or 65%) of all water access entitlements and 6,998 GL (or 23%) of the total water allocated in Australia.
- There were 1,802 permanent water trades in Australia with 248 GL of water traded permanently
- There were 13,456 temporary water trades in Australia with 1,053 GL of water traded temporarily

WATER ACCESS ENTITLEMENTS AND ALLOCATIONS

A water access entitlement is a perpetual or ongoing entitlement to exclusive access to a share of water from a specified consumptive pool as defined in the relevant water plan. The entitlement volume is the share or base volume of water associated with a water access entitlement.

Some forms of water use are not required to have a water access entitlement or require a special type of entitlement. Where these have been identified, they have been noted and excluded from the relevant tables so as to not distort the data. For example, the entitlements associated with hydro-electric power generation in Tasmania (a non-consumptive use of water) are excluded.

A water allocation is the specific volume of water allocated to a water access entitlement in a given season, defined according to rules established in the relevant water plan. The allocated volume is the specific volume of water allocated to water access entitlements for the reference year.

Water can be allocated to a water access entitlement in a number of different ways. In a number of jurisdictions, water allocations are bundled with water access entitlements such that the allocation volume equals the entitlement volume of the water access entitlement. In New South Wales, Victoria and Queensland, water allocation announcements are used to allocate water to water access entitlements in regulated water sources. These announcements are generally expressed as a percentage of the entitlement volume, and may be below, equal to, or above the entitlement volume, depending on water availability.

In 2004–05, there were 223,556 water access entitlements in Australia with a total entitlement volume of 29,831 GL (Table 8.1). New South Wales had the highest number of water access entitlements in Australia, with 118,110 (or 53%) of the total water access entitlements in Australia. New South Wales also had the highest entitlement volume in Australia in 2004–05, with 13,302 GL (or 45%) of the total entitlement volume.

Surface water access entitlements accounted for 76,625 (or 34%) of all water access entitlements and 22,814 GL (or 76%) of the total entitlement volume in Australia (Table 8.2). Groundwater access entitlements accounted for 146,185 (or 65%) of all water access entitlements and 6,998 GL (or 23%) of the total water allocated in Australia. In South Australia and the Australian Capital Territory, water access entitlements that allowed access to both surface and groundwater sources also existed. These accounted for an extremely small percentage of the number and volume of all water access entitlements (0.3% and 0.1% respectively).

WATER TRADING

Australia is one of a small number of water-scarce countries that has instituted markets for trading water. While not explicitly defined in the NWI, water trading is the term used to describe transactions involving water access entitlements or the water allocations assigned to water access entitlements. Trading can occur on a permanent or temporary basis.

Permanent water trades are transactions that permanently affect some aspect of a water access entitlement, such as changes to the ownership, water source, size of share, or reliability of the water access entitlement. With the separation of water access entitlements from land titles, a permanent water trade may involve a change of

WATER TRADING
continued

ownership, a change of location, or both. It should be noted that permanent trading data for New South Wales, Western Australia and Tasmania include trades that result in ownership changes from land sales, while Queensland has excluded these transactions. Therefore, comparisons between jurisdictions should be made with caution.

Temporary water trades are transactions that affect the seasonal water allocation associated with a water access entitlement, that is, the specific volume of water allocated to water access entitlements in a given season. They are generally conducted through leasing arrangements for a period of a year or less.

There are difficulties obtaining price data for water trading on a consistent basis, as not all trades involve a monetary transaction, the administration fee charged by the authority processing the trade may or may not be included in the price of the water trade, and for permanent trades that result from land sales, the value of the water access entitlement is often included in the price of the property and cannot be easily distinguished. The availability and comparability of pricing data on water trades should improve as water registers develop further.

In 2004–05, 1,802 permanent and 13,456 temporary water trades were conducted in Australia with 248 GL of water traded permanently and 1,053 GL of water traded temporarily (Tables 8.3 and 8.4). The highest number of permanent and temporary water trades were conducted in Victoria (702 and 9,323 respectively). Victoria also had the highest volume of water temporarily traded in Australia with 444 GL. The highest volume of water traded permanently occurred in Western Australia with 63 GL.

Interstate Trade

For interstate trades, data have been presented by origin and destination, which show where the water has been traded to and from. In 2004–05, there were 46 permanent and 368 temporary water trades between States with 5.2 GL of water traded interstate permanently and 81.7 GL of water traded interstate temporarily (Tables 8.5 and 8.6).

All water traded permanently originated from Victoria, with South Australia receiving 4.8 GL (or 92%) and New South Wales receiving 0.4 GL (or 8%) of the total water traded interstate (Table 8.5). The largest volume of water traded temporarily originated from Victoria with 28.3 GL (or 34.6%), followed by New South Wales with 28.2 GL (or 34.5%), and South Australia with 25 GL (or 31%) of the total water traded interstate temporarily (Table 8.6).

New South Wales received the largest volume of water traded temporarily with 38 GL (or 46%), followed by South Australia with 25 GL (or 30%), and Victoria with 19 GL (or 24%). The largest volume of water traded temporarily between States was traded from South Australia to New South Wales, with 23 GL (or 28%) of the total water traded interstate temporarily.

8.1 WATER ACCESS ENTITLEMENTS AND ALLOCATIONS—2004–05

	Number of entitlements	*Entitlement volume*	*Allocated volume*
	no.	ML	ML
NSW(a)	118 110	13 301 851	9 798 575
Vic.(b)	25 514	6 680 334	4 733 845
Qld(c)	48 591	4 397 481	na
SA	10 399	1 660 584	1 660 584
WA	17 513	2 546 643	2 546 643
Tas.	3 110	1 038 419	1 038 419
NT	166	139 959	139 959
ACT	153	66 150	66 150
Australia	**223 556**	**29 831 421**	na

na not available
(a) Maximum available water has been used for allocated volume in New South Wales.
(b) Volume taken has been used as a proxy for allocated volume in Victoria.
(c) Excludes 1,931 water licences without a volumetric entitlement volume in Queensland.

8.2 WATER ACCESS ENTITLEMENTS AND ALLOCATIONS, by water source—2004–05

	SURFACE WATER			GROUNDWATER			SURFACE AND GROUNDWATER(a)		
	Number of entitlements	*Entitlement volume*	*Allocated volume*	*Number of entitlements*	*Entitlement volume*	*Allocated volume*	*Number of entitlements*	*Entitlement volume*	*Allocated volume*
	no.	ML	ML	no.	ML	ML	no.	ML	ML
NSW(b)	24 694	10 644 024	7 135 637	93 416	2 657 827	2 662 938	—	—	—
Vic.(c)	17 030	5 827 960	4 370 300	8 484	852 374	363 545	—	—	—
Qld(d)	27 336	3 488 495	na	21 255	908 986	na	—	—	—
SA	3 486	789 057	789 057	6 179	854 296	854 296	734	17 232	17 232
WA	878	902 500	902 500	16 635	1 644 143	1 644 143	—	—	—
Tas.	3 110	1 038 419	1 038 419	—	—	—	—	—	—
NT	64	59 832	59 832	102	80 127	80 127	—	—	—
ACT	27	64 154	64 154	114	660	660	12	1 336	1 336
Australia	**76 625**	**22 814 441**	na	**146 185**	**6 998 412**	na	**746**	**18 568**	**18 568**

— nil or rounded to zero (including null cells)
na not available
(a) Water access entitlements that allow the holder to access both surface and groundwater sources.
(b) Maximum available water has been used for allocated volume in New South Wales.
(c) Volume taken has been used as a proxy for allocated volume in Victoria.
(d) Excludes 1,931 water licences without a volumetric entitlement volume in Queensland.

8.3 PERMANENT WATER TRADING—2004–05

	WATER TRADED WITHIN		WATER TRADED INTO		WATER TRADED OUT		TOTAL WATER TRADED(a)		AVERAGE PRICE
	no.	*ML*	*no.*	*ML*	*no.*	*ML*	*no.*	*ML*	*$/ML*
NSW	154	40 846	10	436	—	—	164	41 282	na
Vic.(b)	656	52 175	—	—	46	5 214	702	57 389	na
Qld	168	20 285	—	—	—	—	168	20 285	1 750
SA	328	28 643	36	4 778	—	—	364	33 421	na
WA	218	62 810	—	—	—	—	218	62 810	680
Tas.	232	37 603	—	—	—	—	232	37 603	na
NT	—	—	—	—	—	—	—	—	—
ACT	—	—	—	—	—	—	—	—	—
Australia	**1 756**	**242 362**	**46**	**5 214**	**46**	**5 214**	**1 802**	**247 576**	na

— nil or rounded to zero (including null cells)
na not available
(a) Total for Australia cannot be calculated by taking the sum of the States and Territories as this would double count interstate trades.
(b) Sourced from the annual reports of rural water authorities in Victoria.

8.4 TEMPORARY WATER TRADING—2004–05

	WATER TRADED WITHIN		WATER TRADED INTO		WATER TRADED OUT		TOTAL WATER TRADED(a)		AVERAGE PRICE
	no.	*ML*	*no.*	*ML*	*no.*	*ML*	*no.*	*ML*	*$/ML*
NSW(b)	1 739	316 506	117	37 848	186	28 196	2 042	382 550	96
Vic.(c)	9 042	396 723	179	19 259	102	28 281	9 323	444 263	na
Qld	1 874	194 195	—	—	—	—	1 874	194 195	na
SA	314	49 525	72	24 560	80	25 190	446	49 525	na
WA	8	8 617	—	—	—	—	8	8 617	80
Tas.	111	5 601	—	—	—	—	111	5 601	na
NT	—	—	—	—	—	—	—	—	—
ACT	—	—	—	—	—	—	—	—	—
Australia	**13 088**	**971 168**	**368**	**81 667**	**368**	**81 667**	**13 456**	**1 052 834**	na

— nil or rounded to zero (including null cells)
na not available
(a) Total for Australia cannot be calculated by taking the sum of the States and Territories as this would double count interstate trades.
(b) Average price for New South Wales is only for those trades where price data were available.
(c) Sourced from the annual reports of rural water authorities in Victoria.

8.5 INTERSTATE PERMANENT WATER TRADING, by origin and destination—2004–05

	ORIGIN							
	New South Wales		*Victoria*		*South Australia*		*Total*	
Destination	*no.*	*ML*	*no.*	*ML*	*no.*	*ML*	*no.*	*ML*
New South Wales	. .	. .	10	436	—	—	10	436
Victoria	—	—	. .	. .	—	—	—	—
South Australia	—	—	36	4 778	. .	. .	36	4 778
Total	—	—	**46**	**5 214**	—	—	**46**	**5 214**

. . not applicable
— nil or rounded to zero (including null cells)

8.6 INTERSTATE TEMPORARY WATER TRADING, by origin and destination—2004–05

	ORIGIN							
	New South Wales		*Victoria*		*South Australia*		*Total*	
Destination	*no.*	*ML*	*no.*	*ML*	*no.*	*ML*	*no.*	*ML*
New South Wales	. .	. .	59	15 059	58	22 789	117	37 848
Victoria	157	16 858	. .	. .	22	2 401	179	19 259
South Australia	29	11 338	43	13 222	. .	. .	72	24 560
Total	**186**	**28 196**	**102**	**28 281**	**80**	**25 190**	**368**	**81 666**

. . not applicable

CHAPTER 9 WATER STOCKS

INTRODUCTION

This chapter presents information on Australia's water stocks and water storage infrastructure. There are several dimensions to water stocks. The first is the physical stock or availability of water, which is covered in the first part of this chapter. Next are the assets associated with water and water management. These include the administrative (e.g. licences and entitlements) and physical infrastructure (dams, pipes, etc.) that are used to manage, store and deliver water. Natural features, like rivers, lakes and wetlands are also part of the physical infrastructure.

Closer collaboration between government agencies and water providers has resulted in improvements in data availability for 2004–05. For water stocks it has allowed additional information on rainfall, run-off and dam storage levels to be included. In particular, this chapter of the Water Account has benefited from data on water resources compiled by the Bureau of Rural Sciences (BRS), CSIRO and Bureau of Meteorology, as well as improved data availability on dam storage from water providers and State and Territory governments.

MAIN FINDINGS

The main findings in this chapter are:

- For 2004–05, rainfall for Australia was estimated at 2,789,424 GL, with below average rainfall causing drought conditions over much of Australia.
- In 2004–05, run-off was 242,779 GL, with most of Australia receiving below average run-off.
- In 2004–05, Australia's large dams had a capacity of 83,853 GL and contained 39,959 GL at 30 June 2005, a decline from 30 June 2004 when they contained 44,164 GL.

PHYSICAL WATER STOCKS

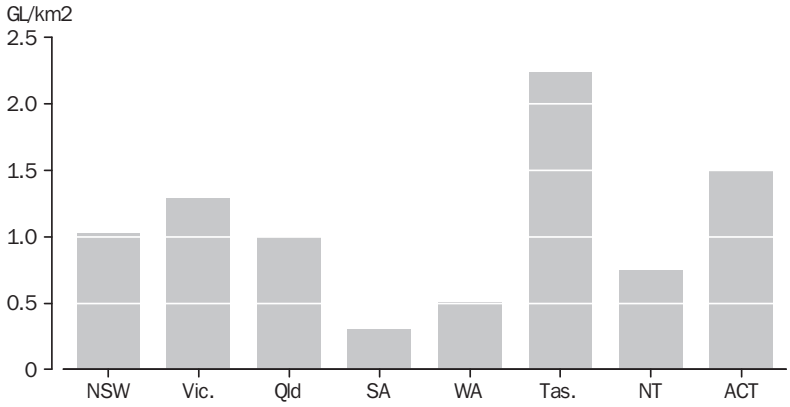
The largest stock of water is the world's oceans, but water also occurs in terrestrial (land) environments as surface and ground water, soil moisture and ice. Water is constantly exchanged between oceans, terrestrial environments and the atmosphere. For example, water is evaporated from the oceans and terrestrial environments to the atmosphere and falls as rain. When rainfall hits the ground it may run-off (into rivers, wetlands, dams, etc), be evaporated from the ground or transpired by plants, be contained in the soil profile, or drain below the root zone (percolation to the water table).

The data on rainfall in this account were provided by the Australian Bureau of Meteorology and the Bureau of Rural Sciences (BRS). Data on run-off, evapotranspiration and deep drainage (groundwater recharge and river base flow) were provided by the BRS. The modelling methods used to estimate run-off, evapotranspiration and deep drainage are described in Welsh et al. (2006) and are based on the work of Zhang et al. (2004, 2005) and Fu (1981).

