



DOMESTIC WATER USE

**NEW
SOUTH
WALES**

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- For further information about these and related statistics, contact the National Information and Referral Service on 1300 135 070 or Erin Stephenson on Sydney 02 9268 4183.

NOTES

INTRODUCTION

This publication contains results from the October 2002 State Supplementary Survey, Domestic Water Use, New South Wales (NSW). It presents information on household use of indoor and outdoor water using appliances. Topics covered include: sources of water; type, age and frequency of use of washing machines; age and frequency of use of dishwashers; number of showers, baths and toilets; frequency of washing vehicles; the use of garden mulch and types of watering systems; and presence of swimming pools.

ROUNDING

Where figures have been rounded, discrepancies may occur between totals and the sums of the component items. Published percentages are calculated prior to rounding, and therefore some discrepancy may occur between these percentages and those that may be calculated from the rounded figures.



ABBREVIATIONS

- ABS Australian Bureau of Statistics
- MPS Monthly Population Survey
- NSW New South Wales
- RSE relative standard error

John Struik
Regional Director, New South Wales

SUMMARY OF FINDINGS

SOURCES OF WATER

In October 2002, an estimated 2,365,700 or 95% of households in New South Wales were connected to a mains water supply. In Sydney, 98% of all households were connected to mains water, compared with 89% of households in the rest of NSW. Households which were connected to mains water were surveyed for their use of water-using appliances, and the results for these households are presented below.

There were 155,100 households with an alternative source of water in addition to the mains water supply, representing 7% of all households connected to mains water. This varied by region, with 2% of households in Sydney having an alternative source of water, compared with 15% of households in the rest of New South Wales.

The most common alternative sources of water were rainwater tanks (4%), and ground bores or spear points (1%). Compared with the results of the previous domestic water use survey — see *Domestic Water Use, NSW, July 1987* (cat. no. 8719.1), there has been no significant change in the percentage of mains connected households with alternative water sources.

SEWAGE DISPOSAL

Of the households in New South Wales connected to mains water, 2,258,000 (95%) were connected to the sewerage system (up from 92% in 1987) and 103,100 (4%) had a septic tank. In Sydney, 97% of households were connected to the sewer, in contrast to 93% of households in the rest of New South Wales.

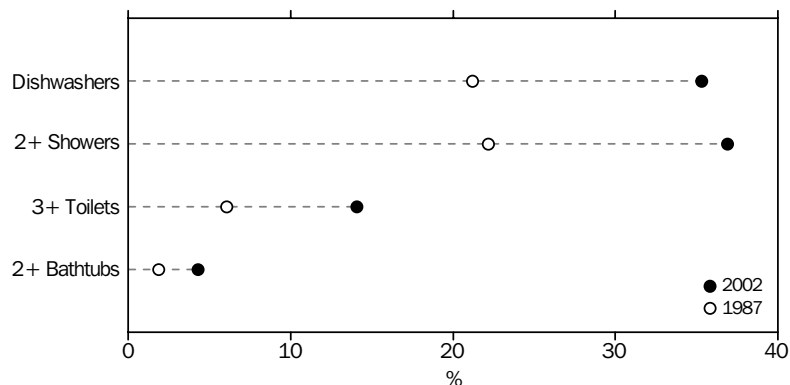
INDOOR WATER USE

An estimated 2,256,100 or 95% of households connected to mains water had a washing machine (up from 92% in 1987). Top loading washing machines were most common, having been installed in 88% of all mains connected households. Of the households with a washing machine, 33% did six or more loads of washing in the week before the survey.

An estimated 834,800, or 35% of households connected to mains water had a dishwasher, a large increase from the 21% reported in 1987.

Almost all of the households connected to mains water had at least one shower, while 37% had two or more showers (up from 22% in 1987). An estimated 87% of households had bathtubs, while 4% had more than one bathtub (up from 2% in 1987). More than half the households (1,254,400) had more than one toilet, and 14% (334,300) had more than two toilets (up from 6% in 1987).

1 PERCENTAGE OF HOUSEHOLDS WITH SELECTED WATER USING APPLIANCES
Comparison of 2002 with 1987



SUMMARY OF FINDINGS *continued*

OUTDOOR WATER USE

An estimated 281,600 or 15% of households living in selected dwelling types connected to mains water had a swimming pool, a proportion which has remained stable since 1987. A higher proportion of households in Sydney had pools (17%), compared with the rest of NSW (11%).

