Supply and Use in SEEA – Water account example

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AusAID

This session…

- ABS Water Account Australia
  - Methodological framework
  - Input collections
  - Converting survey/admin data into supply/ use tables
  - Terminology/definitions
  - 2009-10 WA estimates

Statistical infrastructure

- Register of survey units
- Classification systems
  - The System of Environmental-Economic Accounts (SEEA)
  - International Standard Industrial Classification (ISIC)
  - Water Supply Industry Terminology
- Survey Methodology – sample or census?

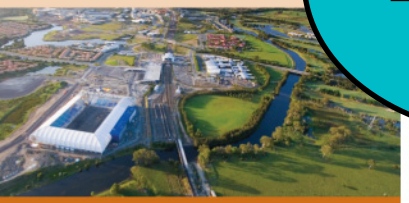


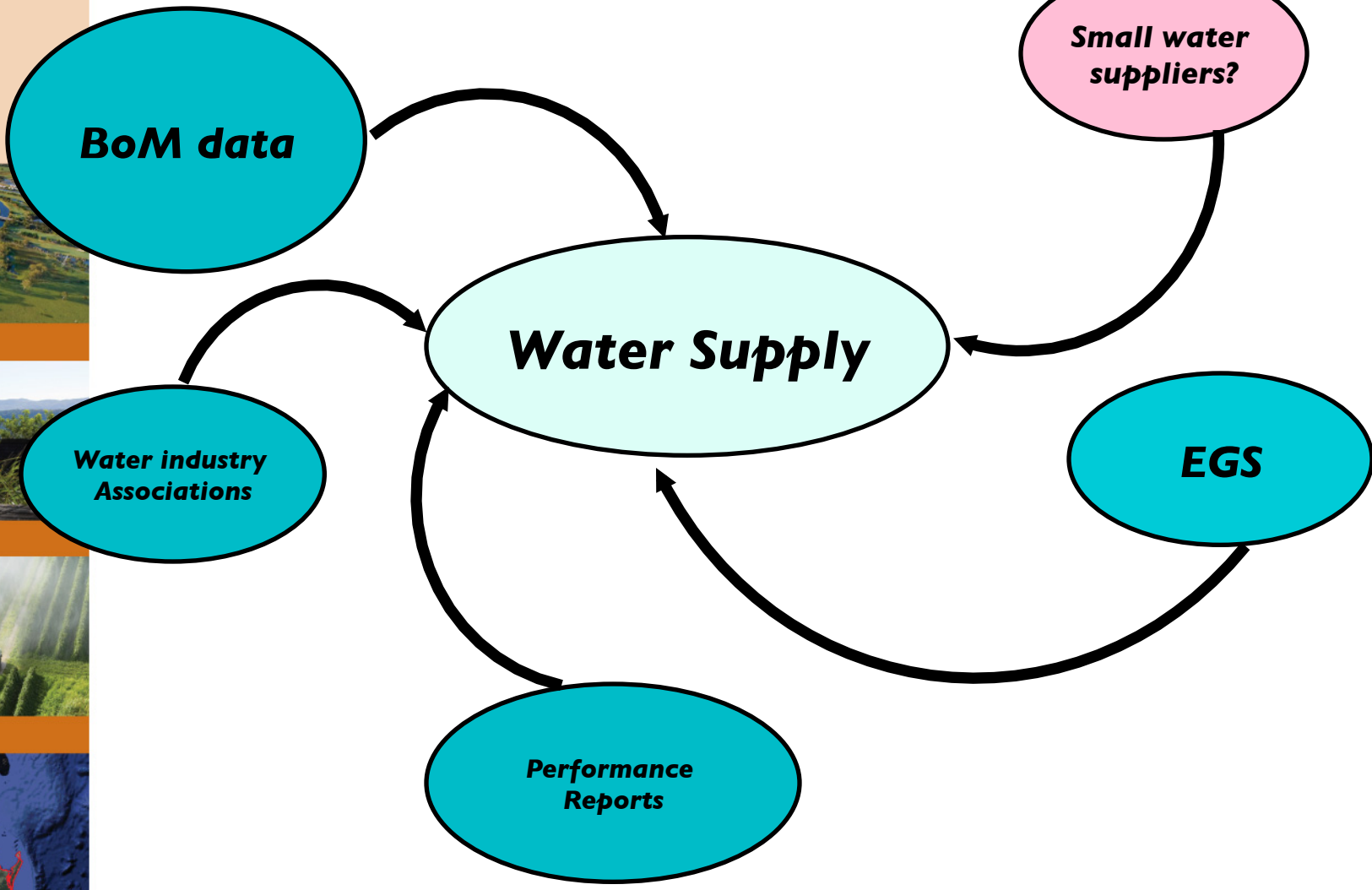

Input Collection types

- Water Supply Survey
- Agriculture Survey/Census
- Electricity Generators Survey
- Energy Water and Environment Survey
  - Mining
  - Manufacturing
  - “Other industries”
- Administrative data (*i.e. published water and annual reports*)




Australian Bureau of Statistics





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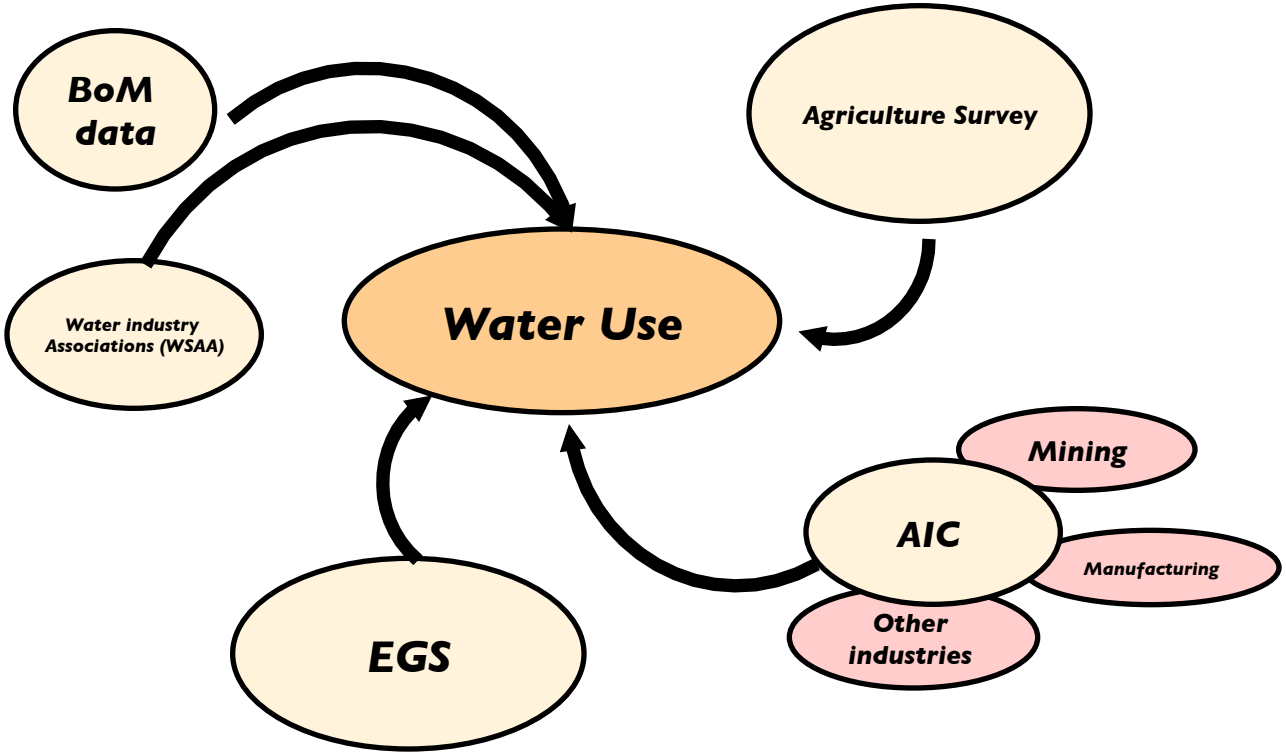