Rainfall

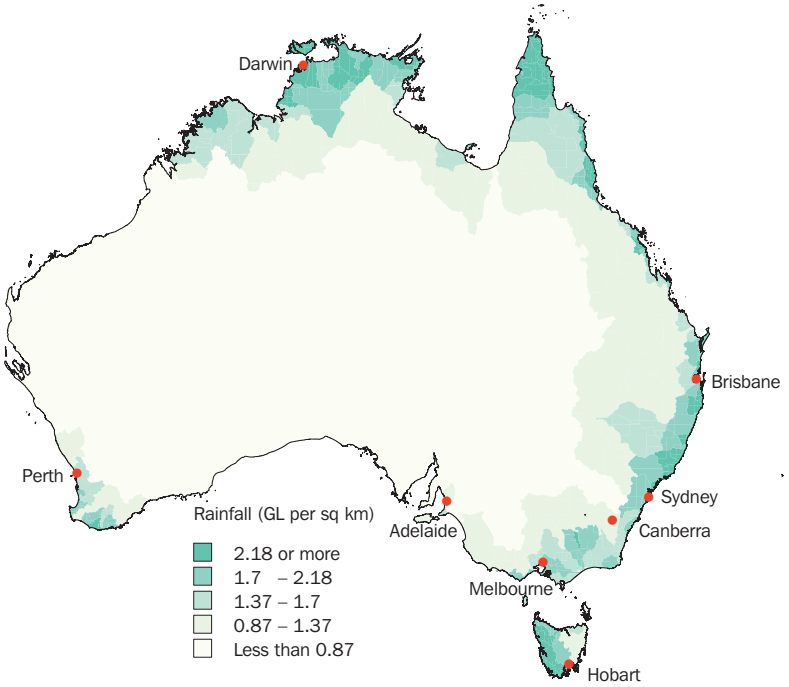
For 2004–05, rainfall for Australia was estimated at 2,789,424 GL, the majority in Queensland (865,973 GL) followed by Western Australia (639,609 GL) and the Northern Territory (505,623 GL) (Table 9.18). Graph 9.1 shows that Tasmania had the highest rainfall per square kilometre (1.12 GL/km^2) of the States and Territories followed by the Australian Capital Territory (0.75 GL/km^2). South Australia had the lowest rainfall by square kilometre (0.15 GL/km^2). Rainfall is not even across the States and Territories (Map 9.2) with higher rainfall confined to river basins along the eastern seaboard, across northern Australia and the west coast of Tasmania. The majority of central and Western Australia received less than 0.43 GL rainfall per square kilometre.

9.1 RAINFALL PER SQUARE KILOMETRE—2004–05



Source: BRS 2006

9.2 RAINFALL, by river basin—2004–05

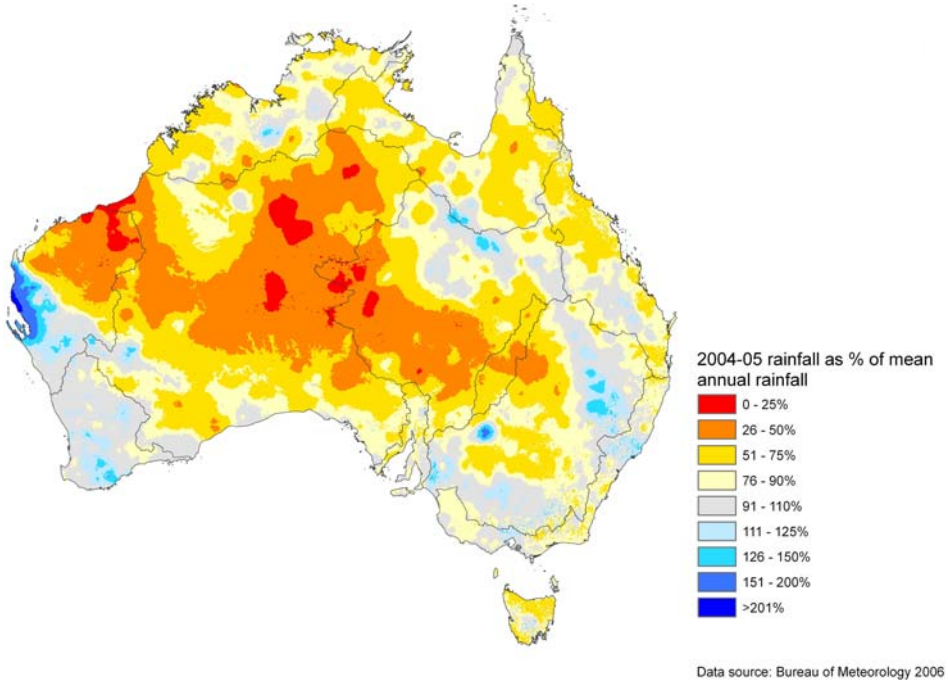


Source: Geoscience Australia 2004, Bureau of Rural Sciences 2006

Rainfall continued

Drought conditions across much of Australia are evident by the percentage deviation of rainfall for 2004–05 compared to the mean annual rainfall (Map 9.3). A significant proportion of the Western Plateau and Lake Eyre drainage divisions received less than 50% of the mean annual rainfall for 2004–05. Some areas within the South-West Coast drainage division, northern and southern regions of the Murray-Darling Basin and South-East Coast drainage divisions received between 90-110% of average rainfall. A few areas experienced above average rainfall, particularly around Carnavon, Western Australia in the Indian Ocean drainage division, where 215 mm fell in July 2004, almost matching the annual average of 226mm.

9.3 PERCENTAGE OF MEAN ANNUAL RAINFALL—2004–05



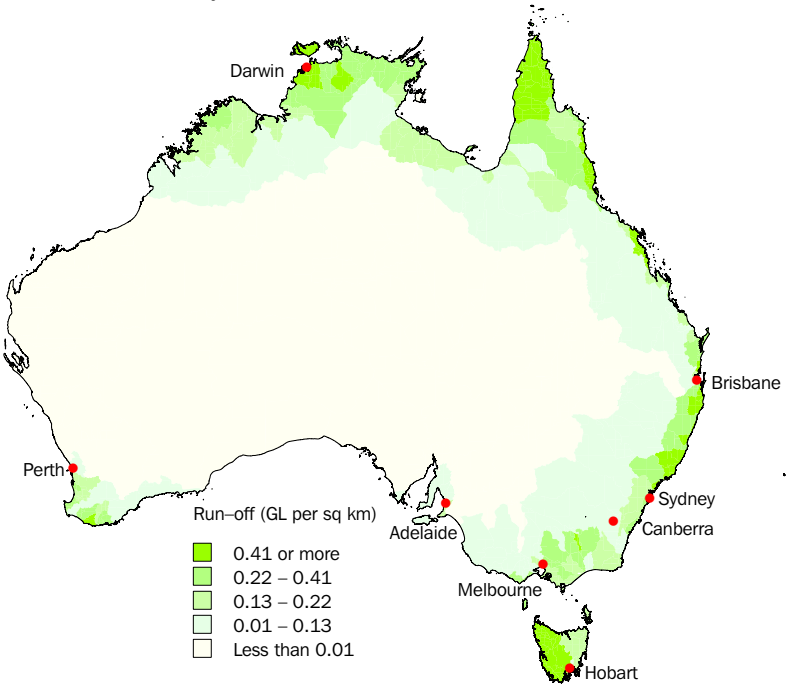
Run-off

Surface water resources are often represented by Mean Annual Run-off (MAR). Mean annual run-off is the average annual stream flow passing a specified point (NLWRA 2001) or the maximum average annual flow observed in a river basin (AWRC 1987). The 2000–01 Water Account presented information on MAR.

For 2004–05, run-off for Australia was determined to be approximately 242,779 GL. The distribution of run-off was geographically uneven at the State and River basin level (Map 9.4, Table 9.18). Run-off was greatest in Queensland (93,018 GL) followed by the Northern Territory (47,151 GL) and Tasmania (32,084 GL) (Table 9.19).

Run-off continued

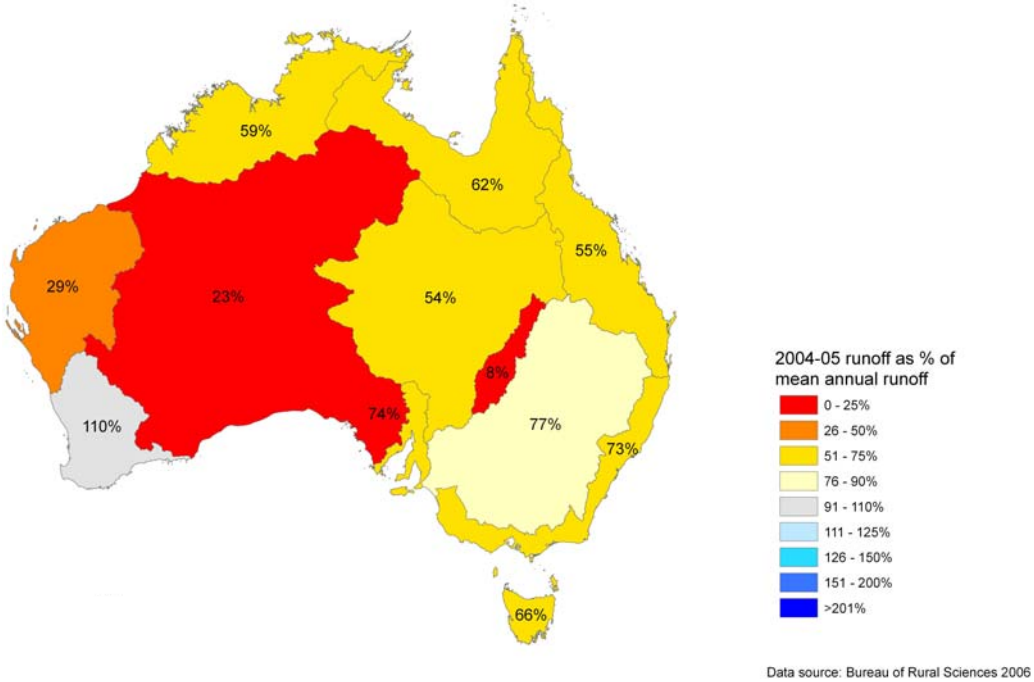
9.4 RUN-OFF, by river basin—2004–05



Source: Geoscience Australia 2004, Bureau of Rural Sciences 2006

Most of Australia received below average mean annual run-off for 2004–05 (Map 9.5). The northern and eastern drainage divisions including the Murray-Darling Basin drainage division, the North-East, South-East, Lake Eyre and Tasmania drainage divisions only received 50-75% of mean annual run-off in 2004–05. Two drainage divisions, Western Plateau and Bulloo-Bancannia, received below 25% of mean annual run-off in 2004–05.

9.5 PERCENTAGE OF MEAN ANNUAL RUN-OFF, by drainage division—2004–05



Data source: Bureau of Rural Sciences 2006

Run-off continued

Some run-off is used in the period it falls (e.g. the calendar or financial year) but part of this resource may be stored in dams to be used in the future. The amount of water held in dams is also part of the water stock and this is examined later in the chapter.

Groundwater Stocks

The volume of groundwater that exists in Australia is not known with certainty. The volume changes as water percolates through the ground to aquifers (underground water resources) and through water being extracted (e.g. from bores). In the past, instead of an absolute measure of groundwater stock, a proxy has been used. That is the amount of water that can be sustainably extracted, referred to as sustainable yield (see NLWRA 2001).

Data on groundwater stocks from the NLWRA (2001) were included in the 2000–01 edition of the Water Account. Similar information was not available for this edition of the Water Account. However, the Australian Water Resources 2005 project will provide information on ground water resources for some water management areas in the near future.

DAMS

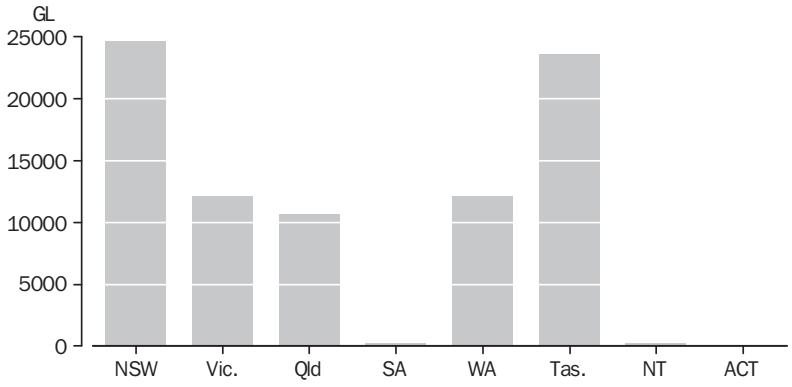
Capacity

The storage capacity of large dams is available from the ANCOLD Register of Large Dams (ANCOLD 2006) and is presented in Graph 9.6 and Table 9.20. Large dams are defined as dams with a crest or wall height of greater than 15 metres, or as dams with a dam wall height of greater than 10 metres but meeting other size criteria as follows: having a crest more than 500 metres in length; creating a reservoir capacity of no less than 1,000 ML; the ability to deal with a flood discharge of no less than 2,000 cubic metres per second; or, being of unusual design (ANCOLD 2001). Using this definition there are 501 large dams in Australia with a storage capacity of 83,853 GL. Large dams in New South Wales (24,629 GL) and Tasmania (23,652 GL) have the largest storage capacity, while large dams in the Australian Capital Territory (120 GL) and South Australia (258 GL) have the least. Most of Australia's large dam capacity has been built since 1970 (Graph 9.7). There has been little change in storage capacity between 2001 and 2005. The number of dams has not changed but extra capacity has been added to dams in Queensland and Western Australia (Table 9.20).

Dams on farms were estimated to account for around 9% of water stored in Australia (NLWRA 2001). The ABS Water survey of water use in agriculture, conducted in respect of 2002-03, asked irrigators to report on farm dams capacity (Note: non-irrigating farms were not surveyed). For irrigated farms, dam storage capacity was 3,257 GL in 2003. Of this New South Wales had by far the most storage capacity with 46% of Australia's total. The question on dam capacity received a relatively low response rate, however, in the absence of other data, the results are presented in Table 9.21. These data should be used with caution.

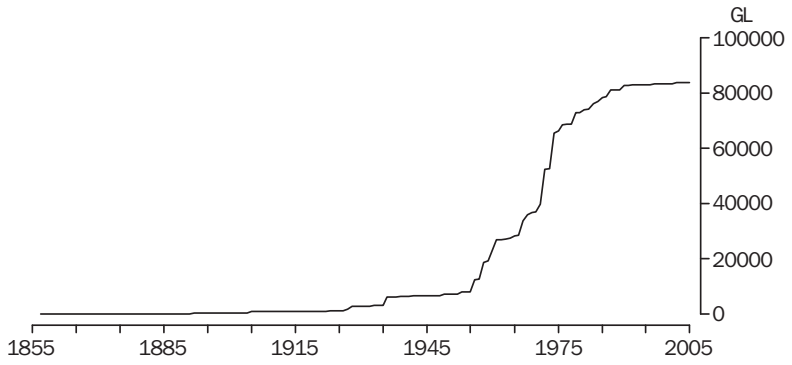
Capacity continued

9.6 STORAGE CAPACITY OF LARGE DAMS—2005



Source: Adapted from ANCOLD 2001, ActewAGL 2006, NCA 2004, WA Water Corporation 2006, Gladstone Area Water Board 2006

9.7 STORAGE CAPACITY OF LARGE DAMS, Australia—1857 to 2005



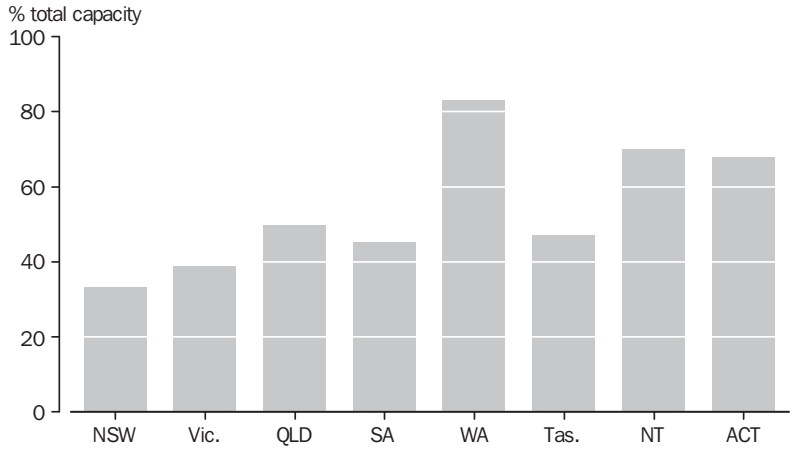
Source: Adapted from ANCOLD 2001, ActewAGL 2006, NCA 2004, WA Water Corporation 2006, Gladstone Area Water Board 2006

Storage Levels

At 30 June 2005, there was 39,959 GL of water stored in large dams. The amount stored varies significantly between States and Territories (Graph 9.8). In June 2005 large dams in Western Australia (83%) and the Northern Territory (70%) had the highest storage levels in percentage terms. New South Wales (33%) and Victoria (39%), the States with the highest populations, had large dams with the lowest storage levels.