In NSW in 2002, 1,848,400 or 96% of households (excluding flats, units or apartments) connected to mains water had gardens. Of these, 65% used garden mulch, compared with 55% in 1987. Households in Sydney were less likely to use mulch compared with the rest of NSW. In Sydney, 62% of households used mulch, compared with 71% of households in the rest of New South Wales.

The most common method of watering gardens was with a hand-held hose, used by 75% of households with gardens. Other common methods of watering were sprinklers (33%) and fixed watering systems (24%).

Of the households in NSW connected to mains water, 1,494,800 households (63%) had vehicles that were washed at the dwelling. During the month prior to October 2002, 73% (1,089,000) of these households washed a vehicle at least once.

EFFECT OF WATER RESTRICTIONS

The NSW Domestic Water Use Survey was conducted during October 2002. In the months leading up to October 2002, many regions of NSW were affected by drought. Consequently certain types of water use may have been curtailed, either voluntarily or due to local water restrictions. The water use patterns recorded in this survey should therefore be interpreted with this in mind (see Explanatory Notes for further detail).

1

HOUSEHOLDS, Sources of water by area of usual residence

Source of water	AREA OF RESIDENCE					
	Sydney		Balance of NSW		Total	
	'000	%	'000	%	'000	%
Connected to mains	1 508.9	98.3	856.8	88.7	2 365.7	94.6
Not connected to mains	25.5	1.7	108.7	11.3	134.2	5.4
Total	1 534.4	100.0	965.4	100.0	2 499.9	100.0

2

HOUSEHOLDS CONNECTED TO MAINS WATER SUPPLY, Type of alternative water source by area of usual residence

Type of alternative sources of water	AREA OF RESIDENCE					
	Sydney		Balance of NSW		Total	
	'000	%	'000	%	'000	%
Rainwater tank	19.7	1.3	83.9	9.8	103.6	4.4
Ground bore/spear point	*6.0	*0.4	27.6	3.2	33.6	1.4
Private dam or spring	*2.6	*0.2	*5.7	*0.7	*8.3	*0.4
Other(a)	*4.0	*0.3	11.7	1.4	15.7	0.7
<i>Total households with alternative water sources(b)</i>	30.5	2.0	124.6	14.5	155.1	6.6
<i>Households with no alternative water sources</i>	1 478.4	98.0	732.2	85.5	2 210.5	93.4
Total households connected to mains	1 508.9	100.0	856.8	100.0	2 365.7	100.0

* estimate has a relative standard error of between 25% and 50% and should be used with caution
 (a) Includes creek, stream, irrigation channel or well.

(b) Components do not add to total as more than one alternative source of water could be used.

3

HOUSEHOLDS CONNECTED TO MAINS WATER SUPPLY, Sewerage connection by area of usual residence

Sewerage type	AREA OF RESIDENCE					
	Sydney		Balance of NSW		Total	
	'000	%	'000	%	'000	%
Connected to sewer	1 463.7	97.0	794.3	92.7	2 258.0	95.4
Septic tank	42.4	2.8	60.7	7.1	103.1	4.4
Other	*4.5	*0.3	*3.4	*0.4	*8.0	*0.3
Total households connected to mains(a)	1 508.9	100.0	856.8	100.0	2 365.7	100.0

* estimate has a relative standard error of between 25% and 50% and should be used with caution

(a) Components do not add to total as a household may have more than one type of sewerage disposal.

4

HOUSEHOLDS CONNECTED TO MAINS WATER SUPPLY, Water-using appliances by area of usual residence