Water Account – data inputs

- ABS Water Supply survey (Annual)
- ABS Agriculture survey (Annual)
- Monetary information (Annual)
  - Manual compilation for 2009-10
  - collected with Water Supply survey from 2010-11 reference year (first year of system operation)

- ABS Electricity Generation survey (EGS)
  - Currently 4 yearly

- ABS Energy Water & Environment survey (EWES)
  - Currently 3 yearly
  - High proportion of total estimate from CE'd component of sample

- Collections feeding into the water S/U tables are shown on Tables 1 - 4 below:

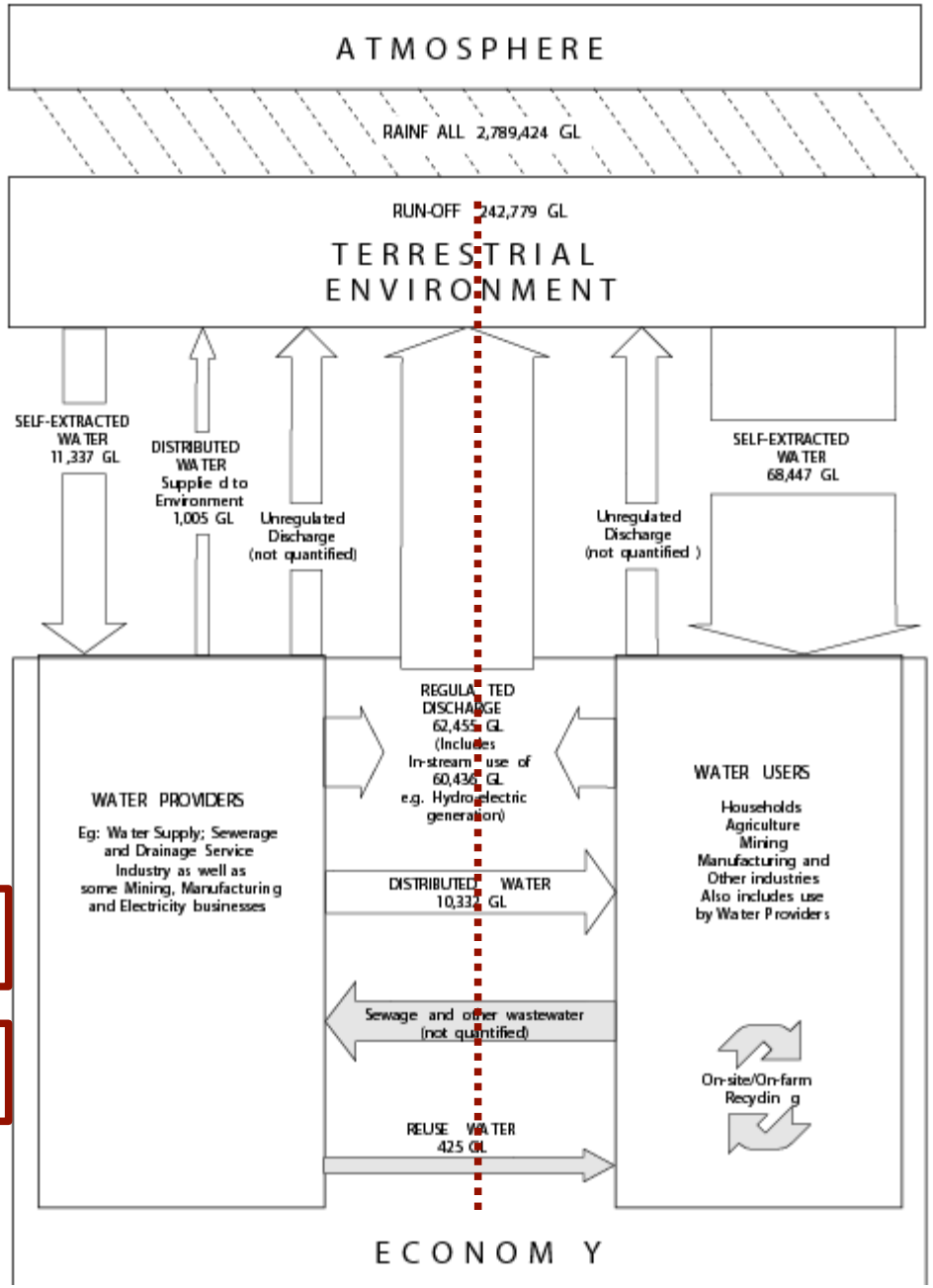
Australian Bureau of Statistics

WAVES

SUPPLY

Water Supply Survey

Administrative Data



USE

Agriculture Survey

Annual Integrated Collection

Electricity Generator Survey

Administrative data

What does a water account do?

- Describes annual flows of water from the environment to the supply side of the economy, distribution to end using businesses and households and returns of wastewater back to the environment.

- Data are produced for the following geographic levels:
  - National
  - State/Territory
  - Select drainage basins

- Results presented by key data item and ANZSIC industry groupings as presented in Table 1.

- Core results:- Supply and Use tables for water
- Additional industry-based information

… cont.

The ABS Water Account - what does it aim to achieve?

- provides a comprehensive picture of water use by different industries, and households, and over time (and water supply)
- assists evidence based policy decision making
- provides a dataset that can be merged with other economic, physical and social statistics
- helps predict future water needs
- helps assess the impact of water use

Supply Use tables in the account

Supply side

- Supply of distributed water (by water supply industry)
- Supply of reuse water
- Regulated discharges of (waste) water

Use Side

- Use of self extracted water
- Use of distributed water
- Use of reuse water
- In-stream use of water
- Total water consumption (derived)
- Use of water by the environment