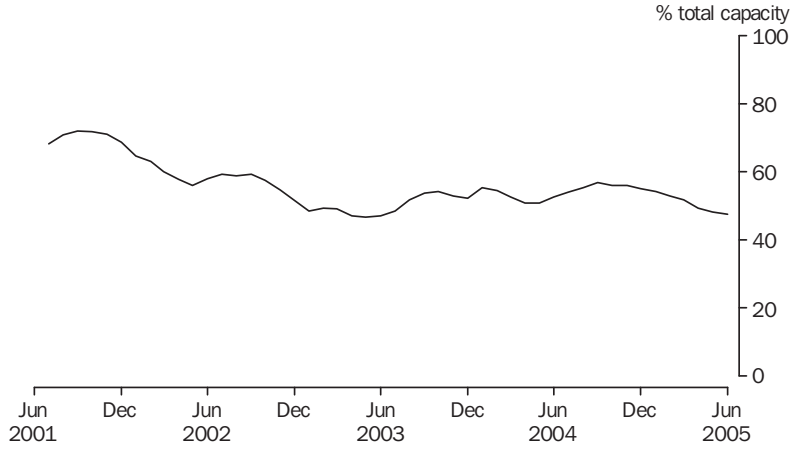
Storage Levels continued

9.8 LARGE DAM STORAGE LEVELS—June 2005



Graph 9.9 illustrates how Australian water storage changed from 2001 to 2005. Drought conditions in 2002 and 2003 are reflected in the reduction of more than 20% of the water stored in large dams. Storage has not recovered to pre-2002 levels.

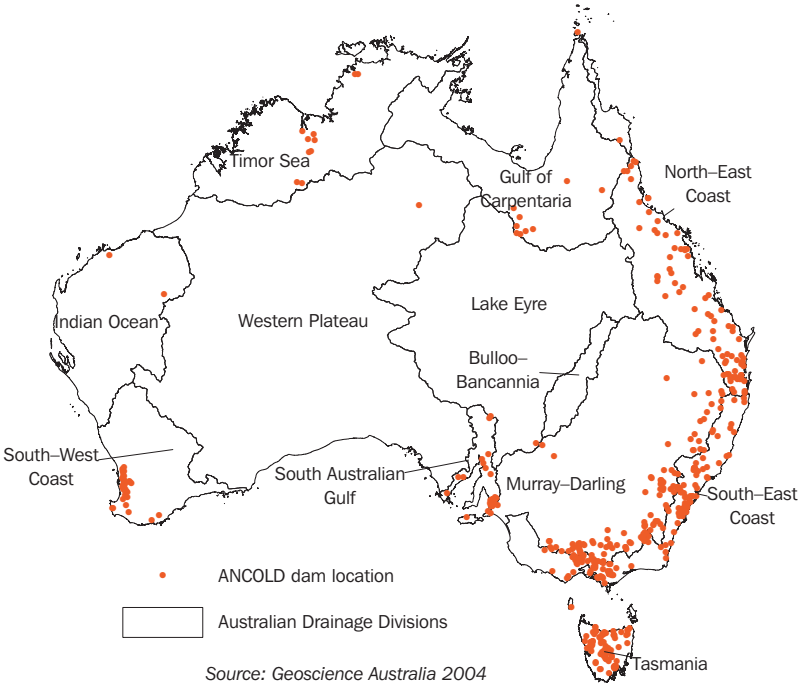
9.9 LARGE DAM STORAGE LEVELS, Australia—2001 to 2005



The location of large dams is influenced by topography, proximity to population and industry, and availability of run-off. Map 9.10 shows the location of large dams, by drainage division, throughout Australia. Very few dams exist in Gulf of Carpentaria (11), Timor Sea (10), Lake Eyre (2), Indian Ocean (2), Western Plateau (1) and Bulloo-Bancannia (0) drainage divisions. Graph 9.11 shows the large dam storage levels for each drainage division at June 2005. The northern Australian drainage divisions had higher dam storage levels compared to drainage divisions in the south. For example, the Timor Sea had the greatest percentage of total storage capacity (88%), while the Murray Darling drainage division had the least (28%).

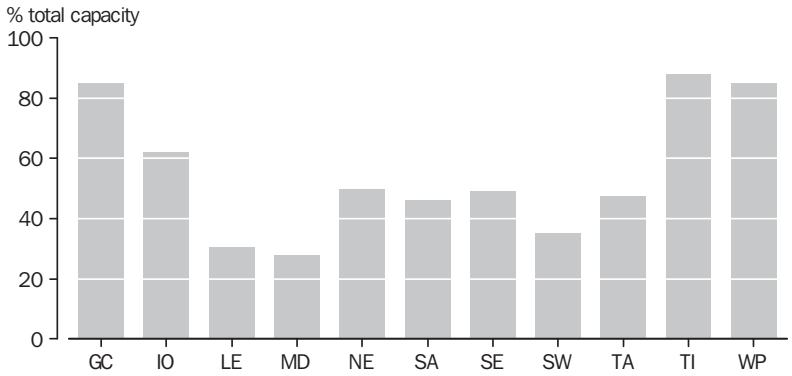
Storage Levels continued

9.10 LOCATION OF LARGE DAMS, by drainage division—June 2005



Source: Geoscience Australia 2004

9.11 LARGE DAM STORAGE LEVELS, by drainage division (a)—June 2005

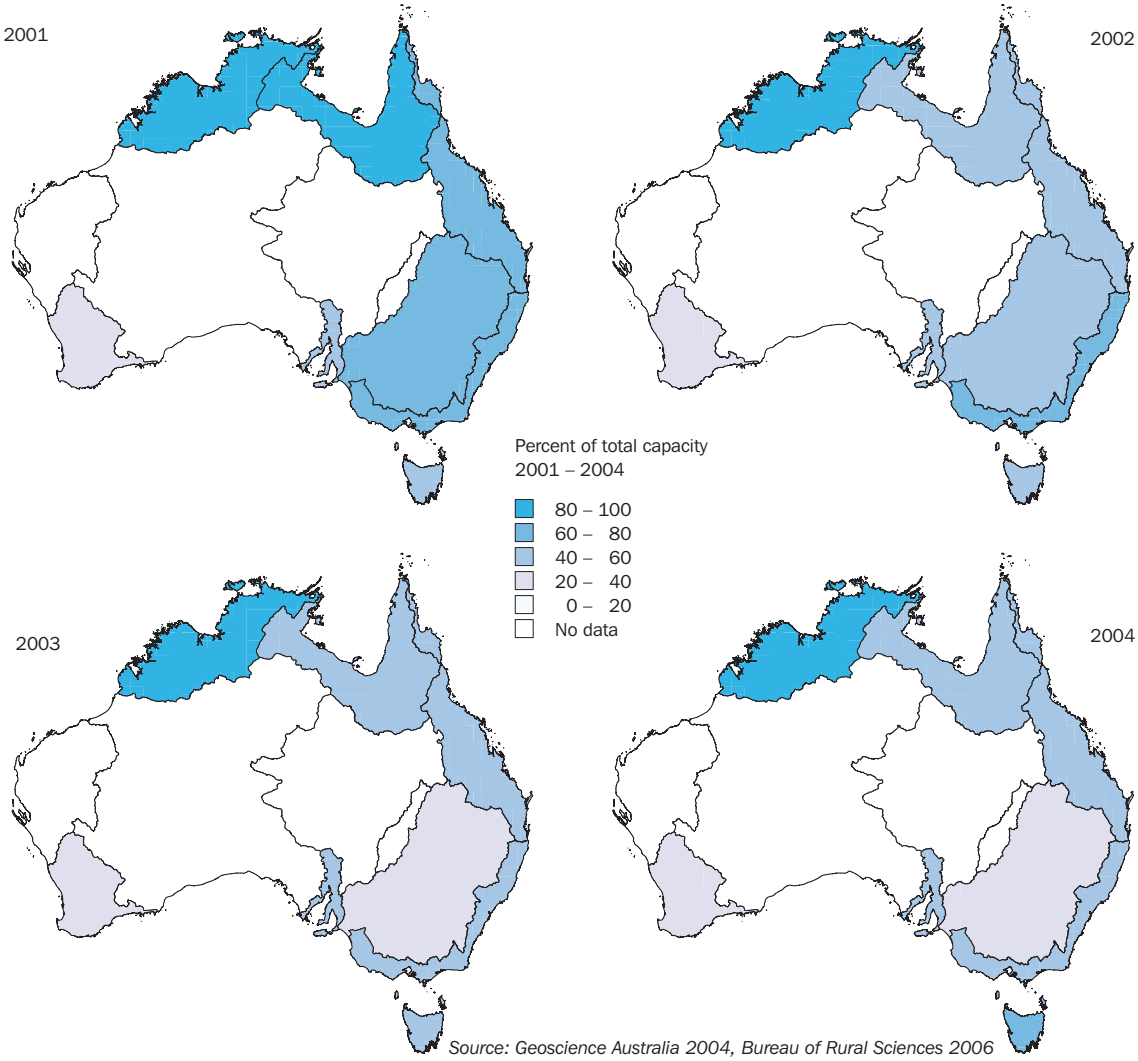


(a) Abbreviations for drainage divisions are listed in Appendix 3.

Note: No dams are located within the Bulloo- Bancannia drainage division.

Map 9.12 shows how water storage changed in drainage divisions, annually, from 2001 to 2004. Map 9.13 shows water storage levels for 2005. The decrease in storage levels (expressed as a percentage of total storage capacity) is apparent in the majority of drainage divisions, especially those with significant population and industry. For example, the Murray-Darling (MD), South-East (SE), North-East (NE) and South-West (SW) drainage divisions. Temporal storage patterns for these drainage divisions are displayed in Graphs 9.14 to 9.17. From 2002 onwards water storage has fluctuated between 30 and 60% of the total storage capacity for each of these drainage divisions. The South-West drainage division has consistently had lower levels of water storage than other drainage divisions.

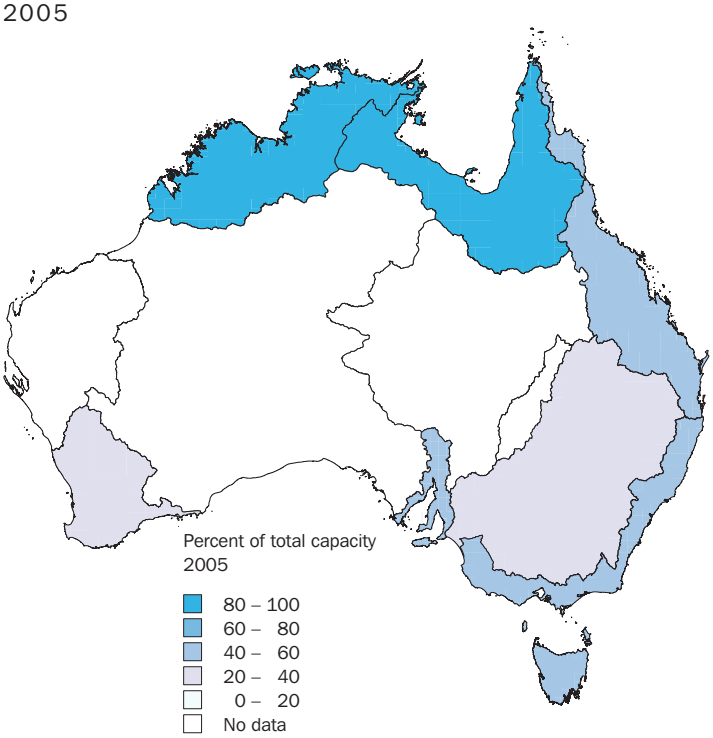
9.12 WATER STORED IN LARGE DAMS, by drainage division—July 2001 to July 2004



Source: Geoscience Australia 2004, Bureau of Rural Sciences 2006

Storage Levels continued

9.13 WATER STORED IN LARGE DAMS, by drainage division—June 2005



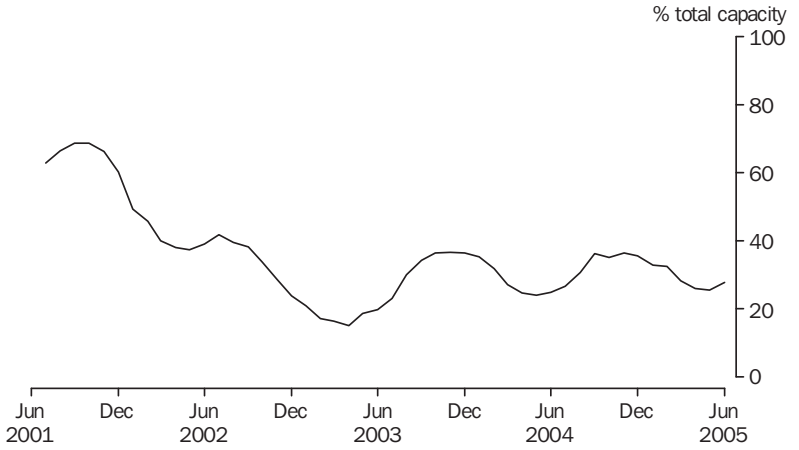
Source: Geoscience Australia 2004, Bureau of Rural Sciences 2006

Temporal patterns in water storage are influenced by factors like rainfall, evaporation and water usage. In the North-East drainage division, dams are affected by seasonally high summer rainfall in December each year, causing storage levels to increase. Notably in 2001 this did not occur, and in 2004 the increase in storage was less than in 2002 and 2003. A different pattern occurs in the dams located in the South-West and Murray-Darling drainage divisions. High winter and spring rainfall combined with low evaporation and low water use increase water stored in dams located in these drainage divisions, but this did not occur in the Murray-Darling drainage division in 2002. Large dams in the South-East drainage division did not display a significant seasonal change between 2001 and 2005. Increases and decreases in water storage in the Murray Darling drainage division are less pronounced than in other drainage divisions, however, the decrease between 2002 and 2003 is marked.