Type of washing machine	AREA OF RESIDENCE					
	Sydney		Balance of NSW		Total	
	'000	%	'000	%	'000	%
Top loading(a)	1 285.3	85.2	784.7	91.6	2 070.0	87.5
Front loading(b)	139.3	9.2	46.7	5.5	186.1	7.9
Dishwasher	589.4	39.1	245.4	28.6	834.8	35.3
Evaporative cooler connected to mains water supply	*6.3	*0.4	102.3	11.9	108.6	4.6
Bathtubs						
None	167.4	11.1	134.7	15.7	302.1	12.8
One	1 267.4	84.0	694.2	81.0	1 961.6	82.9
Two or more	74.1	4.9	27.9	3.3	101.9	4.3
Showers						
One(c)	926.2	61.4	567.5	66.2	1 493.7	63.1
Two or more	582.7	38.6	289.2	33.8	871.9	36.9
Toilets						
One(d)	665.3	44.1	445.9	52.0	1 111.3	47.0
Two	598.8	39.7	321.2	37.5	920.1	38.9
Three or more	244.7	16.2	89.6	10.5	334.3	14.1
Total households connected to mains	1 508.9	100.0	856.8	100.0	2 365.7	100.0

* estimate has a relative standard error of between 25% and 50% and should be used with caution

(a) Includes twin tub.

(b) Includes a small number of households with other types of washing machine.

(c) Includes a small number of households with no shower.

(d) Includes a small number of households with no toilet.

5

HOUSEHOLDS CONNECTED TO MAINS WATER SUPPLY, Number of loads done last week by type of washing machine

Number of loads of washing done last week	TYPE OF WASHING MACHINE					
	Top loading(a)		Front loading(b)		Total	
	'000	%	'000	%	'000	%
None, machine not used	86.9	4.2	*6.3	*3.4	93.2	4.1
1-2 loads	540.3	26.1	40.3	21.6	580.5	25.7
3-5 loads	758.4	36.6	77.6	41.7	836.0	37.1
6-8 loads	361.5	17.5	33.7	18.1	395.2	17.5
9-11 loads	129.3	6.2	13.7	7.3	143.0	6.3
12-16 loads	114.2	5.5	12.1	6.5	126.3	5.6
17 loads or more(c)	79.5	3.8	*2.4	*1.3	81.9	3.6
Total households with at least one washing machine	2 070.0	100.0	186.1	100.0	2 256.1	100.0

* estimate has a relative standard error of between 25% and 50% and should be used with caution
 (a) Includes twin tub.

(b) Includes a small number of households with other types of washing machine.
 (c) Includes number of loads not known.

6

HOUSEHOLDS CONNECTED TO MAINS WATER SUPPLY, Age of washing machine by household type

Age of washing machine	HOUSEHOLD TYPE						
	Person living alone	Couple only	Couple with children	Lone parent	All other households	Total	
	'000	'000	'000	'000	'000	%	
Less than 3 years	104.1	144.4	203.3	56.9	83.0	591.8	25.0
3-5 years	94.5	149.1	209.7	66.4	62.6	582.4	24.6
6-10 years	118.5	155.5	217.8	73.2	68.8	633.8	26.8
11 years or more	142.6	80.7	104.3	32.5	33.9	394.1	16.7
Age not known	18.2	*8.3	*7.0	*9.5	11.0	54.0	2.3
Total households with at least one washing machine	477.9	538.1	742.1	238.5	259.5	2 256.1	95.4
Total households with no washing machine	71.0	14.0	*4.4	*6.2	14.0	109.6	4.6
Total households connected to mains	548.9	552.1	746.5	244.8	273.4	2 365.7	100.0

* estimate has a relative standard error of between 25% and 50% and should be used with caution

7

HOUSEHOLDS CONNECTED TO MAINS WATER SUPPLY, Number of times dishwasher used by household type(a)

Number of times dishwasher used	HOUSEHOLD TYPE					Total	
	Person living alone	Couple only	Couple with children	Lone parent	All other households	'000	%
None	43.9	59.3	74.0	18.8	25.3	221.3	26.5
1-2 times	30.2	58.9	53.3	11.2	15.2	168.8	20.2
3-5 times	13.7	71.8	117.6	19.3	18.6	241.0	28.9
6 times or more(b)	*3.3	29.2	144.4	*9.1	17.7	203.7	24.4
Total households with dishwashers	91.0	219.2	389.3	58.4	76.9	834.8	100.0

* estimate has a relative standard error of between 25% and 50% and should be used with caution

(a) Excludes use of rinse only/prewash cycle.

(b) Includes number of times not known.