Table 1. Supply and use table – Australia

Sourced from Water Supply Survey

Australian Bureau of Statistics

WAVES

	SUPPLY				USE				
	Self-extracted(a)	*Distributed(b)*	*Reuse(c)*	*Regulated discharge(d)*	*Self-extracted(a)*	*Distributed(b)*	*Reuse(c)*	*In-stream use(d)*	*Consumption(e)*
	ML	ML	ML	ML	ML	ML	ML	ML	ML
Agriculture, forestry and fishing									
Agriculture									
Nursery and floriculture production	—	—	—	na	21 867	30 503	6 120	—	58 490
Mushroom and vegetable growing	—	—	—	na	292 437	123 310	16 034	—	431 782
Fruit and tree nut growing	—	—	—	na	372 433	658 916	16 261	—	1 047 610
Sheep, beef cattle and grain farming	—	—	—	na	1 310 110	843 253	23 499	—	2 176 863
Other crop growing	—	—	—	na	944 831	932 006	24 026	—	1 900 863
Dairy cattle farming	—	—	—	na	622 736	625 633	14 513	—	1 262 883
Poultry farming	—	—	—	na	np	13 357	np	—	23 973
Deer farming	—	—	—	na	np	335	np	—	631
Other livestock farming	—	—	—	na	51 311	39 926	1 449	—	92 686
Total	—	—	—	na	*3 625 895*	*3 267 240*	*102 645*	—	6 995 781
Aquaculture	—	—	—	441 411	444 444	1 178	32	441 411	4 243
Forestry and logging	—	—	—	na	1 435	91 267	1 912	—	94 613
Fishing, hunting and trapping	—	—	—	na	439	1 584	—	—	2 024
Agriculture, forestry and fishing support services	—	—	—	na	9 489	51 980	246	—	61 715
Mining									
Coal mining	—	9 057	na	57 099	125 154	104 021	1 043	123 560	97 601
Oil and gas extraction	—	777	na	72 265	94 409	1 219	—	57 609	37 243
Metal ore mining	—	np	na	150 549	386 791	np	5 997	127 939	285 533
Non-metallic mineral mining & quarrying	—	110	na	7 852	40 113	3 826	9	2 341	41 497
Exploration and other mining support services	—	np	na	24 353	68 687	np	7	22 738	45 800
Total	—	*23 539*	na	*312 118*	*715 155*	*143 188*	*7 057*	*334 186*	*507 675*
Manufacturing									
Food, beverage and tobacco product	—	5 554	na	62 031	149 608	139 342	6 677	47	290 025
Textile, leather, clothing and footwear	—	—	na	1 538	1 001	10 204	975	1	12 178
Wood, pulp, paper and converted paper product	—	—	na	66 276	np	43 938	np	—	96 142
Printing (incl the reproduction of recorded media)	—	—	na	155	7	5 504	2	—	5 513
Petroleum, coal, basic chemical and chemical product	—	np	na	20 585	22 120	51 362	np	3 556	72 454
Polymer, rubber and non-metallic mineral product	—	—	na	4 935	np	20 864	468	np	31 318
Primary metal, metal and fabricated metal product	—	np	na	65 141	98 791	57 346	13 331	np	157 735
Transport equipment, machinery and equipment	—	1	na	86	769	9 804	277	—	10 848
Furniture and other	—	—	na	9	31	1 050	4	—	1 084
Total	—	*13 791*	na	*220 755*	*336 009*	*339 412*	*27 961*	*12 295*	*677 298*
Electricity, gas, water and waste services									
Electricity and gas supply(e)	—	266 558	6 505	44 706 235	44 840 605	228 089	9 199	44 483 500	327 834
Water supply, sewerage and drainage services(f)	—	9 369 147	341 463	1 778 772	9 369 147	2 317 205	79 030	—	2 396 235
Waste collection, treatment and disposal services	—	—	na	na	5 208	2 304	1	—	7 512
Other industries(g)	—	—	na	na	319 520	944 355	87 260	93 326	1 257 810
Household	—	—	—	—	172 092	1 593 966	2 193	—	1 768 251
Environment	59 839 438	—	—	—	—	691 265	30 432	—	—
Total	**59 839 438**	**9 673 034**	**347 968**	**47 459 291**	**59 839 438**	**9 673 034**	**347 968**	**45 364 718**	**14 100 991**

Supply use tables cont.

- Results presented by key data item (columns) and ANZSIC industry groupings (rows)

- ANZSIC Industry categories:
  - 3-Digit Agriculture
  - 2-Digit Mining, Manufacturing & Utilities
  - Grouped 1-Digit (service and remaining industries)
    - Key requirement to 'unpack' these service industries over time

- Core results:- <u>Supply and Use tables for water</u>
- Additional industry-based information

Table 1. Supply and use table – Australia

Sourced from Water Supply Survey

Australian Bureau of Statistics

WAVES

	SUPPLY				USE				
	Self-extracted(a)	*Distributed(b)*	*Reuse(c)*	*Regulated discharge(d)*	*Self-extracted(a)*	*Distributed(b)*	*Reuse(c)*	*In-stream use(d)*	*Consumption(e)*
	ML	ML	ML	ML	ML	ML	ML	ML	ML
Agriculture, forestry and fishing									
Agriculture									
Nursery and floriculture production	—	—	—	na	21 867	30 503	6 120	—	58 490
Mushroom and vegetable growing	—	—	—	na	292 437	123 310	16 034	—	431 782
Fruit and tree nut growing	—	—	—	na	372 433	658 916	16 261	—	1 047 610
Sheep, beef cattle and grain farming	—	—	—	na	1 310 110	843 253	23 499	—	2 176 863
Other crop growing	—	—	—	na	944 831	932 006	24 026	—	1 900 863
Dairy cattle farming	—	—	—	na	622 736	625 633	14 513	—	1 262 883
Poultry farming	—	—	—	na	np	13 357	np	—	23 973
Deer farming	—	—	—	na	np	335	np	—	631
Other livestock farming	—	—	—	na	51 311	39 926	1 449	—	92 686
Total	—	—	—	na	*3 625 895*	*3 267 240*	*102 645*	—	6 995 781
Aquaculture	—	—	—	441 411	444 444	1 178	32	441 411	4 243
Forestry and logging	—	—	—	na	1 435	91 267	1 912	—	94 613
Fishing, hunting and trapping	—	—	—	na	439	1 584	—	—	2 024
Agriculture, forestry and fishing support services	—	—	—	na	9 489	51 980	246	—	61 715
Mining									
Coal mining	—	9 057	na	57 099	125 154	104 021	1 043	123 560	97 601
Oil and gas extraction	—	777	na	72 265	94 409	1 219	—	57 609	37 243
Metal ore mining	—	np	na	150 549	386 791	np	5 997	127 939	285 533
Non-metallic mineral mining & quarrying	—	110	na	7 852	40 113	3 826	9	2 341	41 497
Exploration and other mining support services	—	np	na	24 353	68 687	np	7	22 738	45 800
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Textile, leather, clothing and footwear	—	—	na	1 538	1 001	10 204	975	1	12 178
Wood, pulp, paper and converted paper product	—	—	na	66 276	np	43 938	np	—	96 142
Printing (incl the reproduction of recorded media)	—	—	na	155	7	5 504	2	—	5 513
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Polymer, rubber and non-metallic mineral product	—	—	na	4 935	np	20 864	468	np	31 318
Primary metal, metal and fabricated metal product	—	np	na	65 141	98 791	57 346	13 331	np	157 735
Transport equipment, machinery and equipment	—	1	na	86	769	9 804	277	—	10 848
Furniture and other	—	—	na	9	31	1 050	4	—	1 084
Total	—	*13 791*	na	*220 755*	*336 009*	*339 412*	*27 961*	*12 295*	*677 298*
Electricity, gas, water and waste services									
Electricity and gas supply(e)	—	266 558	6 505	44 706 235	44 840 605	228 089	9 199	44 483 500	327 834
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Household	—	—	—	—	172 092	1 593 966	2 193	—	1 768 251
Environment	59 839 438	—	—	—	—	691 265	30 432	—	—
Total	**59 839 438**	**9 673 034**	**347 968**	**47 459 291**	**59 839 438**	**9 673 034**	**347 968**	**45 364 718**	**14 100 991**