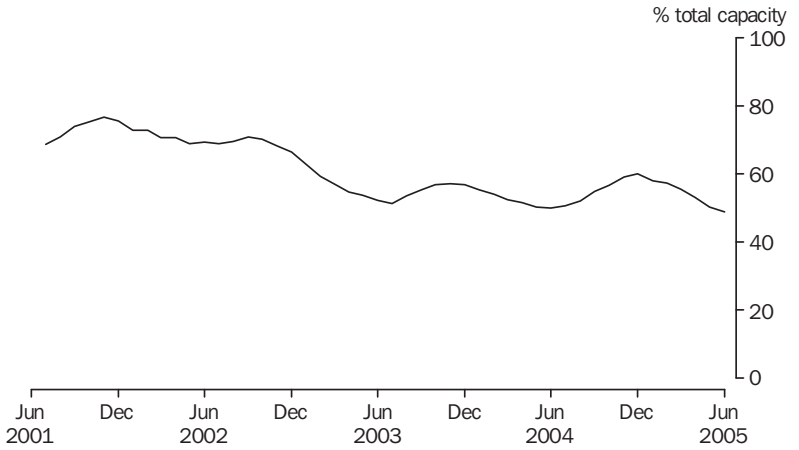
The change in the volume of water stored in large dams and the changes from year-to-year are presented in Table 9.22 and Table 9.23. In most States and Territories volumes decreased between years. The largest decrease from one year to the next was in New South Wales between 2002 and 2003 when total volume in storage decreased by 3,577GL.

Storage Levels continued

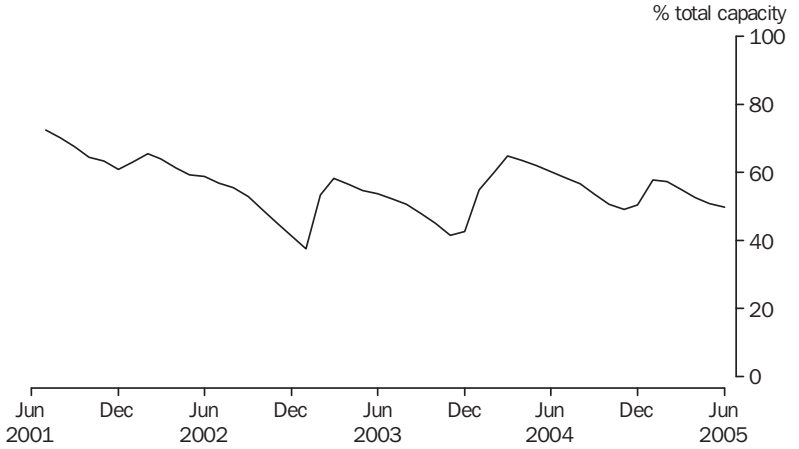
9.14 DAM STORAGE LEVELS, Murray Darling Basin—2001 to 2005



9.15 DAM STORAGE LEVELS, South East Coast—2001 to 2005

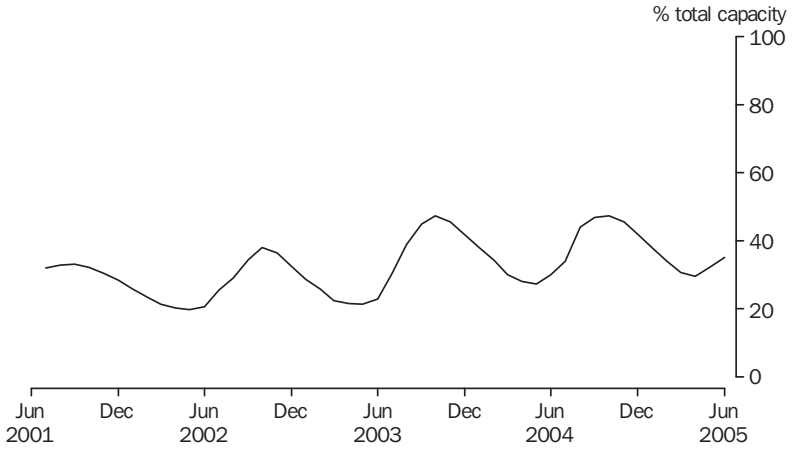


9.16 DAM STORAGE LEVELS, North East Coast—2001 to 2005



Storage Levels continued

9.17 DAM STORAGE LEVELS, South West Coast—2001 to 2005



Although the total volume of water stored in dams can theoretically be utilised, in practice this is rarely the case due to the type of infrastructure established for storage and delivery of water. The quantity of water that cannot be used is known as 'dead' storage and when subtracted from total storage, results in 'active' or 'available' storage – the quantity of water storage that water authorities can access (SCA 2006). The data presented here is for total storage, not 'active' or 'available' storage.

VALUING WATER STOCKS AND WATER RELATED INFRASTRUCTURE

Valuing surface water and groundwater stocks is not easy. Water is one of the natural resources that can theoretically be included separately on the National Balance Sheet. The ABS already includes three classes of natural resources on the balance sheet: land, subsoil assets and timber (see Chapter 25, *Environment by Numbers: Selected Articles on Australia's Environment* (cat. no. 4617.0)) (ABS 2003). The value of water is at least partially included in land values, and the emergence and maturity of water markets may enable a value of water to be determined consistent with the principles of the System of National Accounts and SEEA 2003.

The infrastructure used to store and distribute water is already included on the National Balance Sheet, but is currently not separately identified. The ABS has been researching the feasibility of producing monetary water accounts to address the need for information on the value of water stocks and water related infrastructure. A research paper on this will be released early in 2007.

9.18 RAINFALL, RUN-OFF AND LAND AREA—2004–05

	NSW	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*	*Australia*
Rainfall (GL)	406 562	146 928	865 973	147 773	639 609	75 189	505 623	1 767	2 789 424
Evapotranspiration (GL)	369 163	129 967	759 355	143 563	601 867	41 877	450 090	1 589	2 497 471
Run-off (GL)	30 266	14 266	93 018	1 285	24 560	32 084	47 151	149	242 779
Deep drainage (GL)	7 133	2 695	13 599	2 925	13 182	1 228	8 382	29	49 174
Bare ground (km^2)	979	543	2 440	18 437	15 178	239	1 466	2	39 284
Agricultural land (km^2)(a)	498 850	148 101	1 013 792	863 322	1 968 677	24 048	1 078 043	707	5 595 540
Forests and plantations (km^2)	297 378	69 451	696 563	85 976	518 303	41 224	262 755	1 466	1 973 116
Intensive use / urban (km^2)	2 645	3 037	2 239	909	697	275	141	180	10 123
Water (km^2)	6 301	3 620	10 560	10 686	19 627	1 310	2 470	8	54 582
Total land area (km^2)	**804 059**	**226 846**	**1 725 594**	**979 330**	**2 522 482**	**67 096**	**1 344 875**	**2 363**	**7 672 645**

(a) Includes dryland farming, irrigated areas and pasture.

Source: Bureau of Rural Sciences, unpublished data

9.19 RAINFALL AND RUN-OFF PER SQUARE KILOMETRE—2004–05

	NSW	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*	*Australia*
	GL/km2	GL/km2	GL/km2	GL/km2	GL/km2	GL/km2	GL/km2	GL/km2	GL/km2
Rainfall	0.51	0.65	0.50	0.15	0.25	1.12	0.38	0.75	0.36
Run-off	0.04	0.06	0.05	—	0.01	0.48	0.04	0.06	0.03

— nil or rounded to zero (including null cells)

Source: Bureau of Rural Sciences, unpublished data

9.20 NUMBER AND STORAGE CAPACITY OF LARGE DAMS(a), 2001 and 2005

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Australia
2005									
Number	135	97	99	29	48	86	3	4	501
Volume (GL)	24 629	12 109	10 657	258	12 148	23 652	280	120	83 853
2001									
Number	135	97	99	29	48	86	3	4	501
Volume (GL)	24 629	12 109	10 163	258	12 101	23 652	280	120	83 312

(a) As at 30 June.

9.21 STORAGE CAPACITY OF IRRIGATED-FARM DAMS—2003(a)

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Australia
Storage capacity (GL)	1 489	198	1 107	65	212	186	—	—	3 257
Proportion of Australian total (%)	46	6	34	2	7	6	—	—	100

— nil or rounded to zero (including null cells)

(a) As at 30 June.

Note: Data should be used with caution because there was a poor response rate to this question.

Source: Water survey, Agriculture 2002-03

9.22 WATER STORED IN LARGE DAMS(a), 2002 to 2005

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Australia
	GL	GL	GL	GL	GL	GL	GL	GL	GL
2002	12 206	6 083	6 226	115	11 254	12 494	237	69	48 683
2003	8 629	2 815	5 602	105	10 236	11 886	241	61	39 576
2004	7 970	4 371	6 287	111	11 352	13 744	251	78	44 164
2005	8 200	4 729	5 309	116	10 135	11 191	196	82	39 959

(a) As at 30 June.

9.23 CHANGE IN WATER STORED IN LARGE DAMS(a), 2002 to 2005

	NSW	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*	*Australia*
	GL	GL	GL	GL	GL	GL	GL	GL	GL
2002 to 2003	–3 577	–3 268	–624	–9	–1 018	–608	4	–7	–9 107
2003 to 2004	–659	1 556	685	6	1 116	1 858	10	17	4 588
2004 to 2005	231	358	–978	6	–1 217	–2 552	–55	4	–4 205

(a) As at 30 June.

EXPLANATORY NOTES

INTRODUCTION

1 The ABS Water Account is one of the physical accounts produced by the ABS as part of an environmental accounting system. It consists of supply and use tables (collectively referred to as flow tables) as well as information on water stocks and other related issues. The aim of the Water Account is to integrate data from different sources into a consolidated information set making it possible to link physical data on water to economic data, such as that in Australia's National Accounts.

2 Environmental accounts can facilitate a range of issues that include:

- a broader assessment of the consequences of economic growth;
- the contribution of sectors to particular environmental footprints; and
- implications of environmental policy measures across sectors (for example, regulation, charges and incentives).

3 One advantage of environmental accounts is that by linking together physical and economic data in a consistent framework it is possible to undertake scenario modelling. Issues that can be modelled include assessing relative efficiencies in interactions between different sectors of the economy and the environment, and resource implications of structural change.

4 When the ABS produced the 1993–94 to 1996–97 and 2000–01 Water Accounts, any readily available data on water resources from various government and non-government organisations was used and aggregated. This did not duplicate existing data collection activities, but tied together industry, regional and State data into a single system showing the supply and use of water within the Australian economy.

5 To produce the 2004–05 Water Account, a new ABS survey of water providers was developed and supplementary questions were added to several existing ABS surveys. This approach simplified compilation of the account as well as reducing the time required to produce the account. The survey approach will also help to improve the comparability and consistency of data, allowing analysis and evaluation over time. As with previous Water Accounts, data from other sources was also used to fill gaps, and for data consistency and checking. The additional survey activity undertaken by the ABS for 2004–05 did not duplicate existing data collections, but collected comprehensive data on all organisations supplying water in Australia and more detailed information on water use.

ENVIRONMENTAL ACCOUNTING FRAMEWORK

6 The Water Account was developed using methods proposed in the System of Integrated Environmental and Economic Accounting (SEEA). SEEA was first published by the United Nations (UN) in 1993 (UN 1993a), and revised in 2003 (UN 2003a). SEEA is a supplementary account to the System of National Accounts 1993 (UN 1993b). Environmental accounts extend the boundaries of the System of National Accounts (SNA) framework to include environmental resources, which occur outside the economic production and asset boundaries measured by the SNA.

RELATIONSHIP BETWEEN ENVIRONMENTAL ACCOUNTS AND NATIONAL ACCOUNTS

7 Water supply and use tables provide a framework to link core components of the National Accounts to physical information. These tables are a component of physical input-output (I-O) tables and allow comparison of physical and monetary information through interactions between the economy and environment. Physical data are presented in supply and use tables while some linkages to economic data are also made.

WATER SUPPLY AND USE

Scope

8 Chapter 2 aggregates all available quantitative data (megalitres) in terms of the supply and use of water within the Australian economy for the financial year 2004–05. Supply and use tables illustrate the economic use of water and include self-extracted, distributed, and regulated discharge (including in-stream use) and effluent reuse.

9 The use of saline water (including water from estuaries) for power generation and other industrial uses, although measurable and reported, is not included in the supply and use tables. This is because the scope of the Water Accounts is fresh water only. This is consistent with the international SEEA accounting framework. Some information on saline water use for electricity generation is included in Chapter 6.

Coverage

10 The supply table incorporates comprehensive coverage. Coverage in the use tables includes all major users, with some estimates included for minor users.

11 Coverage for both supply and use tables include the following:

- individuals and companies that directly extract water from surface water and groundwater sources for their own use (e.g. domestic, industrial, commercial or agricultural use);
- individuals and companies that use water supplied by water providers for domestic, industrial, agricultural or other uses;
- water providers who extract water from surface water and groundwater sources, and supply it on to customers for use (e.g. domestic, industrial, or other use). The majority of water providers are categorised in WATER SUPPLY, SEWERAGE AND DRAINAGE SERVICES industry (ANZSIC 370) but other industries also supply a small amount of water; and
- water providers who provide reuse water to their customers; other large organisations who treat water and make it available for subsequent reuse; other large organisations who discharge water directly to the environment (e.g. power stations, mines); and major in-stream water users, for example aquaculture and hydro-electricity generation, where this information was available.

12 Items not covered by the supply and use tables include:

- the reuse of water on-farm or on-site;
- non-point/diffuse discharges;
- the impact of storm water infiltration into the sewerage reticulation system; and
- water that is extracted from the environment as part of oil and gas extraction as this process is under-reported.

Data Sources

13 Data have come from a range of ABS surveys as well as State, Territory and Local Government agencies, water authorities and industry organisations.

14 The main ABS surveys used were:

- 2004–05 Water Supply Survey
- 2004–05 Agricultural Survey
- 2004–05 Economic Activity Survey (of mining and manufacturing industries; sporting associations; thoroughbred, harness and greyhound racing associations and trainers)
- 2004–05 Electricity Generators Survey of Water Use
- March 2005 Monthly Population Survey

15 State and Territory government agencies and major businesses from which data was used in this publication include:

- In New South Wales, the Department of Natural Resources and the Department of Energy, Utilities and Sustainability. In particular, the *2004–05 NSW Water Supply and Sewerage Performance Monitoring Report* (DEUS 2006).

Data Sources continued

- In Victoria, the Department of Sustainability and Environment. In particular, the *2004–05 State Water Report – A Statement of Victorian Water Resources* , (DSE 2006) and the *2004–05 Victorian Water Review* (Victorian Water Industry Association 2006).
- In Queensland, the Department of Natural Resources and Water. In particular, *2004–05 Annual Reports and Financial Statements of Queensland's Category 2 Water Authorities* (NRW 2006), *2004–05 Annual Water Statistics* (NRW 2006), and *2004–05 Urban Water Service Providers Queensland Report* (NRW 2006).
- In South Australia, the Department of Water, Land and Biodiversity Conservation.
- In Western Australia, the Department of Water, Water Corporation, Water and Rivers Commission and Office of Water Regulation.
- In Tasmania, the Department of Primary Industries, Water and Environment and Hydro Tasmania.
- In the Northern Territory, the Power and Water Authority and the Department of Lands, Planning and Environment.
- In the Australian Capital Territory, ACTEW and Environment ACT.