8

HOUSEHOLDS CONNECTED TO MAINS WATER SUPPLY, Age of dishwasher by household type

Age of dishwasher	HOUSEHOLD TYPE					Total	
	Person living alone	Couple only	Couple with children	Lone parent	All other households	'000	%
Less than 3 years	19.3	59.2	123.5	12.9	21.0	235.9	10.0
3-5 years	19.7	48.8	98.9	15.4	18.4	201.2	8.5
6-10 years	28.0	59.4	104.9	17.2	20.7	230.2	9.7
11 years or more	18.9	42.2	45.3	*8.9	12.5	127.8	5.4
Age not known	*5.1	*9.7	16.6	*4.0	*4.3	39.6	1.7
Total households with at least one dishwasher	91.0	219.2	389.3	58.4	76.9	834.8	35.3
Total households with no dishwasher	457.9	332.9	357.2	186.3	196.5	1 530.9	64.7
Total households connected to mains	548.9	552.1	746.5	244.8	273.4	2 365.7	100.0

* estimate has a relative standard error of between 25% and 50% and should be used with caution

9

HOUSEHOLDS CONNECTED TO MAINS WATER SUPPLY, Number of bathtubs, showers and toilets by dwelling type

	DWELLING TYPE							
	Separate house		Semi detached, row or terrace house, or townhouse		Flat, unit or apartment (a)		Total	
	'000	%	'000	%	'000	%	'000	%
.....								
Bathtubs								
None	160.8	9.4	30.0	13.9	111.4	25.3	302.1	12.8
One	1 456.5	85.2	177.4	82.1	327.7	74.3	1 961.6	82.9
Two or more	91.6	5.4	*8.6	*4.0	*1.7	*0.4	101.9	4.3
Showers(b)								
One(c)	963.2	56.4	145.5	67.4	385.0	87.3	1 493.7	63.1
Two or more	745.7	43.6	70.4	32.6	55.8	12.7	871.9	36.9
Toilets								
One(d)	660.0	38.6	94.1	43.6	357.1	81.0	1 111.3	47.0
Two	755.1	44.2	86.7	40.1	78.3	17.8	920.1	38.9
Three or more	293.8	17.2	35.2	16.3	*5.3	*1.2	334.3	14.1
Total households connected to mains	1 708.9	100.0	216.0	100.0	440.8	100.0	2 365.7	100.0

* estimate has a relative standard error of between 25% and 50% and should be used with caution

(a) Includes dwellings classified as other.

(b) Includes showers both inside and outside the dwelling.

(c) Includes a small number of households with no shower.

(d) Includes a small number of households with no toilet.

10

HOUSEHOLDS LIVING IN SELECTED DWELLINGS CONNECTED TO MAINS WATER SUPPLY(a), Type of swimming pool

Type of swimming pool	AREA OF RESIDENCE					
	Sydney		Balance of NSW		Total	
	'000	%	'000	%	'000	%
In-ground pool	162.7	14.0	58.1	7.6	220.8	11.5
Above-ground pool	30.2	2.6	15.5	2.0	45.7	2.4
Toddlers' paddling pool	*5.0	*0.4	*5.4	*0.7	10.4	0.5
Other	**1.6	**0.1	*3.0	*0.4	*4.7	*0.2
<i>Total households with a pool</i>	199.5	17.2	82.1	10.8	281.6	14.6
<i>Total households with no pool</i>	961.9	82.8	681.4	89.2	1 643.3	85.4
Total households connected to mains	1 161.4	100.0	763.5	100.0	1 924.9	100.0

* estimate has a relative standard error of between 25% and 50% and should be used with caution
 ** estimate has a relative standard error greater than 50% and is considered too unreliable for general use

(a) Includes separate houses, semi detached, row or terrace houses, or townhouses.

11

HOUSEHOLDS LIVING IN SELECTED DWELLINGS CONNECTED TO MAINS WATER SUPPLY, With gardens, Use of mulch and watering methods(a)

	AREA OF RESIDENCE					
	Sydney		Balance of NSW		Total	
	'000	%	'000	%	'000	%
Mulch used	682.1	61.6	522.6	70.6	1 204.8	65.2
Mulch not used	425.6	38.4	218.1	29.4	643.6	34.8
Watering methods						
Fixed watering system	257.7	23.3	187.5	25.3	445.2	24.1
No fixed watering system	850.0	76.7	553.2	74.7	1 403.2	75.9
A hand-held hose	846.1	76.4	547.0	73.9	1 393.1	75.4
A sprinkler	347.0	31.3	262.7	35.5	609.7	33.0
A soaker hose	91.7	8.3	83.6	11.3	175.3	9.5
Other	45.8	4.1	46.4	6.3	92.2	5.0
<i>Total households with a garden(b)</i>	1 107.7	100.0	740.7	100.0	1 848.4	100.0
<i>Total households with no garden</i>	53.6	..	22.9	..	76.5	..
Total households connected to mains	1 161.4	..	763.5	..	1 924.9	..