Table 2. Supply and use table – Australia

Sourced from Agricultural Survey

Australian Bureau of Statistics

WAVES

	SUPPLY				USE				
	Self-extracted(a)	*Distributed*(b)	*Reuse*(c)	*Regulated discharge*(d)	*Self-extracted*(a)	*Distributed*(b)	*Reuse*(c)	*In-stream use*(d)	*Consumption*(e)
	ML	ML	ML	ML	ML	ML	ML	ML	ML
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Agriculture									
Nursery and floriculture production	—	—	—	na	21 867	30 503	6 120	—	58 490
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Deer farming	—	—	—	na	np	335	np	—	631
Other livestock farming	—	—	—	na	51 311	39 926	1 449	—	92 686
Total	—	—	—	na	*3 625 895*	*3 267 240*	*102 645*	—	*6 995 781*
Aquaculture	—	—	—	441 411	444 444	1 178	32	441 411	4 243
Forestry and logging	—	—	—	na	1 435	91 267	1 912	—	94 613
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Table 3. Supply and use table – Australia

Sourced from EGS

	SUPPLY				USE				
	Self-extracted(a)	*Distributed*(b)	*Reuse*(c)	*Regulated discharge*(d)	*Self-extracted*(a)	*Distributed*(b)	*Reuse*(c)	*In-stream use*(d)	*Consumption*(e)
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Table 4. Supply and use table – Australia

Sourced from EWES

	SUPPLY				USE				
	Self-extracted(a)	*Distributed*(b)	*Reuse*(c)	*Regulated discharge*(d)	*Self-extracted*(a)	*Distributed*(b)	*Reuse*(c)	*In-stream use*(d)	*Consumption*(e)
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Printing (incl the reproduction of recorded media)	—	—	na	155	7	5 504	2	—	5 513
Petroleum, coal, basic chemical and chemical product	—	np	na	20 585	22 120	51 362	np	3 556	72 454
Polymer, rubber and non-metallic mineral product	—	—	na	4 935	np	20 864	468	np	31 318
Primary metal, metal and fabricated metal product	—	np	na	65 141	98 791	57 346	13 331	np	157 735
Transport equipment, machinery and equipment	—	1	na	86	769	9 804	277	—	10 848
Furniture and other	—	—	na	9	31	1 050	4	—	1 084
Total	—	*13 791*	na	*220 755*	*336 009*	*339 412*	*27 961*	*12 295*	*677 298*
Electricity, gas, water and waste services									
Electricity and gas supply(e)	—	266 558	6 505	44 706 235	44 840 605	228 089	9 199	44 483 500	327 834
Water supply, sewerage and drainage services(f)	—	9 369 147	341 463	1 778 772	9 369 147	2 317 205	79 030	—	2 396 235
Waste collection, treatment and disposal services	—	—	na	na	5 208	2 304	1	—	7 512
Other industries(g)	—	—	na	na	319 520	944 355	87 260	93 326	1 257 810
Household	—	—	—	—	172 092	1 593 966	2 193	—	1 768 251
Environment	59 839 438	—	—	—	—	691 265	30 432	—	—
Total	**59 839 438**	**9 673 034**	**347 968**	**47 459 291**	**59 839 438**	**9 673 034**	**347 968**	**45 364 718**	**14 100 991**

Key Data Items

2.11 WATER SUPPLY AND USE, Australia—2008–09

	SUPPLY			
	Self-extracted(a)	*Distributed*(b)	*Reuse*(c)	*Regulated discharge*(d)
	ML	ML	ML	ML
Agriculture, forestry and fishing				
Agriculture				
Nursery and floriculture production	—	—	—	na
Mushroom and vegetable growing	—	—	—	na
Fruit and tree nut growing	—	—	—	na
Sheep, beef cattle and grain farming	—	—	—	na
Other crop growing	—	—	—	na
Dairy cattle farming	—	—	—	na
Poultry farming	—	—	—	na
Deer farming	—	—	—	na
Other livestock farming	—	—	—	na
Total	—	—	—	na
Aquaculture	—	—	—	441 411
Forestry and logging	—	—	—	na
Fishing, hunting and trapping	—	—	—	na
Agriculture, forestry and fishing support services	—	—	—	na
Mining				
Coal mining	—	9 057	na	57 099
Oil and gas extraction	—	777	na	72 265
Metal ore mining	—	np	na	150 549
Non-metallic mineral mining & quarrying	—	110	na	7 852
Exploration and other mining support services	—	np	na	24 353
Total	—	*23 539*	na	*312 118*
Manufacturing				
Food, beverage and tobacco product	—	5 554	na	62 031
Textile, leather, clothing and footwear	—	—	na	1 538
Wood, pulp, paper and converted paper product	—	—	na	66 276
Printing (incl the reproduction of recorded media)	—	—	na	155
Petroleum, coal, basic chemical and chemical product	—	np	na	20 585
Polymer, rubber and non-metallic mineral product	—	—	na	4 935
Primary metal, metal and fabricated metal product	—	np	na	65 141
Transport equipment, machinery and equipment	—	1	na	86
Furniture and other	—	—	na	9
Total	—	*13 791*	na	*220 755*
Electricity, gas, water and waste services				
Electricity and gas supply(e)	—	266 558	6 505	44 706 235
Water supply, sewerage and drainage services(f)	—	9 369 147	341 463	1 778 772
Waste collection, treatment and disposal services	—	—	na	na
Other industries(g)	—	—	na	na
Household	—	—	—	—
Environment	59 839 438	—	—	—
Total	**59 839 438**	**9 673 034**	**347 968**	**47 459 291**

Agriculture in the Water Account

SUPPLY-USE TABLES – Total Water Consumption

- total water consumption derived from the Agricultural Survey

2.11 WATER SUPPLY AND USE, Australia—2008–09 *continued*

	USE				
	Self-extracted (a)	*Distributed* (b)	*Reuse* (c)	*In-stream use* (d)	*Consumption* (e)
	ML	ML	ML	ML	ML
Agriculture, forestry and fishing					
Agriculture					
Nursery and floriculture production	21 867	30 503	6 120	—	58 490
Mushroom and vegetable growing	292 437	123 310	16 034	—	431 782
Fruit and tree nut growing	372 433	658 916	16 261	—	1 047 610
Sheep, beef cattle and grain farming	1 310 110	843 253	23 499	—	2 176 863
Other crop growing	944 831	932 006	24 026	—	1 900 863
Dairy cattle farming	622 736	625 633	14 513	—	1 262 883
Poultry farming	np	13 357	np	—	23 973
Deer farming	np	335	np	—	631
Other livestock farming	51 311	39 926	1 449	—	92 686
Total	*3 625 895*	*3 267 240*	*102 645*	—	*6 995 781*
Aquaculture	444 444	1 178	32	441 411	4 243
Forestry and logging	1 435	91 267	1 912	—	94 613
Fishing, hunting and trapping	439	1 584	—	—	2 024
Agriculture, forestry and fishing support services	9 489	51 980	246	—	61 715

Agriculture in the Water Account

SUPPLY-USE TABLES – Distributed Water

- Derived from Water Supply Survey data
- Water suppliers provide information on volumes of water supplied to agriculture
- WSS data reconciled with total water use as reported by farmers on Agricultural Survey