16 Surveys conducted by industry associations, as well as annual reports of water providers were used. These include:

- *Water Services Association Australia (WSAA) Facts 2005 Australian Urban Water Industry report* (WSAA 2005).
- *Australian National Committee on Irrigation and Drainage (ANCID) Australian Irrigation Water Benchmarking Report for 2004–05* (ANCID 2006).
- Annual/environmental reports for 2004–05 for various water providers (lists of those that provided a water supply or sewerage service were collected from State agencies and industry contacts).
- *MDBC Water Audit Monitoring Report 2004–05 and Special Audit NSW Barwon-Darling/Lower Darling Cap Valley Report of the Independent Audit Group* , MDBC, Canberra (MDBC 2006).

Methods for Calculating Water Supply and Use

17 These notes are intended as a general guide to the method of calculating estimates of water supply and use. For more detail on the methods please contact the Director, Centre of Environment and Energy Statistics (CEES), Australian Bureau of Statistics.

18 Supply and use tables integrate data from a wide range of sources. Some of the water supply and use data are from decentralised sources as most water distribution is managed by local governments or privatised water authorities. The data collected from these sources were collated to a uniform standard and aggregated to a State and Territory level.

19 A complete list of water providers in 2004–05 was compiled from information supplied by State and Territory regulatory departments, industry bodies, and other water providers. All water providers identified were surveyed in the ABS 2004–05 Water Supply Survey.

20 Water providers provided information on:

- Volume of water extracted from the environment and/or the volume of water received from other water providers (this information was used to reconcile total supplies and to avoid double counting of water volumes).
- Volumes of water supplied to particular industries (e.g. agriculture, mining and manufacturing) and for household use. Irrigation/rural water suppliers also reported the amount of water applied to particular crop types. This information was reconciled with water use as reported by water users. It also enabled the calculation of coefficients (e.g. ML/employee) for industries for which there was little or no recent data on water use.

Methods for Calculating Water Supply and Use continued

- The amount of water used by the water supply organisation (including mains flushing and water used on parks and gardens operated by councils that supplied water).
- Volume of water lost from the supply system. Where losses could be split between customer meter errors and system water losses, the system water losses were considered to be a form of use by the water providers, and customer meter errors were considered to be a form of use by the customers.
- Volume of water discharged by location and the level of treatment of the water discharged (primary, secondary, or tertiary).
- Volumes of reuse water supplied to particular industries (e.g. agriculture, mining and manufacturing) and for household use. Irrigation/rural water suppliers also reported the amount of reuse water applied to particular crop types. Water reuse volumes were not imputed where water providers did not provide reuse water volumes.
- Distributed water supplied to households and the population served by water supply and sewerage services. Where information was not available for distributed water supplied to households, State level coefficients based on average kilolitre use per person were used.
- The amount of water released for environmental provisions. This only includes those environmental provisions released in accordance with a specific plan prepared in conjunction and/or approved by the appropriate environmental (resource) regulator.

21 For agriculture

- Distributed water use was the amount supplied to the agricultural industry by water providers.
- Total water use by agriculture was sourced from the 2004–05 ABS Agriculture Survey. The amount of distributed water used was subtracted from total water used, the remainder was assumed to be self-extracted water.
- Reuse water usage includes water used from regional reuse schemes.

22 For mining and manufacturing

- Distributed water use was the amount supplied to the mining and manufacturing industries by water providers.
- Self extracted water use and water discharge was sourced from the 2004–05 Economic Activity Survey of Mining and Manufacturing industries, supplemented with information from company websites and annual/environmental reports.
- Mine dewatering was assumed to be self-extraction by the mining industry in all States. The water is usually utilised on-site or subsequently discharged.

23 For electricity and gas

- Distributed, self extracted and in-stream water use, and discharge for electricity generation were sourced from ABS 2004–05 Electricity Generators Survey of Water Use.

24 For cultural, recreational and personal services

- Distributed water use for parks and gardens and sports fields were sourced from the 2004–05 Water Supply Survey.
- Distributed and self-extracted water use for sporting associations (including golf courses and racecourses) were sourced from the ABS 2004–05 Economic Activity Survey.

25 For other industry sectors estimates of water use were derived using information supplied by water providers, some limited data collected by the ABS, and development of appropriate coefficients.

26 Household water use;

Methods for Calculating Water Supply and Use continued

- Distributed water use was the amount supplied to households by water providers.
- Self-extracted water use by households was calculated by applying average State kilolitre use per person coefficients and applying this to the population known not to be served by water providers (estimated by subtracting the population served by water providers from the total population in each State and Territory).

Data Quality and Reliability

27 Data for the Water Account are from a range of sources with variable degrees of consistency and reliability. Data suppliers were asked to indicate the reliability of the data provided, however comprehensive data was not obtained from all respondents.

28 All water supply, distributed water use and reuse water information was collected by the ABS. This information can be used with a high degree of confidence.

29 Data on self-extracted use was compiled from a range of sources. The degree of confidence that can be attached to these estimates is variable.

- Water supply and electricity and gas estimates were based on the ABS 2004–05 Water Supply Survey and the 2004–05 Electricity Generators Survey of Water Use and can be used with a high degree of confidence.
- Mining and manufacturing industries estimates were based on ABS surveys and can be used with a moderate degree of confidence.
- Agriculture industry estimates were based on the ABS 2004–05 Agriculture Survey, and can be used with a moderate degree of confidence.
- Only a limited amount of survey data was available for other industries, estimates were mostly based on coefficients of water use. These estimates can be used with a low degree of confidence.
- For households, self-extracted water use was based on coefficients of water use and can be used with a moderate degree of confidence.

GROSS VALUE OF AGRICULTURAL PRODUCTION - CHAPTER 5

Data Sources

30 The gross value of irrigated agricultural production was estimated using data from the ABS 2004–05 Agricultural Survey as well as other ABS collections and administrative data used to calculate the value of agricultural commodities produced (see *Agricultural Commodities, 2004–05, Australia* ABS cat. no. 7121.0 and *Value of Principal Agricultural Commodities Produced, 2004–05, Australia, Preliminary*, ABS cat. no. 7501.0).

Method of Calculation

31 The ABS 2004–05 Agricultural Survey collected information on production of agricultural commodities and the area of irrigated land used for several crop and pasture types. The ABS also collects and publishes data on the value of agricultural commodities produced (see ABS cat. no. 7121.0). By using these primary data sources, estimates of the value of irrigated agricultural production were made. This method has built on the method used in the first and second Water Accounts and estimates are comparable with those estimates.

32 Different methods were used for different commodities, with the method used dependent on the nature of the commodity and the availability of data. For rice, 100% of the gross value of agricultural production was attributed to irrigation. For cotton, the volume of the production from irrigated land was collected directly via the ABS 2004–05 Agricultural Survey. This volume was then applied to the value of cotton in the respective States.

33 For the remaining commodities two general methods were used to determine the value of irrigated agricultural production.

- Method 1. The area of the commodity that was irrigated was divided by the total area of the commodity (i.e. irrigated plus non-irrigated area) and multiplied by the total value of the commodity produced. This method has an under-estimating bias as it is likely that commodities grown on irrigated land will be more productive (e.g. t/ha) than the same commodity grown on non-irrigated land.

Method of Calculation continued

- Method 2. The percentage of agricultural establishments (farms) that irrigated within particular ANZSICs was determined and this percentage applied to the total gross value of the particular commodities produced by that ANZSIC. This method is likely to over-estimate the value of irrigated production as not all production on all irrigated farms is from irrigated land.

34 The simple average of these methods was used to estimate the value of irrigated production for vegetables, fruit (including nuts), grapes, other pastures and sugar. The second method was used to estimate the value of milk production from dairy pastures as data from the Victorian Dairy Industry Survey of 1999 and Armstrong, et al. (1998) indicated that where a dairy farm was irrigated, nearly all milk production can be attributed to irrigation.

35 Method 1 was used to estimate the value of other cereals as investigations of the data revealed that the irrigated area made up only a small fraction of the production area on most farms. As such, attributing all production from irrigated farms to irrigation was likely to lead to a large over-estimate of irrigation production. A combination of methods was used for other crops.

Data Quality and Reliability

36 Calculation of the gross value of irrigated production is based on several assumptions so these estimates should be used and interpreted cautiously.

WATER ACCESS ENTITLEMENTS, ALLOCATIONS AND TRADING - CHAPTER 8

Data Sources

37 Data presented in this chapter are drawn from the ABS publication *Water Access Entitlements, Allocations and Trading 2004–05, Australia*, ABS Cat no. 4610.0.55.003.

38 State and Territory agencies were asked to provide data on water access entitlements, allocations and trading to the ABS from their administrative systems.

39 Data were sought from the agencies responsible for administering water access entitlements, allocations and trading in each State and Territory. The main data providers were:

- Department of Natural Resources, New South Wales
- Department of Sustainability and Environment, Victoria
- Department of Natural Resources and Water, Queensland
- Department of Water, Land and Biodiversity Conservation, South Australia
- Department of Water, Western Australia
- Department of Primary Industries and Water, Tasmania
- Department of Natural Resources, Environment and the Arts, Northern Territory
- Environment ACT, Australian Capital Territory

Data Quality and Reliability

40 Because of differences in terminology, legislative arrangements and administrative systems, the data need to be interpreted with caution, particularly when making comparisons between jurisdictions. Please refer to the publication *Water Access Entitlements, Allocations and Trading 2004–05, Australia* (ABS 2006d) for further information.

STOCK TABLES - CHAPTER 9

Data Sources

41 The data presented in chapter 9 were drawn from a variety of sources.

42 The rainfall and run-off data for 2004–05 were supplied by the BRS. The data were generated for the Australian Water Availability Project, a project involving the BRS, the CSIRO and the Bureau of Meteorology. These agencies are working together to develop an on-line, operational system for monitoring soil moisture, run-off and other components of water balance, based on the method developed by Welsh et al. (2006). A steady-state catchment water balance model was used to generate the run-off data presented in this account. For more information please contact the BRS.

43 Information on the storage capacity of large dams was from the ANCOLD Register of Large Dams. Data from the register were confronted against dam owners' administrative data and adjusted accordingly.

Data Sources continued

44 Information on the volume in storage in large dams was sourced from publicly available information, supplemented by a direct collection of data by the ABS. For large dams for which there was no information available, the ABS derived an estimate using a standard statistical imputation process. The imputed data contributed less than 10% of the Australian total.

Data Quality and Reliability

45 The data on rainfall and run-off are the results of complex models based on data collected by a range of agencies. Because of the complexity of the model and possible errors associated with the data used in the model, these estimates should may be used with a moderate degree of confidence.

46 The data on large dam capacity and dam storage levels are based on publicly available information and direct collection by the ABS. Imputed storage volumes accounted for less than 10% of Australia's total dam storage. These estimates may be used with a high degree of confidence.

NEXT EDITION

47 At this stage the next Water Account is scheduled to be produced in May 2011 in respect of 2008–09. This would continue the current four-yearly cycle of the publication. On-going developments in the concepts, data sources and methods used for water accounting along with additional resources, may enable the Water Account to be produced more frequently or ahead of schedule.

ABBREVIATIONS

'000	thousand
$m	million dollars
ABS	Australian Bureau of Statistics
ACT	Australian Capital Territory
ANCID	Australian National Committee on Irrigation and Drainage
ANCOLD	Australian National Committee on Large Dams
ANZSIC	Australian and New Zealand Standard Industrial Classification
ASR	aquifer storage and recovery
ATSE	Australian Academy of Technological Sciences and Engineering
Aust.	Australia
AWA	Australian Water Association
AWR 2005	Australian Water Resources 2005
AWRC	Australian Water Resources Council
BE	bulk entitlement
BoM	Bureau of Meteorology
BRS	Bureau of Rural Sciences
COAG	Council of Australian Governments
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DEUS	New South Wales Government Department of Energy, Utilities and Sustainability
DIPNR	New South Wales Government Department of Infrastructure, Planning and Natural Resources
DSE	Victorian Government Department of Sustainability and Environment
DWR	South Australian Department of Water Resources
EFG	Environmental Flow Guidelines
EPA	Environmental Protection Agency
GA	Geoscience Australia
GCCC	Gold Coast City Council
GL	gigalitre
GWh	gigawatt hour
ha	hectare
I-O	input-output
IGVA	industry gross value added
kL	kilolitre
km²	square kilometre
kWh	kilowatt hour
L	litre
mg	milligram
mm	millimetre
MAR	mean annual run-off
MDBC	Murray-Darling Basin Commission
ML	megalitre

nec	not elsewhere classified
no.	number
NCC	National Competition Council
NCP	National Competition Policy
NLWRA	National Land and Water Resources Audit
NPI	National Pollutant Inventory
NRW	Queensland Department of Natural Resources and Water
NSW	New South Wales
NT	Northern Territory
NWC	National Water Commission
NWI	National Water Initiative
PC	Productivity Commission
PIRSA	Primary Industries and Resources South Australia
Qld	Queensland
SA	South Australia
SEEA	System of Integrated Environmental and Economic Accounting
SEEAW	System of Environmental-Economic Accounting for Water
SNA	System of National Accounts
SOI	Southern Oscillation Index
SWMA	surface water management area
Tas.	Tasmania
UN	United Nations
Vic.	Victoria
WA	Western Australia
WSAA	Water Services Association of Australia
yr	year

APPENDIX 1 CLIMATE CONDITIONS

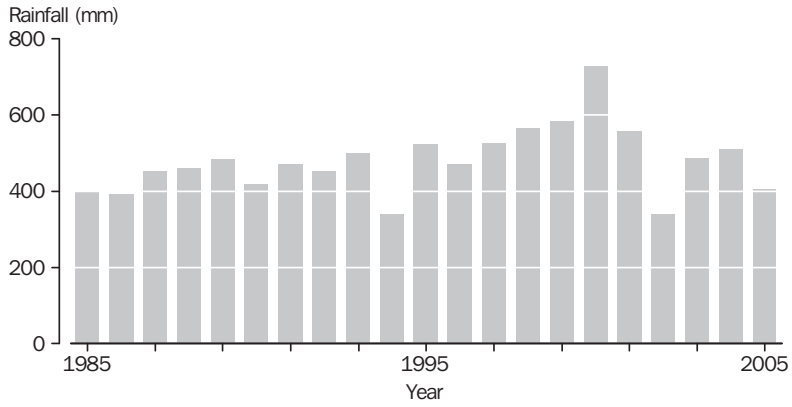
INTRODUCTION

The supply and use of water in Australia needs to be seen in the context of climate. In particular, rainfall in the years preceding the Water Account reference periods (i.e. 2000–01 and 2004–05) is important as this plays a large part in determining the amount of water available in the environment as surface and groundwater as well as in dams and other water storages.