.. not applicable

(a) Includes separate houses, semi detached, row or terrace houses, or townhouses.

(b) Components do not add to total as households may have used more than one type of watering method.

12

HOUSEHOLDS CONNECTED TO MAINS WATER SUPPLY, Number of vehicles washed at dwelling

Vehicles washed	AREA OF RESIDENCE					
	Sydney		Balance of NSW		Total	
	'000	%	'000	%	'000	%
None	603.9	40.0	266.9	31.2	870.9	36.8
One	486.0	32.2	333.3	38.9	819.4	34.6
Two	308.2	20.4	191.0	22.3	499.2	21.1
Three or more	110.7	7.3	65.5	7.6	176.2	7.4
Total households connected to mains	1 508.9	100.0	856.8	100.0	2 365.7	100.0

13

HOUSEHOLDS CONNECTED TO MAINS WATER SUPPLY, Frequency of washing vehicles

Frequency of washing vehicles in the last month(a)	AREA OF RESIDENCE					
	Sydney		Balance of NSW		Total	
	'000	%	'000	%	'000	%
Vehicles not washed in last month	235.5	26.0	170.3	28.9	405.8	27.2
1-2 times	458.9	50.7	282.5	47.9	741.3	49.6
3-5 times	159.3	17.6	102.0	17.3	261.4	17.5
6-8 times	38.1	4.2	26.3	4.5	64.4	4.3
9 times or more	13.2	1.5	*8.7	*1.5	21.9	1.5
Total households where vehicles are washed	905.0	100.0	589.8	100.0	1 494.8	100.0

* estimate has a relative standard error of between 25% and 50% and should be used with caution

a) Total number of times any vehicles were washed in the last month

EXPLANATORY NOTES

INTRODUCTION

1 This publication contains results from the 2002 NSW State Supplementary Survey, Domestic Water Use. The survey was conducted throughout NSW during the two weeks commencing Monday 7 October 2002.

2 In the months leading up to October 2002, many regions of NSW were affected by drought. Consequently certain types of water use may have been curtailed, either voluntarily or due to local water restrictions, around this time. In particular, some of the data relating to water use had a short reference period, referring only to the week or month prior to the time of the survey. The data items most likely to be affected are:

- Number of loads of washing done last week in the washing machine
- Whether dishwasher was used last week
- Types of wash cycles used last week in the dishwasher
- Number of times rinse only/prewash cycle used last week in the dishwasher
- Number of times other cycles (not rinse only/prewash) used last week in the dishwasher
- Number of times used shower last week
- Number of times used bath last week
- Number of times vehicles were washed at this dwelling last month

3 The survey was conducted as a supplement to the Australina Bureau of Statistics (ABS) Monthly Population Survey (MPS). The MPS is a multi-stage area sample of private dwellings and non-private dwellings (hotels, motels, caravan parks, etc.). Information is obtained from the occupants of the selected dwellings by specially trained interviewers.

4 For details of the design, scope and coverage of the MPS, readers should refer to any recent edition of the ABS publication, *Labour Force, Australia* (cat. no. 6203.0) and the *Information Paper: Labour Force Survey Sample Design, 1997* (cat. no. 6269.0).

SCOPE

5 Information was collected by either face to face or telephone interview from one responsible adult per household, who answered questions on behalf of the household. This survey was conducted using seven-eighths of the full sample of private dwellings in New South Wales that were included in the Monthly Population Survey and excluded:

- visitors to the household
- members of the permanent defence forces
- certain diplomatic personnel of overseas governments, customarily excluded from censuses and surveys
- overseas residents in Australia
- members of non-Australian defence forces (and their dependants) stationed in Australia and
- residents of non-private dwellings such as hospitals and motels.

6 Information was sought from approximately 6,300 households, and of these about 5,800 (92%) responded.

COVERAGE

7 Coverage rules were applied to ensure that each person was associated with only one dwelling, and hence had only one chance of selection in the survey.