2.11 WATER SUPPLY AND USE, Australia—2008–09 *continued*

	USE				
	Self-extracted (a)	*Distributed* (b)	*Reuse* (c)	*In-stream use* (d)	*Consumption* (e)
	ML	ML	ML	ML	ML
Agriculture, forestry and fishing					
Agriculture					
Nursery and floriculture production	21 867	30 503	6 120	—	58 490
Mushroom and vegetable growing	292 437	123 310	16 034	—	431 782
Fruit and tree nut growing	372 433	658 916	16 261	—	1 047 610
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Total	*3 625 895*	*3 267 240*	*102 645*	—	*6 995 781*
Aquaculture	444 444	1 178	32	441 411	4 243
Forestry and logging	1 435	91 267	1 912	—	94 613
Fishing, hunting and trapping	439	1 584	—	—	2 024
Agriculture, forestry and fishing support services	9 489	51 980	246	—	61 715

Agriculture in the Water Account

SUPPLY-USE TABLES - Reuse Water

- Derived from Water Supply Survey data
- Water providers provide information on volumes of reuse water supplied to agriculture
- WSS data is reconciled with water reuse volumes as reported by farmers on the Agricultural Survey




2.11 WATER SUPPLY AND USE, Australia—2008–09 *continued*

	USE				
	Self-extracted (a)	*Distributed* (b)	*Reuse* (c)	*In-stream use* (d)	*Consumption* (e)
	ML	ML	ML	ML	ML
Agriculture, forestry and fishing					
Agriculture					
Nursery and floriculture production	21 867	30 503	6 120	—	58 490
Mushroom and vegetable growing	292 437	123 310	16 034	—	431 782
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Poultry farming	np	13 357	np	—	23 973
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Total	*3 625 895*	*3 267 240*	*102 645*	—	*6 995 781*
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Forestry and logging	1 435	91 267	1 912	—	94 613
Fishing, hunting and trapping	439	1 584	—	—	2 024
Agriculture, forestry and fishing support services	9 489	51 980	246	—	61 715

Agriculture in the Water Account

SUPPLY-USE TABLES – Self-extracted water

- amount of distributed and reuse water used was subtracted from total water used, the remainder was assumed to be self-extracted water




2.11 WATER SUPPLY AND USE, Australia—2008–09 *continued*

	USE				
	Self-extracted (a)	*Distributed* (b)	*Reuse* (c)	*In-stream use* (d)	*Consumption* (e)
	ML	ML	ML	ML	ML
Agriculture, forestry and fishing					
Agriculture					
Nursery and floriculture production	21 867	30 503	6 120	—	58 490
Mushroom and vegetable growing	292 437	123 310	16 034	—	431 782
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Total	*3 625 895*	*3 267 240*	*102 645*	—	*6 995 781*
Aquaculture	444 444	1 178	32	441 411	4 243
Forestry and logging	1 435	91 267	1 912	—	94 613
Fishing, hunting and trapping	439	1 584	—	—	2 024
Agriculture, forestry and fishing support services	9 489	51 980	246	—	61 715

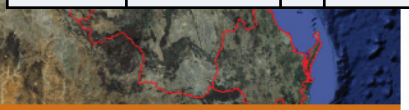
Water Balance Modelling Equation

Distributed Water

WATER IN					WATER OUT							Balance
Extracted Water			Received water	Total sourced water	Bulk supply	Supplied to Customers		Environmental Flows	Own use	Losses	Total distributed	Water in less Water out
Surface	Groundwater	Desalinated				Residential	Non-residential					

Reuse Water

WATER IN				WATER OUT						Balance
Reuse water received			Reuse water collected	Total sourced reuse water	Bulk reuse supply	Supplied to Customers		Environmental Flows	Own use	Discharges to the environment	Total reuse water	Water in less Water out
						Residential	Non-residential					



Editing and imputation

- Editing strategy (2008-09 document)
  - Key data items *(e.g. distributed and reuse water, supply to customers by household and industry split, bulk water supply and water losses)*
  - Editing priorities
    - 1st round – Distributed and reuse water aggregates, regulated discharge and environmental flows *(national and by state)*
    - 2nd round – Netting out bulk supply , industry splits
  - Validate units applying the water balance tests
  - Validate movement between years of key data for top movers
    - Comparison of reported values between years for key data
  - Assess aggregate estimates with external sources (coherence checks)
    - NWC's National Performance Report
    - ABS' Water use on Australian Farms
    - Other available national and state water

Coherence checks (example)

Data Item	Reference Period				
	2004-05	2006-07	2008-09	Change (ML)	% Change
Distributed water					
Urban	387,242		358,663	(28,579)	(7.4%)
Rural	349,026		273,411	(75,615)	(21.7%)
Total	736,628		632,074	(104,194)	(14.2%)
Comparative data item (ERA)					
Total urban supplied		318,221	330,329	12,108	3.8%
Total Irrigation supplied		251,080	221,892	(29,188)	(11.6%)
Total supplied		569,301	552,221	(17,080)	(3%)
Difference could be attributed to inclusion or non exclusion of own use and water losses in the ERA Report.					
Comparative data item (Department of Water)					
Total urban supplied *			379,500		
Total Irrigation supplied			412,600		
Total supplied			792,100		
** Data based on calendar year 2008*					
Comparative data item (NPR)					
Total urban supplied *		282,267	290,494	8,227	2.9%
** NPR reports about 90- 95% of total distributed water in the State*					
Comparative data item (Water Use in Australian Farms)					
Distributed Rural	429,372		318,395	(110,977)	(26%)

Editing and imputation

Imputation Strategy (non-response)

- Historical imputes *(i.e. applying growth factors on previous data)*
- Donor imputes (using average information from surrounding areas)
- Simple weight adjustment

Estimating Household Water Consumption

- **Distributed and reuse water**
  - Water Supply Survey
  - Energy, Water and Environment Survey
  - Electricity Generators Survey
  - modelled data
- **Self-extracted water**
  - modelled data

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2.11 WATER SUPPLY AND USE, Australia—2008–09 *continued*

	USE				
	Self-extracted (a)	*Distributed* (b)	*Reuse* (c)	*In-stream use* (d)	*Consumption* (e)
	ML	ML	ML	ML	ML
Agriculture, forestry and fishing					
Agriculture					
Nursery and floriculture production	21 867	30 503	6 120	—	58 490
Mushroom and vegetable growing	292 437	123 310	16 034	—	431 782
Fruit and tree nut growing	372 433	658 916	16 261	—	1 047 610
Sheep, beef cattle and grain farming	1 310 110	843 253	23 499	—	2 176 863
Other crop growing	944 831	932 006	24 026	—	1 900 863
Dairy cattle farming	622 736	625 633	14 513	—	1 262 883
Poultry farming	np	13 357	np	—	23 973
Deer farming	np	335	np	—	631
Other livestock farming	51 311	39 926	1 449	—	92 686
Total	*3 625 895*	*3 267 240*	*102 645*	—	*6 995 781*
Aquaculture	444 444	1 178	32	441 411	4 243
Forestry and logging	1 435	91 267	1 912	—	94 613
Fishing, hunting and trapping	439	1 584	—	—	2 024
Agriculture, forestry and fishing support services	9 489	51 980	246	—	61 715
Mining					
Coal mining	125 154	104 021	1 043	123 560	97 601
Oil and gas extraction	94 409	1 219	—	57 609	37 243
Metal ore mining	386 791	np	5 997	127 939	285 533
Non-metallic mineral mining & quarrying	40 113	3 826	9	2 341	41 497
Exploration and other mining support services	68 687	np	7	22 738	45 800
Total	*715 155*	*143 188*	*7 057*	*334 186*	*507 675*
Manufacturing					
Food, beverage and tobacco product	149 608	139 342	6 677	47	290 025
Textile, leather, clothing and footwear	1 001	10 204	975	1	12 178
Wood, pulp, paper and converted paper product	np	43 938	np	—	96 142
Printing (incl the reproduction of recorded media)	7	5 504	2	—	5 513
Petroleum, coal, basic chemical and chemical product	22 120	51 362	np	3 556	72 454
Polymer, rubber and non-metallic mineral product	np	20 864	468	np	31 318
Primary metal, metal and fabricated metal product	98 791	57 346	13 331	np	157 735
Transport equipment, machinery and equipment	769	9 804	277	—	10 848
Furniture and other	31	1 050	4	—	1 084
Total	*336 009*	*339 412*	*27 961*	*12 295*	*677 298*
Electricity, gas, water and waste services					
Electricity and gas supply (f)	44 840 605	228 089	9 199	44 483 500	327 834
Water supply, sewerage and drainage services (g)	9 369 147	2 317 205	79 030	—	2 396 235
Waste collection, treatment and disposal services	5 208	2 304	1	—	7 512
Other industries (h)	319 520	944 355	87 260	93 326	1 257 810
Household	172 092	1 593 966	2 193	—	1 768 251
Environment	—	691 265	30 432	—	—
Total	**59 839 438**	**9 673 034**	**347 968**	**45 364 718**	**14 100 991**