Comparison of 2000–01 to 2004–05

The years preceding 2004–05 were dry compared to 2000–01 and the years immediately before. Graph A1.1 shows a peak in rainfall in 2000 followed by a trough in 2002. Maps A1.2 and A1.3 also highlight the spatial differences in rainfall patterns in 2001 compared to 2005.

A1.1 ANNUAL RAINFALL—1985 to 2005



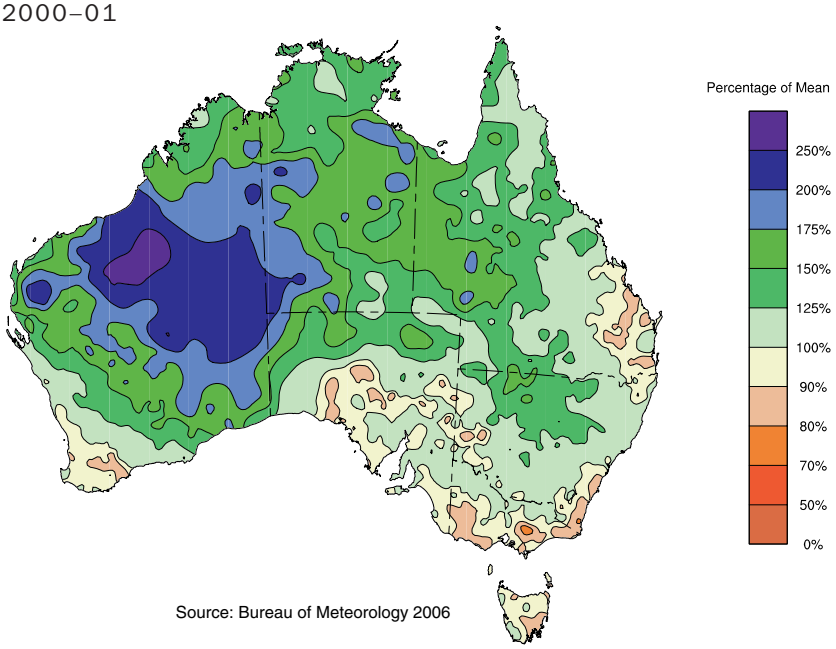
Source: Bureau of Meteorology 2006

CONDITIONS FOR 2004–05

The period from July 2004 to June 2005 was a dry and warm one over most of Australia. More than 90% of the country had below-normal rainfall for the 12-month period, making it the 9th driest July-June period in 106 years of records (MAP A1.4). The national area-averaged rainfall was 367 mm, 22% below the average for 1961 to 1990. The period from January to May 2005 was especially dry (the second driest on record, after 1965) Mean temperatures for Australia were the highest on record for a July-June period, being 0.76°C above the 1961 to 1990 mean, which broke the previous record of 0.72°C, set in 1997–98.

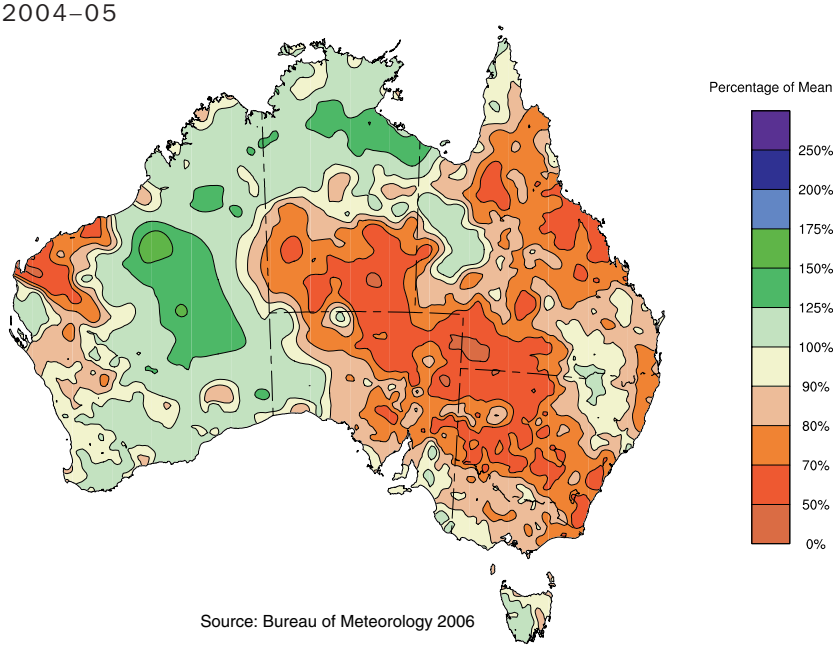
CONDITIONS FOR 2004–05
continued

A1.2 PERCENTAGE OF MEAN ANNUAL RAINFALL, 1998–99 to 2000–01



Source: Bureau of Meteorology 2006

A1.3 PERCENTAGE OF MEAN ANNUAL RAINFALL, 2002–03 to 2004–05



Source: Bureau of Meteorology 2006

The most significant contributor to the dry and warm conditions in 2004–05 was a weak tropical monsoon in the summer of 2004–05. Wet season rainfall was well below normal through most of the tropics and subtropics, except for those areas directly under the paths of tropical cyclones. In particular, there were no episodes during the summer in which there was significant penetration of tropical moisture into central Australia. The only widespread rain through central Australia in 2004–05 fell in June 2005, which was a rather wet month through much of the country. Despite the June rains, it was the driest July-June period on record in parts of interior Western Australia, and large parts of the inland had less than 100 mm for the 12 months, with some areas receiving less than 50 mm. Before June rains lifted their July-June total to 68 mm, Alice Springs had only

CONDITIONS FOR 2004–05
continued

36.6 mm for the 12 months from June 2004 to May 2005, only 14% of normal and a record low for this period.

Much of Queensland was also drier than normal, whilst another notably dry area was northern Tasmania, where some locations had their driest 12-month period on record. Autumn 2005 was very dry through much of eastern and central Australia, particularly in Victoria and South Australia which both had their driest autumn on record. There were few substantial areas of above-normal rainfall. The most significant was around Carnarvon on the west coast of Western Australia, where 215 mm fell in July 2004, almost matching the annual average of 226 mm. Another area of above-average rainfall was in parts of northern inland New South Wales, which was particularly wet in October and December 2004, with some associated flooding in parts of the upper Murray-Darling basin. Victoria's rainfall for the 12-month period was generally close to normal, as was that in the south-west of Western Australia, where a wet autumn in 2005 offset a dry finish to 2004.

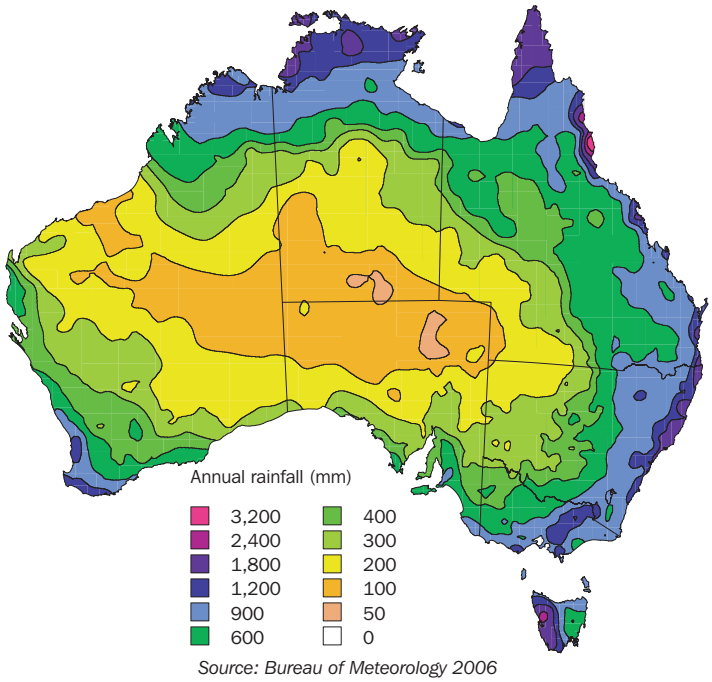
Temperatures in 2004–05 were well above normal, particularly from November 2004 onwards. Autumn 2005 was especially warm. April 2005 (2.58°C above average) was Australia's warmest month on record, in terms of the difference from the long-term average, with about two-thirds of the country having its warmest April on record.

Influenced by the relatively low rainfall and reduced cloud cover, temperatures in northern Australia during the tropical wet season (October-April) were also the highest on record.

Daytime maximum temperatures were particularly warm. In parts of the western Northern Territory they were more than 2°C above normal, whilst anomalies in the 1 to 2°C range occurred across extensive areas of New South Wales, the southern half of Queensland, the southern Northern Territory and the interior of Western Australia.

There were no significant areas of below-normal maximum temperatures. Overnight minimum temperatures were closer to normal (the generally dry conditions and reduced cloud cover leading to a wider-than-normal daily temperature range). They were 0.5 to 1.0°C above normal in most of Western Australia and south-western Queensland, but within 0.5°C of normal in most other areas.

A1.4 RAINFALL, Australia—2004–05



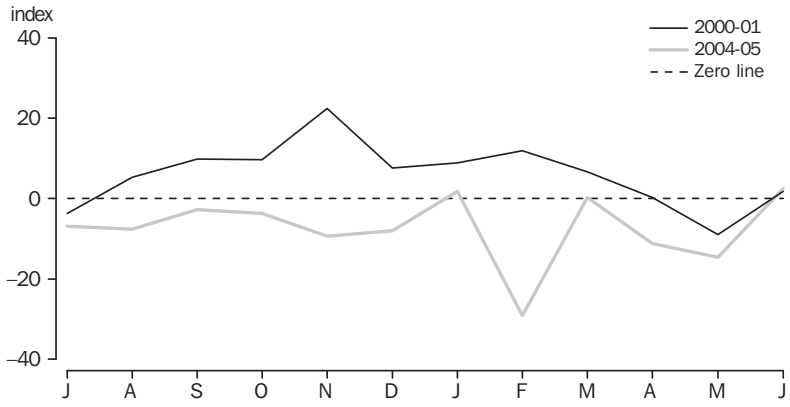
Source: Bureau of Meteorology 2006

EL NINO

El Niño refers to the extensive warming of the central and eastern Pacific that leads to a major shift in weather patterns across the Pacific. El Niño is measured by the Southern Oscillation Index (SOI) and is calculated from the monthly or seasonal fluctuations in the air pressure difference between Tahiti and Darwin. Sustained negative values of the SOI often indicate El Niño episodes. The SOI for 2000–01 and 2004–05 is presented in Graph A1.5.

In Australia (particularly eastern Australia), El Niño events are associated with an increased probability of drier conditions. These conditions contributed to 2004–05 being a period of below average rainfall over much of the continent, particularly in the north, and south-west, with a weak monsoon influencing climate in the tropical areas. This weak monsoon caused below average rainfall conditions in northern and central Australia, with the exception of those areas in the paths of tropical cyclones. Central areas of the Northern Territory and Queensland remained very dry, as well as areas of Western Australia and northern Tasmania. In comparison for much of 2000–01, the period of the last Water Account, Australia was under the influence of La Nina. Consistent with the weather patterns associated with La Nina, many areas of Australia had a wet year, particularly in the north of the continent.

A1.5 SOUTHERN OSCILLATION INDEX, July to June—2000–01 and 2004–05



Source: Bureau of Meteorology 2006

APPENDIX 2 ENVIRONMENTAL FLOWS

INTRODUCTION

This appendix is provided as a guide to environmental flows. Environmental flows is a general term that can be taken to mean a variety of things, including *environmental water provisions* as defined in the Australian Water Resources 2005. The aim of the appendix is to help readers understand how environmental flows are allocated and provided for in each of the States and Territories of Australia. It also helps to explain their relationship to the presentation of water supplied to the environment by the economy as presented in the supply and use tables found in Chapter 2.

The 2000–01 Water Account presented information on environmental flows defined as water delivered (released) for the purpose of the environment in accordance with a specific plan prepared in conjunction with and/or approved by the appropriate environmental (resource) regulator. The 2004–05 Water Account again includes information on the water supplied or allocated to the environment in the supply and use tables but we have not termed this environmental flows. This is because many environmental flows provided for by water providers and water management agencies under various State and Territory legislation are not allocated or recorded in a way that currently enables them to be easily included in a water accounting format. There is currently work in this area under the NWI and it is hoped that in the future environmental flows can be incorporated into a water accounting format.

BACKGROUND

In the 1994 water reform agreement, COAG recognised the environment as a legitimate user of water, acknowledging a need in all jurisdictions to arrest widespread natural resource degradation caused by historical and current patterns of water use (NCC 2004). One of the aims of the NWI is to implement an integrated management system of water resources which explicitly provides water for the environment and other public benefit outcomes. Environmental outcomes may include maintaining ecosystem function, biodiversity, water quality and river health targets, where as other public benefits includes mitigation of pollution, indigenous and cultural values, recreation, fisheries, tourism, navigation and amenity values.

States and Territories use different methods of allocating environmental flows that reflect the different geographic, climatic and ecological conditions, and past water management practices (Land and Water Australia 2003, NWC 2006b). Methods of allocating environmental water include:

- providing specific quantities of water to the environment through ecological licences and allocations.
- placing limits and rules on extractive water licenses, and
- strategic management of flow regimes and water quality.

Due to the differences in allocation methods, and the relative complexity involved in the processes of environmental flow definition, provision and reporting, it is difficult to quantify and present data on environmental flows in a nationally consistent manner (SKM 2006). The 2000–01 Water Account presented information on environmental flows, but this was only the volume of water released by water providers for environmental purposes. The same information is presented for 2004–05 but has been re-named provision of water for the environment in recognition that this does not represent all environmental flows.

BACKGROUND *continued*

Since the publication of the 2000–01 Water Account, the NWI has required the jurisdictions to develop annual environmental water accounting arrangements, that include:

- reporting on environmental water rules and whether or not they were activated in a particular year;
- the extent to which these rules were implemented;
- the overall effectiveness of the use of resources in the context of the environmental and other public benefit outcomes sought and achieved; and
- implementing a compatible register of new and existing environmental water.

During 2004–05 the jurisdictions were at various stages of developing and implementing arrangements for providing water for the environment and accounting, limiting the availability of data on environmental flows. This is expected to improve as nationally accepted frameworks and definitions are developed.

SUMMARY OF ARRANGEMENTS

The following paragraphs summarise the various methods used for the provision of water for the environment and other public benefit outcomes in Australia. Descriptions of the methods used for allocating environmental flows in each State and Territory are provided as well as data on environmental flows for 2004–05 where available.

New South Wales

The New South Wales *Water Management Act 2000* provides for three categories of environmental flows:

- environmental health water, where water is allocated for fundamental environmental health and must be provided at all times;
- supplementary environmental water, where water is committed for a specific environmental purpose, but under normal circumstances can be used for other purposes; and
- adaptive environmental water, which is water granted under a water access licence for specified environmental purposes and can be traded or converted to an extractive use.

Water Sharing Plans establish rules for the assignment of environmental water and in total aim to return an average of 220 GL of water to the environment each year. Broad level catchment plans are being prepared for the unregulated rivers and groundwater sources that are not covered by Water Sharing Plans. These plans will develop a standard set of water sharing rules based on catchments with similar characteristics (DIPNR 2005).