EFFECTS OF ROUNDING

8 Estimates have been rounded and discrepancies may occur between sums of the component items and totals.

DATA INTERPRETATION

9 Some of the tables in this publication include a column or row which is headed 'Other'. These contain respondent answers which could not be entered into any of the pre-coded response categories. The 'Other' categories are generally made up of widely varying responses given by a small proportion of the survey population. Wherever possible, a summarised content of the 'Other' category is footnoted at the end of each relevant table. Further information is available from the ABS contact on the front cover of this publication.

EXPLANATORY NOTES *continued*

ACKNOWLEDGMENT

10 The ABS publications draw extensively on information provided freely by individuals, businesses, governments and other organisations. Their continued cooperation is very much appreciated. Without it, the wide range of statistics published by the ABS would not be available. Information received by the ABS is treated in strict confidence as required by the *Census and Statistics Act 1905*.

RELATED PUBLICATIONS

11 The ABS produces a wide range of publications containing social and demographic statistics. Other ABS publications which relate to this survey topic include:

Environmental Issues: People's Views and Practices, Australia, March 2002,
cat. no. 4602.0

Environmental Issues: People's Views and Practices, Australia, March 1998,
cat. no. 4602.0

Environmental Issues: People's Views and Practices, Australia, June 1994,
cat. no. 4602.0

Domestic Water Use, New South Wales, July 1987, cat. no. 8719.1

Water Usage, Western Australia, October 1986, cat. no. 8708.5

Water Using Appliances in Private Dwellings, Victoria, October 1985,
cat. no. 8709.2

12 Users should be aware that some changes have been made to survey procedures and methodology since the 1987 NSW Survey of Domestic Water Use was conducted. Comparisons of the frequency of appliance usage are most affected by these changes.

APPENDIX ADDITIONAL DATA AVAILABLE

ADDITIONAL DATA AVAILABLE	In addition to the statistics provided in this publication, ABS can produce upon request customised tables cross-classifying any of the following information. Inquiries should be made to the contact person shown on the front of this publication. Information collected in the survey included:
<i>Demographic characteristics</i>	Type of household e.g. person living alone, married couple only, etc. Type of dwelling Type of tenure Area of usual residence, Sydney/balance of NSW Labour force region
<i>Sources of Water</i>	Whether the dwelling is connected to mains water supply/town water Whether the dwelling has any other sources of water in addition to mains water supply Types of alternative sources of water Uses of alternative sources of water Type of sewerage connection
<i>Indoor Water Use</i>	Whether the household has a washing machine Age of washing machine Type of washing machine Number of loads of washing done last week in the washing machine Whether household has a dishwasher Age of dishwasher Whether dishwasher was used last week Types of wash cycles used last week in the dishwasher Number of times rinse only/prewash cycle used last week in the dishwasher Number of times other cycles (not rinse only/prewash) used last week in the dishwasher Whether the dwelling has an evaporative cooler Whether the evaporative cooler is connected to mains water supply Number of toilets both inside and outside dwelling Number of single flush toilets at dwelling Number of dual flush toilets at dwelling Number of other types of toilets at dwelling Total all types of toilets at dwelling Number of showers both inside and outside the dwelling Number of times used shower last week Number of bath tubs in the dwelling Number of times used bath last week
<i>Outdoor Water Use</i>	Number of vehicles washed at the dwelling Number of times vehicles were washed at the dwelling last month Whether use hose for washing down balconies, footpaths and buildings etc. Whether dwelling has any gardens or lawns Whether mulch used on the garden Whether have a fixed watering system in the garden Type of fixed watering system Type of automatic timer on fixed watering system Whether garden or lawn watered with a hand-held hose, a sprinkler, a soaker hose, etc. Whether dwelling has a swimming pool Type of swimming pool Number of leaking taps, toilets, or other fixtures both inside and outside dwelling To discuss your data requirements or for further information regarding this survey, please contact Erin Stephenson on Sydney 02 9268 4183.

TECHNICAL NOTE SAMPLING VARIABILITY

ESTIMATION PROCEDURE

1 Estimates derived from this survey were obtained using a post-stratification procedure. This procedure ensured that the survey estimates conformed to an independently estimated distribution of the population, by the number of adults and children within the household, and part of state, rather than the distribution among respondents.