Estimating Household Water Consumption

Distributed water

Three steps:

- Step 1: Calculate the population and household size for each LGA (Local Government Area) in each state;
- Step 2: Gather water supply survey data from WSS and model/impute any missing data;
- Step 3: Estimate the ‘stock and domestic’ adjustment




Estimating Household Water Consumption

Distributed water (cont.)

Step 1: Calculate the population and household size for each LGA (Local Government Area) in each state:

- Request population estimates by LGA from demography for the reference year (source: Regional Population Growth, Australia (cat. no. 3218.0))

- Request LGA mean household size from Census quickstat

- Calculate number of households in each LGA
  = LGA Population Estimates/LGA mean household size

Estimating Household Water Consumption

Distributed water (cont.)

Step 2: use household estimates from WSS, and model/impute any missing data:

- Key data items: Q20(a) residential connections, Q16(a) volume supplied to domestic or residential customers (incl. stock and domestic)

- Model/impute any missing data

  - Method 1 (use this method if data from previous year is available (e.g. volume or residential connections)

= Data from previous year x population of reference year/

population of previous year x

changes in 'proportion connected' or 'ratio of vol per connection' of geographically neighbouring LGAs between reference and previous years

Estimating Household Water Consumption

Distributed water (cont.)

- Model/impute any missing data

  - Method 2: Use geographically neighbouring mean volume per connection (ratio) to impute Q16(a) or Q20(a)

Volume per connection (ratio) =
Q16(a) Volume supplied to residential /
Q20(a) residential connections

(If geographically neighbouring mean rate unavailable, use State Mean Rate)




Estimating Household Water Consumption

Distributed water (cont.)

Step 3: Estimate the household water use and stock adjustment

- 'WSS 2010-11 Q16(a) volume supplied to domestic or residential' includes water supplied to both domestic and stock.

- Split the water supplied for stock use and household use, and apply ‘stock adjustments’ by

    1) subtracting this stock volume from residential supply for each supplier; and

    2) adding the stock volume to agricultural industry supply for each supplier




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16 What was the volume of water supplied to the following customers between 1 July 2010 and 30 June 2011?

	Volume (Megalitres)
(a) Domestic or residential (including stock and domestic) … … … … … … … … …	, ,
(b) Non-residential …	, ,
(c) Total (sum of (a) and (b)) …	, ,

Estimating Household Water Consumption

Distributed water (cont.)

Step 3: Stock adjustments (cont.)

- Calculate “Mean ratio for all suppliers” for each state
  = ∑WSS 2010-11 Q16(a) vol supplied to residential/
  ∑Q20(a) residential connections

- If ratio for a unit > 2 x “Mean rate for all suppliers” = “High rates”

- Calculate mean ratio for each state (excl. ‘high rates’) = “State Mean rate”

- If ratio for a unit => 2 x “State Mean rate” then “Stock adjustment” required
  = (ratio for a unit - 2 x “State Mean rate”) x Q20(a)

  WSS 2010-11 Q16(a) – “Stock adjustment”
  WSS 2010-11 Q16(b) + “Stock adjustment”

Australian Bureau of Statistics

16 What was the volume of water supplied to the following customers between 1 July 2010 and 30 June 2011?

	Volume (Megalitres)
(a) Domestic or residential (including stock and domestic) … … … … … … … … …	
(b) Non-residential …	
(c) **Total** (sum of (a) and (b)) …	

- Stock adjustment

+ Stock adjustment

Estimating Household Water Consumption

Self-extracted water

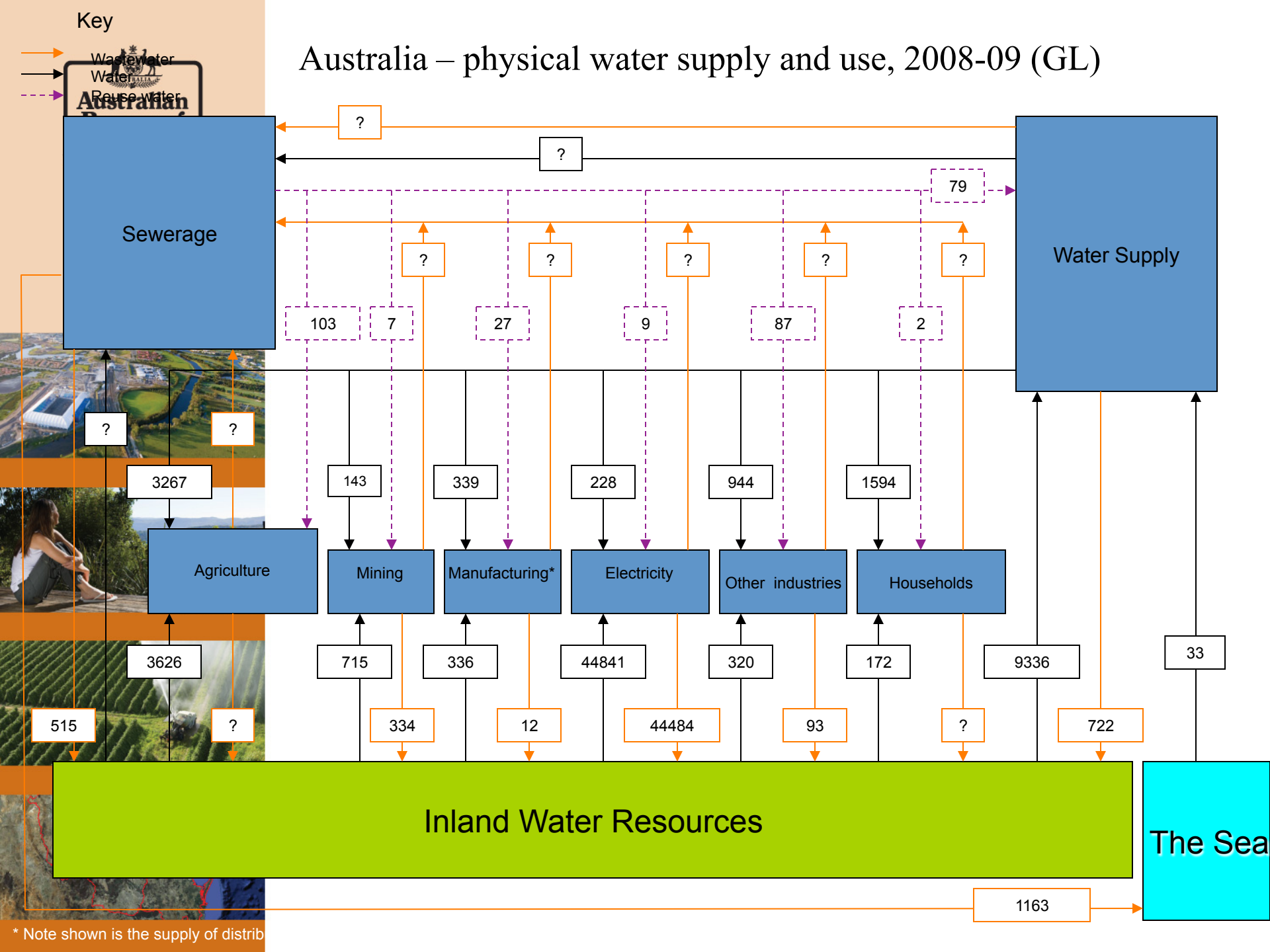
To estimate the self-extracted volume, we apply the rate of use in connected households to the remaining, unconnected households:

- No. of unconnected households = (Estimated State Resident Population/Ave state household size) - WSS 2010-11 Q20(a) residential connections

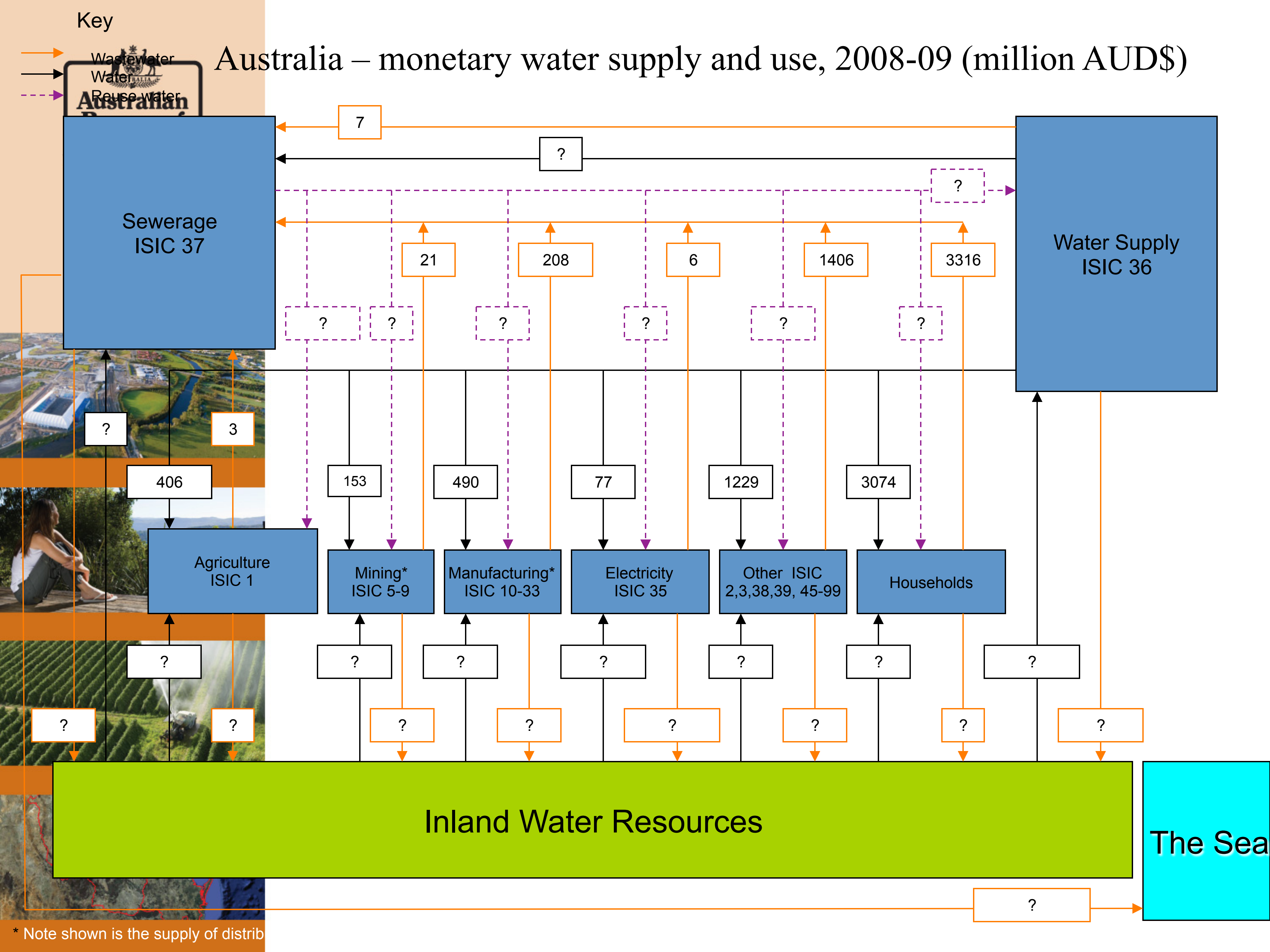
(Sourced from 3218.0 Regional Population Growth, Australia and 2006 census quickstats)

- Household self-extracted use = No of unconnected households * Ratio of use in connected households + admin data relating to self extracted household use (**Manual Intervention** required here)

Australia – physical water supply and use, 2008-09 (GL)



* Note shown is the supply of distrib


Key
Wastewater
Water
Reuse water
Australia – monetary water supply and use, 2008-09 (million AUD$)
Sewerage
ISIC 37
Water Supply
ISIC 36
7
?
?
21
208
6
1406
3316
?
?
?
?
?
?
?
3
406
153
490
77
1229
3074
Agriculture
ISIC 1
Mining*
ISIC 5-9
Manufacturing*
ISIC 10-33
Electricity
ISIC 35
Other ISIC
2,3,38,39, 45-99
Households
?
?
?
?
?
?
?
?
?
?
?
?
?
?
?
?
Inland Water Resources
The Sea
?
* Note shown is the supply of distrib

Hybrid presentation…

	AUSTRALIA		2008–09							
	2004–05	*2008–09*	*NSW*	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*
Water consumption by industry (GL)(a)	16 659	12 333	4 026	2 649	3 043	1 046	1 045	387	115	21
Water consumption by households (GL)	2 108	1 768	536	342	308	122	326	69	39	27
Total water consumption (GL)	18 767	14 101	4 562	2 991	3 351	1 168	1 371	456	154	48
Gross State Product ($m)	1 116 248	1 255 241	394 980	287 619	250 573	77 407	180 008	22 247	16 658	25 748
Population ('000)	20 329	21 953	7 134	5 443	4 425	1 624	2 245	503	226	352
Gross State Product/Total water consumption	59	89	87	96	75	66	131	49	108	536
Gross State Product/Industry water consumption	67	102	98	109	82	74	172	57	145	1 251
Per capita/Total water consumption (kL)	923	642	639	549	757	719	611	906	681	137
Per capita/Household water consumption (kL)	104	81	75	63	70	75	145	136	173	78