Despite drought conditions across much of inland New South Wales in 2004–05, the environmental flow rules in each Water Sharing Plan were implemented in all of the seven regulated river systems with the exception of the Lachlan. For the twenty unregulated river Water Sharing Plans, cease to pump rules are used during very low flow conditions and were implemented during 2004–05 in fourteen plan areas (DIPNR 2005). The main environmental provision for groundwater sources is protecting the long-term storage component and a proportion of the recharge from extraction.

In 2004–05, the first Aboriginal cultural access licence was granted in New South Wales. Under the Murrumbidgee Water Sharing Plan, 2,150 ML of water was granted for the inundation of a culturally significant wetland (DIPNR 2005).

Victoria

Water for the environment in Victoria is held primarily in environmental water reserves, which is the share of water resources set aside to maintain the environmental values of a water system (DSE 2004). This volume of water has been established by setting limits on diversions through:

- conditions on bulk entitlements specifying minimum and/or flushing flows;
- surface and groundwater license rules established in water management plans;
- caps on bulk entitlements, placed on the total volume diverted and/or the rate of diversion; and

Victoria continued

- in some regulated rivers a bulk entitlement may provide water specifically for the environment.

Bulk entitlements for the environment may be held in storage such that all or part of the entitlement can be traded on the temporary water market where this does not affect the achievement of the objectives of the environmental water reserve. Water can also be provided to the environment through private donations from the community.

The Victorian river basins located in the Murray Darling Basin use the restrictions placed on the consumptive use of water by the Murray Darling Basin Cap (see http://www.mdbc.gov.au/nrm/the_cap) to set the environmental water reserve. In unregulated rivers and aquifers, environmental water reserves are provided by managing existing diversions through Stream Flow Management Plans and Groundwater Management Plans, which identify the environmental flow requirements for the plan area. Environmental flows in unregulated streams are protected by placing rosters and restrictions on private diverters who pump from the river in summer and by limiting the number of farm dams in winter. The use of groundwater is managed through the licensing regime and where necessary, restricting use to maintain groundwater levels to meet the requirements of the environmental water reserve. The ability to meet environmental flow requirements is subject to maintaining a reasonable level of supply reliability for existing users.

Queensland

The *Water Act 2000* provides for Water Resource Plans to manage Queensland's water resources. These plans make provisions for the natural processes that underpin river health, as well as considering the social and economic aspects of water management. Environmental flow objectives are set out in Water Resource Plans to sustain healthy aquatic ecosystems when tradable water entitlements are to be established. Water Resource Plans are implemented by Resource Operations Plans. These establish tradable water entitlements and detail the management arrangements and rules, including for how natural flows are to satisfy environmental flow objectives. Plans are to be reviewed every ten years to assess whether they have provided adequate environmental flows for Queensland's Rivers. Plans have been completed for 12 of the 21 river basins in Queensland.

Environmental flow objectives have performance indicators for low, medium and high-flow characteristics. Environmental flow objectives range from setting limits as to the extent of time when the river should be dry through to the frequency of flood events of varying magnitudes. A similar approach is used for groundwater where objectives are being set in terms of water levels that sustain the groundwater discharges needed to maintain ecological systems (see http://www.nrw.qld.gov.au/wrp/pdf/general/u_wrp.pdf).

South Australia

Environmental flows in South Australia are achieved through environmental water requirements which are the hydrological regimes needed to sustain the ecological values of aquatic ecosystems, including their processes and biological diversity, at a low level of risk (DWR 2000). Environmental water provisions are those parts of the environmental water requirements that can be met at any given time, after considering existing users' rights, social and economic impacts. These provisions are sought for water courses, riparian zones, wetlands, flood plains, estuaries, cave and aquifer ecosystems. In cases where current environmental water provisions are not sufficient to meet the requirements of water-dependent ecosystems, the aim of the policy is to progressively increase environmental water allocations until they do.

Prescription of a water resource is used in South Australia when the level of water use and the declining condition of an area's water resources indicate that sustainable management is needed. All water users of a prescribed water resource require a licence, which specifies how much water is allocated to the user and may specify other conditions or controls. 'Use limits' are estimated for prescribed water resources, which

South Australia continued

describes the maximum annual volume of water that can be made available for human activities and industry without seriously impacting on the environment (DWR 2000). These limits are based on typical conditions, and may be above sustainable use in circumstances such as extended periods of drought. In July 2005, six major catchment and groundwater areas in South Australia were prescribed resources.

Western Australia

The Western Australian *Environmental Water Provisions Policy 2000* describes the principles and processes to be applied to determine how much water should be retained for the environment when allocating and reviewing water use entitlements. As in South Australia, ecological water requirements and environmental water provisions (as defined above) are used to allocate water for environmental and other public benefit outcomes. Western Australia also has social water requirements, which are the elements of a water regime that are identified to meet social values, and mitigation water requirements, which are elements of the water regime that are identified to improve diminished water quality. Both social and mitigation water requirements may form part of the environmental water provisions. Environmental water provisions can not be traded in Western Australia.

In areas proclaimed under the *Rights in Water and Irrigation Act 1914*, the Western Australian Government ensures that water use is within sustainable limits through the issuing of licenses to approved users. Licence holders may only take water for the purpose and in the way specified by the licence so that allocation limits are not exceeded and the environment is not compromised. Further allocations to new or existing consumptive users will only occur where environmental water provisions are being met.

Tasmania

Water for ecosystems in Tasmania is allocated within the framework of the *Water Management Act 1999* and its associated *Water for Ecosystems Policy*. Environmental flows are delivered through a rules basis on water licences and allocations, with minimal water volumes maintained in streams and bores. Environmental water can be held as an entitlement for environmental and other public benefit outcomes, however none have been registered as at July 2005 (Jackson 2006, personal communication).

Water for the environment in Tasmania is defined in terms of environmental water requirements and environmental water provisions, which are the same as the ecological water requirements and environmental water provisions used in South Australia and Western Australia. Water Management Plans prescribe the environmental water requirements for a catchment's water resources. These plans have been partially or fully completed for many Tasmanian rivers. Environmental water requirements have been implemented for the waterways in 5 of the 48 Land and Water Management Catchments, which represents an approximate 10% progress towards full assessment and implementation (Read 2006, personal communication).

Mechanisms are currently being introduced to manage groundwater areas, especially where groundwater use may exceed the yield capacity of the aquifer. Groundwater management plans will be developed for the State's groundwater management regions. During 2004–05 work commenced on the development of management procedures, including licensing and metering of bores in areas of high groundwater use.

Northern Territory

Water Allocation Plans for surface and groundwater in the Northern Territory include contingent allocations for the environment which provide a conservative and sustainable balance between environmental needs and other water uses (NCC 2001). To ensure that water extraction remains within the estimated sustainable yield, licences are issued only after accounting for environmental needs.

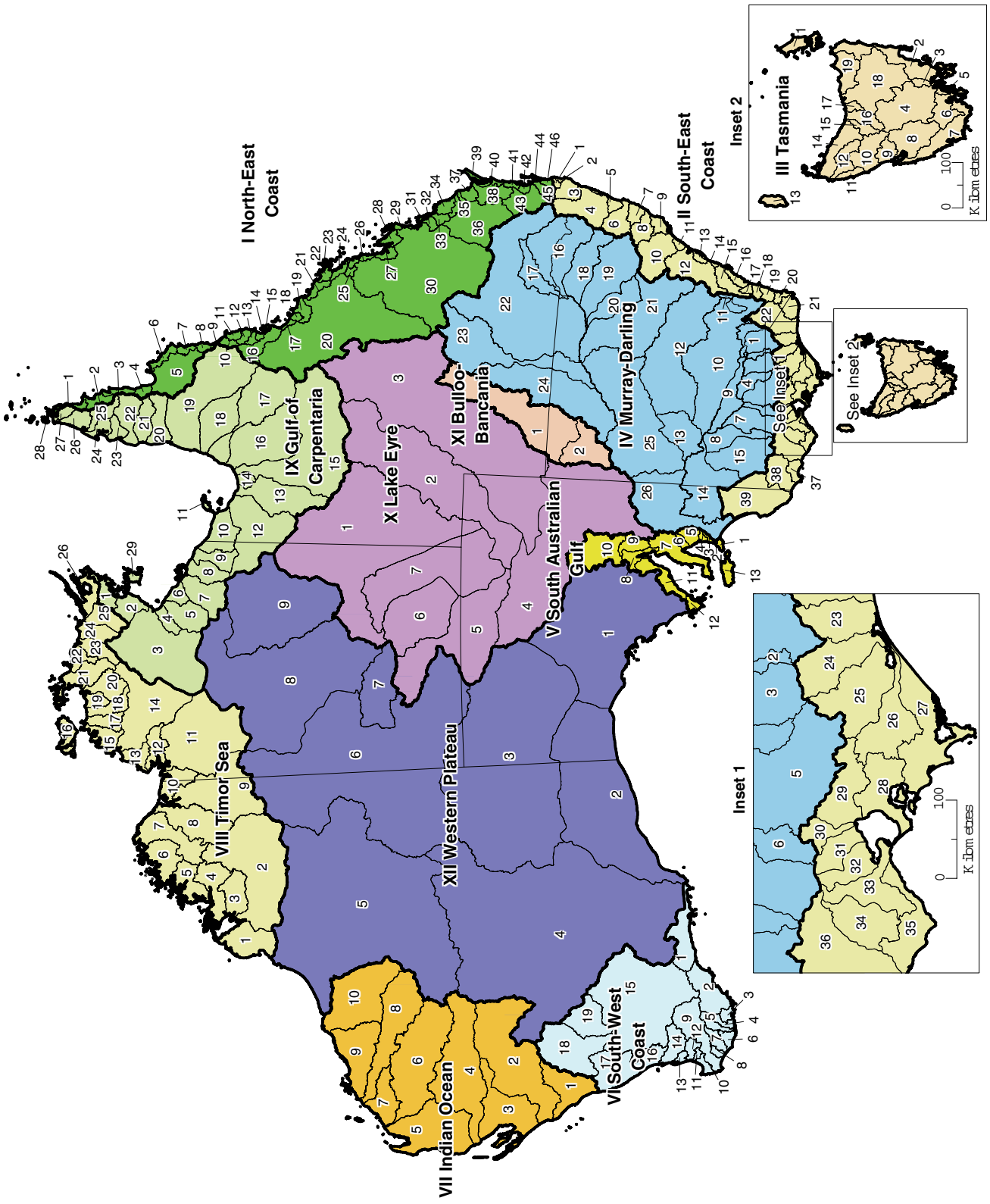
Northern Territory continued

There are highly variable environmental conditions in the Northern Territory, from tropical environments of the Top End in the north, through the semi-arid mulga scrubs and mallee, to the sand dunes of the Arid Zone in the centre. Surface water extraction in the Top End is limited to no more than 20% of streamflow at any time. Groundwater extraction licences are limited so that groundwater extraction generally does not exceed 20% of the total recharge rate. In the Arid Zone, licences are generally limited so that no more than 80 per cent of the aquifer storage will be depleted over at least one to two hundred years.

The Northern Territory's Integrated Natural Resource Management Plan (DIPE 2005) estimated that over 99% of mean annual flow remains available for environmental and cultural uses in 24 of the 31 rivers in the Top End of the Northern Territory. Over 90% of average annual recharge to 10 of the 16 groundwater provinces in the Northern Territory is considered to be available to sustain environmental and cultural values (DIPE 2005).

Australian Capital Territory

In the ACT, some of the water resources fall under the jurisdiction of the ACT, NSW and the Commonwealth, others fall solely under the jurisdiction of the ACT. Water can only be used for other purposes in the ACT once environmental flow requirements have been met. Environmental flows are required to be supplied in the context of the ACT Water Resource Management Plan. "Think Water, Act Water" describes the ACT's water resources, including the flows required to meet the environmental needs of individual rivers and aquifers. In 2005, draft Environmental Flow Guidelines were prepared, which set out the environmental flow requirements needed to maintain aquatic ecosystems (Environment ACT 2005). Only limited groundwater extraction occurs and is limited to 10% of groundwater recharge in each subcatchment (Environment ACT 2005).


I North-East Coast
II South-East Coast
III Tasmania
IV Murray-Darling
V South Australian Gulf
VI South-West Coast
VII Indian Ocean
VIII Timor Sea
IX Gulf of Carpentaria
X Lake Eyre
XI Bulloo-Bancania
XII Western Plateau
Inset 1
Inset 2
See Inset 1
See Inset 2
0 100
Kilometres

I North-East Coast

1 Jacky Jacky Creek
2 Olive-Pascoe Rivers
3 Lockhart River
4 Stewart River
5 Normanby River
6 Jeannie River
7 Endeavour River
8 Daintree River
9 Mossman River
10 Barron River
11 Mulgrave-Russell Rivers
12 Johnstone River
13 Tully River
14 Murray River (QLD)
15 Hinchinbrook Island
16 Herbert River
17 Black River
18 Ross River
19 Haughton River
20 Burdekin River
21 Don River
22 Proserpine River
23 Whitsunday Island
24 O'Connell River
25 Pioneer River
26 Plane Creek
27 Styx River
28 Shoalwater Creek
29 Water Park Creek
30 Fitzroy River (QLD)
31 Curtis Island
32 Calliope River
33 Boyne River
34 Baffle creek
35 Kolan River
36 Burnett River
37 Burrum River
38 Mary River (QLD)
39 Fraser Island
40 Noosa River
41 Maroochy River
42 Pine River
43 Brisbane River
44 Stradbroke Island
45 Logan-Albert Rivers
46 South Coast

II South-East Coast

1 Tweed River
2 Brunswick River
3 Richmond River
4 Clarence River
5 Bellinger River
6 Macleay River
7 Hastings River
8 Manning River
9 Karuah River
10 Hunter River
11 Macquarie-Tuggerah Lakes
12 Hawkesbury River
13 Sydney Coast-Georges River
14 Wollongong Coast
15 Shoalhaven River
16 Clyde River-Jervis Bay
17 Moruya River
18 Tuross River
19 Bega River
20 Towamba River
21 East Gippsland
22 Snowy River
23 Tambo River
24 Mitchell River (VIC)
25 Thomson River
26 Latrobe River
27 South Gippsland
28 Bunyip River
29 Yarra River
30 Maribyrnong River
31 Werribee River
32 Moorabool River
33 Barwon River
34 Lake Corangamite
35 Otway Coast
36 Hopkins River
37 Portland Coast
38 Glenelg River
39 Millicent Coast

III Tasmania

1 Flinders-Cape Barren Islands
2 East Coast
3 Coal River
4 Derwent River
5 Kingston Coast
6 Huon River
7 South-West Coast
8 Gordon River
9 King-Henty Rivers
10 Pieman River
11 Sandy Cape Coast
12 Arthur River
13 King Island
14 Smithton-Burnie Coast
15 Forth River
16 Mersey River
17 Rubicon River
18 Tamar River
19 Piper-Ringarooma Rivers