RELIABILITY OF ESTIMATES

Non-sampling errors

2 Estimates in this publication are subject to non-sampling and sampling errors.

3 Non-sampling errors may arise as a result of errors in the reporting, recording or processing of the data and can occur even if there is a complete enumeration of the population. Non-sampling errors can be introduced through inadequacies in the questionnaire, non-response, inaccurate reporting by respondents, errors in the application of survey procedures, incorrect recording of answers and errors in data entry and processing.

4 It is difficult to measure the size of the non-sampling errors. The extent of these errors could vary considerably from survey to survey and from question to question. Every effort is made in the design of the survey and development of survey procedures to minimise the effect of these errors.

Sampling errors

5 Sampling error is the error which occurs by chance because the data were obtained from a sample, rather than from the entire population.

ESTIMATES OF SAMPLING ERROR

6 One measure of the variability of estimates which occurs as a result of surveying only a sample of the population is the *standard error* (see table on page 16).

7 There are about two chances in three (67%) that a survey estimate is within one standard error of the figure that would have been obtained if all households/persons had been included in the survey. There are about nineteen chances in twenty (95%) that the estimate will lie within than two standard errors.

8 Linear interpolation can be used to calculate the standard error of estimates falling between the sizes of estimates listed in the table.

9 The standard error can also be expressed as a percentage of the estimate. This is known as the *relative standard error* (RSE). The RSE is determined by dividing the standard error of an estimate SE(x) by the estimate x and expressing it as a percentage. That is: $RSE(x) = \frac{100SE(x)}{x}$ (where x is the estimate). The relative standard error is a measure of the error likely to have occurred due to sampling.

10 An example of the calculation and use of standard errors for estimates of households is as follows. Table 4 shows that the estimated number of households in New South Wales that have a dishwasher is 834,800. Since this estimate is between 500,000 and 1,000,000 the standard error (as shown in the table on page 16) will be between 13,363 and 16,220 and can be approximated as 15,276 (by linear interpolation). Thus there are about two chances in three that the value that would have been obtained, had all dwellings been included in the survey, lies between 819,524 and 850,076. Similarly, there are about nineteen chances in twenty that the value lies between 804,248 and 865,352.

11 Proportions and percentages formed from the ratio of two estimates are also subject to sampling error. The size of the error depends on the accuracy of both the numerator and the denominator. The formula for the relative standard error of a proportion or percentage is: $RSE\left(\frac{x}{y}\right) = \sqrt{[RSE(x)]^2 + [RSE(y)]^2}$

TECHNICAL NOTE SAMPLING VARIABILITY *continued*

ESTIMATES OF SAMPLING
ERROR *continued*

12 Only estimates with a RSE of 25% or less, and percentages based on such estimates, are considered sufficiently reliable for most purposes. However, estimates and percentages with a larger RSE have been included, preceded by * (RSE between 25% and 50%) or ** (RSE greater than 50%) to indicate that they are subject to high standard errors and should be used with caution.

**STANDARD ERRORS OF ESTIMATES OF NSW HOUSEHOLDS:
Domestic Water Use, October 2002**

Size of estimate (households)	Standard	Relative
	Error	Standard Error
	no.	%
1 000	591.7	59.2
1 500	782.2	52.1
2 000	947.4	47.4
2 500	1 095.1	43.8
3 000	1 229.9	41.0
3 500	1 354.4	38.7
4 000	1 470.7	36.8
5 000	1 683.2	33.7
8 000	2 213.6	27.7
10 000	2 508.5	25.1
20 000	3 624.8	18.1
30 000	4 431.7	14.8
50 000	5 623.7	11.2
100 000	7 563.8	7.6
200 000	9 863.9	4.9
300 000	11 357.5	3.8
500 000	13 362.7	2.7
1 000 000	16 220.3	1.6
2 000 000	19 090.4	1.0

GLOSSARY

Ground bore/spear point	A ground water supply that is accessed from within the householder's property. Essentially, it is a type of well that enables ground water to be pumped to the surface and consumed.
Evaporative cooler	An air conditioning system that uses the evaporation of water to absorb heat.
Septic tank	A tank buried in the ground on the householder's property, from which sewage is gradually dispersed into the earth.

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