IV Murray-Darling

1 Upper Murray River
2 Kiewa River
3 Ovens River
4 Broken River
5 Goulburn River
6 Campaspe River
7 Loddon River
8 Avoca River
9 Murray-Riverina
10 Murrumbidgee River
11 Lake George
12 Lachlan River
13 Benanee
14 Mallee
15 Wimmera-Avon Rivers
16 Border Rivers
17 Moonie River
18 Gwydir River
19 Namoi River
20 Castlereagh River
21 Macquarie-Bogan Rivers
22 Condamine-Culgoa Rivers
23 Warrego River
24 Paroo River
25 Darling River
26 Lower Murray River

V South Australian Gulf

1 Fleurieu Peninsula
2 Myponga River
3 Onkaparinga River
4 Torrens River
5 Gawler River
6 Wakefield River
7 Broughton River
8 Mambray Coast
9 Willochra Creek
10 Lake Torrens
11 Spencer Gulf
12 Eyre Peninsula
13 Kangaroo Island

VI South-West Coast

1 Esperance Coast
2 Albany Coast
3 Denmark River
4 Kent River
5 Frankland River
6 Shannon River
7 Warren River
8 Donnelly River
9 Blackwood River
10 Busselton Coast
11 Preston River
12 Collie River
13 Harvey River
14 Murray River (WA)
15 Avon River
16 Swan Coast
17 Moore-Hill Rivers
18 Yarra Yarra Lakes
19 Ninghan

VII Indian Ocean

1 Greenough River
2 Murchison River
3 Wooramel River
4 Gascoyne River
5 Lyndon-Minilya Rivers
6 Ashburton River
7 Onslow Coast
8 Fortescue River
9 Port Hedland Coast
10 De Grey River

VIII Timor Sea

1 Cape Leveque Coast
2 Fitzroy River (WA)
3 Lennard River
4 Isdell River
5 Prince Regent River
6 King Edward River
7 Drysdale River
8 Pentecost River
9 Ord River
10 Keep River
11 Victoria River
12 Fitzmaurice River
13 Moyle River
14 Daly River
15 Finniss River
16 Bathurst and Melville Islands
17 Adelaide River
18 Mary River (NT)
19 Wildman River
20 South Alligator River
21 East Alligator River
22 Goomadeer River
23 Liverpool River
24 Blyth River
25 Goyder River
26 Buckingham River

IX Gulf of Carpentaria

1 Koolatong River
2 Walker River
3 Roper River
4 Towns River
5 Limmen Bight River
6 Rosie River
7 McArthur River
8 Robinson River
9 Calvert River
10 Settlement Creek
11 Mornington Island
12 Nicholson River
13 Leichhardt River
14 Morning Inlet
15 Flinders River
16 Norman River
17 Gilbert River
18 Staaten River
19 Mitchell River (QLD)
20 Coleman River
21 Holroyd River
22 Archer River
23 Watson River
24 Embley River
25 Wenlock River
26 Ducie River
27 Jardine River
28 Torres Strait Islands
29 Groote Eylandt

X Lake Eyre

1 Georgina River
2 Diamantina River
3 Cooper Creek
4 Lake Frome
5 Finke River
6 Todd River
7 Hay River

XI Bulloo-Bancannia

1 Bulloo River
2 Lake Bancannia

XII Western Plateau

1 Gairdner
2 Nullarbor
3 Warburton
4 Salt Lake
5 Sandy Desert
6 Mackay
7 Burt
8 Wiso
9 Barkly

Source: Geoscience Australia 2004

GLOSSARY

ANZSIC	The Australian and New Zealand Standard Industrial Classification (ANZSIC) is the standard classification used in Australia and New Zealand for the collection, compilation, and publication of statistics by industry.
Aquifer	A geologic formation which is capable of holding water and through which water can percolate. Aquifers are capable of yielding quantities of groundwater for economic activities.
Australian Water Resources 2005 (AWR 2005)	Australian Water Resources 2005 is the baseline assessment of water resources for the National Water Initiative.
Bulk water	Water supplied by a water provider to another water provider.
Bulk entitlement	A type of water access entitlement in Victoria, issued to rural and regional water authorities, who then distribute the water to their rural and urban customers, to some electricity generating companies and to the State Minister for Environment.
Cap on water diversions	The limit imposed on the volume of surface water which can be diverted from rivers for consumptive uses.
Catchment	The area of land determined by topographic features, within which rainfall will contribute to run-off at a particular point. The catchment for a major river and its tributaries is usually referred to as a River basin. A map of Australian River basins is included in Appendix 3.
Commercial water use	Water used primarily for basic water supply and sanitation purposes, including use by offices, schools, hospitals, apartment buildings, hotels and resorts, restaurants, and retail stores.
Consumptive pool	The amount of water resource that can be made available for consumptive use in a given water system under the rules of the relevant water plan.
Consumptive use	The use of water for private benefit consumptive purposes including irrigation, industry, urban and stock and domestic use (NWI definition). This is different to the definition of water consumption used in this publication.
Cooling water	Water used for cooling purposes (e.g., for electricity generation).
Desalination	A process where salt is removed from water with a high salt content (usually seawater but sometimes other brackish water) to make it suitable for domestic or industrial use.
Discharge	The transfer of water or waste water (of any treatment level) from the control of a water supplier or user to the environment.
Distributed water	Distributed water is water supplied to a user including through a non-natural network (piped or open channel), and where an economic transaction has occurred for the exchange of this water. The majority of distributed water is supplied by the WATER SUPPLY, SEWERAGE AND DRAINAGE SERVICES industry (ANZSIC group 3701). The water supply component consists of units mainly engaged in storage, purification or distribution of water by pipeline or carrier. It also includes the operation of irrigation systems that supply water to a farm and the supply of steam and hot water.
Domestic or residential water supply	Water supplied primarily to domestic or residential customers. In rural areas this includes water supplied for stock and domestic uses.

Drainage division	Drainage divisions comprise 12 areas defined by drainage patterns following major topographic features covering the whole of the Australian continent. Drainage divisions are sub-divided into 77 drainage regions and 245 river basins. These smaller sub-areas within a drainage division are based on groups of rivers and individual rivers respectively. A map of Australian Drainage divisions is included in Appendix 3.
Drainage services	The collection of water through a regional network of surface and/or subsurface drains. This water may be reused or discharged to the environment.
Drainage water	Excess surface or subsurface water collected and conveyed from irrigated lands. It may be captured for reuse or conveyed for downstream demands.
Ecological water requirement	A description of the water regimes needed to maintain ecological values of water dependent ecosystems at a low level of risk. They are used in South Australia, Western Australia and Tasmania (however, Tasmania uses the term "Environmental Water Requirements").
Effluent discharge	The discharge of used water by an organisation into the environment, with its associated quality characteristics, including, for example, the temperature of the discharge.
Environmental allocation	An amount of water allocated for environmental purposes and released to meet the environmental needs of a given area, e.g. a forest.
Environmental flow	This is a general term that can have a variety of meanings, including Environmental Water Provisions (defined below). The 2000-01 Water Account, Australia and the ABS 2004–05 Water Supply Survey defined environmental flows to be: water delivered (released) for the purpose of the environment in accordance with a specific plan prepared in conjunction with and/or approved by the appropriate environmental (resource) regulator.
Environmental water provisions	The water regimes that are provided as a result of the water allocation decision-making process, taking into account ecological, social and economic impacts. They aim to meet in part or in full, the ecological water requirements. They are used in South Australia, Western Australia and Tasmania.
Environmental water requirement	See Ecological Water Requirements.
Environmental water reserve	The share of water resources set aside to maintain the environmental values of a water system in Victoria.
Estuary	The part of a river in which water levels are affected by sea tides, and where fresh water and salt water mix.
Evapotranspiration	Process of moisture loss to the atmosphere from plants by transpiration and evaporation.
Gigalitre	One thousand million litres.
Gross State Product (GSP)	GSP is defined equivalently to gross domestic product. It is the total market value of goods and services produced in a state within a given period after deducting the cost of goods and services used up in the process of production but before deducting allowances for the consumption of fixed capital.
Groundwater	Water occurring below the ground's surface.
Industry Gross Value Added (IGVA)	The value of an industry's output at basic prices, minus the value of goods and services consumed as inputs during the process of production. Basic prices valuation of output removes the distortion caused by variations in commodity taxes and subsidies across the output of individual industries.
In-stream use	The use of freshwater in situ (e.g. within a river or stream). Can include recreation, tourism, scientific and cultural uses, ecosystem maintenance, hydro-electricity and commercial activities, and dilution of waste. The volume of water required for most in-stream uses cannot be quantified, with the exception of hydro-electricity generation.

Inland surface water	All waters on the surface of the earth, excluding sea water. Includes lakes, rivers, dams, wetlands, snow and ice.
Irrigation	Water artificially applied to soils (i.e., does not include precipitation/rainfall).
Irrigation/Rural water provider	A water provider undertaking the supply of retail irrigation water in rural areas. Functions of irrigation/rural water providers include the delivery of water for the purpose of irrigation and the collection of drainage off agricultural land through surface or sub-surface drainage systems. In addition most supply water for stock and domestic purposes and either bulk or reticulated water to service rural towns. Delivery systems can range from channel/canal to pipes to carriers and natural streams/water courses.
Kilolitre	One thousand litres.
Major urban water provider (Metropolitan)	An urban water provider servicing >50,000 water or sewerage connections. A connection corresponds to a water meter or sewerage connection regardless of the type of customer.
Megalitre	One million litres.
Minor urban water provider	An urban water provider servicing <10,000 water or sewerage connections. A connection corresponds to a water meter or sewerage connection regardless of the type of customer.
Murray Darling Basin Cap	The limit imposed on the volume of surface water which can be diverted from rivers for consumptive uses. Started in 1995 as the Interim Cap.
National Water Initiative (NWI)	An intergovernmental agreement on water reform created in June 2004.
Net water supply	The quantity of water supplied to customers of the water provider. This comprises the distributed water supply less: losses, water provided for environmental benefits, and, water used directly by the industry.
Non-major urban water provider	An urban water provider servicing between 10,000 and 50,000 water or sewerage connections. A connection corresponds to a water meter or sewerage connection regardless of the type of customer.
Other water provider	An organisation that supplies water but whose main activity is in an industry other than the WATER SUPPLY, SEWERAGE AND DRAINAGE SERVICES industry (eg. MINING or MANUFACTURING).
Permanent water trading	A transaction that permanently affects some aspect of a water access entitlement, such as changes to the ownership, water source, size of share, or reliability.
Primary treatment	Treatment of waste water that involves the screening of solids from waste water allowing a proportion of solids and organic matter to settle and be removed by sedimentation tanks.
Process water	Water used in the production of goods or the provision of services. For example, water use in the production of food, cleaning in industrial production, or water used in laundry facilities.
Recycled water	Recycled water is any water that is reused by the same organisation on-site after it has been used once, or water that would normally go down the drain but is used for another purpose.
Regulated discharge	Water discharged after use where that discharge does not match the natural flow regime of the receiving water body. For example, waste water discharged into a river, ocean or land outfall by a sewerage service provider is considered a regulated discharge. Water discharged from a household is not considered to be a regulated discharge because it is usually discharged into a sewerage system.
Regulated flow	A controlled flow rate resulting from the influence of a regulating structure, such as a dam or weir.

Reuse water	Drainage, waste or storm water that has been used again without first being discharged to the environment. It may have been treated to some extent.
River basin	The 245 River basins in Australia are defined by the area drained by a stream and its tributaries where surface run-off collects. In an area of uncoordinated drainage, drainage patterns define a basin. A map of Australian River basins is included in Appendix 3.
Run-off	The part of precipitation in a given area and period of time that appears as stream flow.
SEEA	SEEA is the System for Integrated Environmental and Economic Accounting. It is a framework used to develop environmental accounts by integrating environmental information into an accounting framework. The SEEA publication provides the conceptual basis for developing a framework to describe the interrelationship between the natural environment and the economy.
SEEAW	SEEAW is the International System for Environmental and Economic Accounting for Water. It is an elaboration of the SEEA and provides a conceptual framework for organising hydrological and economic information in a coherent and consistent framework. The latest draft was released for comment in November 2006.
Secondary treatment	Treatment of waste water that utilises biological processes to oxidise remaining organic matter dissolved or suspended within primary treated effluent.
Sewerage	Infrastructure used to remove sewage (waste water).
Storm water	Rainfall that is collected after it has run off urban surfaces.
Surface water	Water flowing or held in streams, rivers and other wetlands in the landscape.
System of National Accounts (SNA)	The System of National Accounts (SNA) is an international framework which can be used to develop a comprehensive, consistent and flexible set of macro-economic accounts.
Temporary water trading	A transaction that affects only the seasonal water allocation associated with a water access entitlement.
Tertiary treatment	Treatment of waste water in which secondary treated effluent is processed through a number of processes to remove additional nutrients: including coagulation, flocculation and clarification.
Total water use	Total water use is equal to distributed water use plus self-extracted water use plus reuse water use.
Treated waste water	See primary, secondary and tertiary treatment.
Urban water provider	Includes major, non-major and minor urban water provider.
Waste water	Any water that has been used once and cannot be used again without treatment, for example untreated effluent, sewage water and trade waste.
Water access entitlement	A perpetual or ongoing entitlement to exclusive access to a share of water from a specified consumptive pool as defined in the relevant water plan.
Water allocation	The specific volume of water allocated to water access entitlements in a given season, defined according to rules established in the relevant water plan.
Water consumption	Water consumption is equal to distributed water use plus self-extracted water use plus reuse water use minus distributed water supplied to other users minus in-stream use (where applicable).
Water extracted	Water extracted directly from the environment for use (including rivers, lakes, groundwater and other bodies). Some of this water may be then distributed via water providers to others. Excludes water supplied by water providers via regulated systems.
Water license	A type of water access entitlement.

Water losses	Water that enters the water distribution system of a water provider that does not reach the end users/customers. Water losses can be attributed to seepage, leakage, evaporation(excluding evaporation from water storages), meter inaccuracies and theft.
Water plan	Statutory plans for surface and/or groundwater systems, developed in consultation with all relevant stakeholders on the basis of best scientific and socio-economic assessment, to provide secure ecological outcomes and resource security for users.
Water provider	A business or organisation that provides a reticulated water supply, irrigation water, reuse/recycle water and/or bulk water supply service. Water providers may be government or private and often operate water storage, purification and supply services. They may also provide sewerage or drainage services.
Water right	A type of water access entitlement in Victoria issued to individuals in rural water authority supplied irrigation districts.
Water stocks	Surface and groundwater resources available in Australia for economic and environmental use.
Water source	The location from which water is withdrawn by an organisation.
Water system	A system that is hydrologically connected and described at the level desired for management purposes (eg sub-catchment, catchment, basin or drainage division and/or groundwater management unit, sub-aquifer, aquifer, groundwater basin).
Water trading	Transactions involving water access entitlements or water allocations assigned to water access entitlements.
Water treatment plant	An individual location receiving raw or partially treated water for treatment and ultimate delivery to customers. There may be more than one water treatment plant at an individual facility. Secondary or booster disinfection plants are not included, even where they have pH treatment. Water treatment plants that provide fluoridation only should be classified as disinfection only.

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