(a) All industries i.e. Agriculture, Mining, Manufacturing

Australian Bureau of Statistics

1.5 MONETARY AND PHYSICAL NET DISTRIBUTED WATER USE, by industry and households— 2004–05 and 2008–09

	EXPENDITURE ON DISTRIBUTED WATER(a)		PHYSICAL USE OF DISTRIBUTED WATER(a)	
	Distributed water	*Percent of total*	*Distributed water*	*Percent of total*
	$m	(%)	GL	(%)
2008–09				
Total consumption by industries(b)				
Agriculture, forestry & fishing	406	7	3 518	50
Mining	153	3	150	2
Manufacturing	490	9	367	5
Electricity , gas & waste services	77	1	237	3
Water supply, sewerage & drainage	6	—	107	2
All other service industries	1 229	22	1 034	15
Total	2 361	43	5 414	77
Actual final consumption by households	3 074	56	1 596	23
Actual final consumption by Governments	60	1	-	-
Total net use(c)	**5 495**	**100**	**7 010**	**100**
2004–05				
Total consumption by industries(b)				
Agriculture, forestry & fishing	291	8	5 651	65
Mining	53	2	79	1
Manufacturing	232	6	354	4
Electricity , gas & waste services	91	3	121	1
Water supply, sewerage & drainage	2	—	61	1
All other service industries	698	20	592	7
Total	1 367	39	6 858	79
Actual final consumption by households	2 147	61	1 876	21
Actual final consumption by Governments	-	-	-	-
Total net use(c)	**3 514**	**100**	**8 734**	**100**

— nil or rounded to zero (including null cells)

(a) Includes reuse water.

(b) Total consumption by industries = total intermediate consumption.

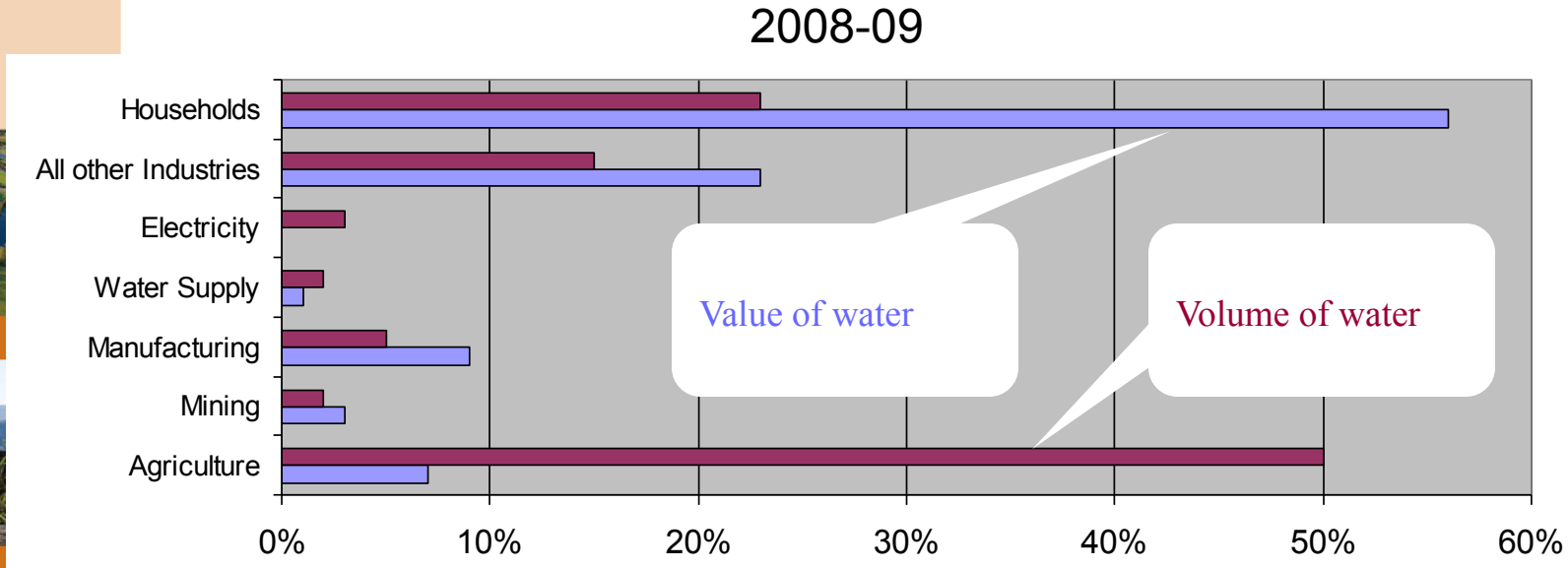
(c) Total net use = Total use less losses by Water Supply Industry and environmental provisions.

Australian Bureau of Statistics

3.2 EXPENDITURE ON WATER SUPPLY AND SERVICES(a)—2008–09

	Urban distributed water(b)	*Rural distributed water(b)*	*Bulk water (urban and rural)*	*Waste water & Sewerage*	*Total*
	$m	$m	$m	$m	$m
Industry consumption(c)					
Agriculture, forestry & fishing	2	404	—	3	409
Mining	153	—	—	21	174
Manufacturing	483	7	—	208	698
Electricity, gas and waste	80	3	921	13	1 017
Electricity, gas & waste services	74	3	—	6	83
Water supply, sewerage & drainage	6	—	921	7	934
Other industries	1 229	—	—	1 406	2 635
Total industry consumption	*1 947*	*414*	921	*1 651*	*4 933*
Final consumption					
Final consumption by households	3 074	—	—	3 316	6 390
Final consumption by Government	60	—	—	66	126
Total final consumption	*3 134*	—	—	*3 382*	*6 516*
Exports	—	—	—	—	—
Total net use	**5 081**	**414**	**921**	**5 033**	**11 449**

Monetary vs. physical use of distributed water (% of total use)



QUESTIONS?

Australian Bureau of Statistics

Australian Government

AusAID

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WAVES

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TERMINOLOGY & DEFINITIONS

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 natural (e.g. river) or 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, sewerage and drainage services industry (ANZSIC Division 28). 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. Distributed water can include potable, mains and raw water but does not include reuse or bulk water.

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.

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, however the 2000–01, 2004–05 and 2008–09 editions of *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. Note that environmental flows can be either Planned (rules-based) or Held (entitlement-based) - see Explanatory Notes 33-36 for more details. Note that in the Physical water supply and use tables, volumes of water supplied to the environment as 'environmental flows' are presented within the estimates for distributed, reuse water and in-stream water supplied and used by the Water supply, sewerage and drainage services and Electricity and gas supply industries. Consumption for these industries is not affected by this treatment of environmental flows volumes (i.e. these flows are defined as non-consumptive use).

Gross water supply

Water supplied to other water providers and customers, plus losses, own use by water providers, and environmental flows.

Groundwater

Water occurring below the ground's surface. Note that in the Physical water supply and use tables all ground water is included in self-extracted water.

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. In-stream use is usually a subset of self-extracted use, however in some instances in-stream can be a subset of distributed water, for example where an unplanned release of distributed water is used to dilute polluted water to an acceptable concentration for release into the environment.

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.

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.

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.

Net water supply

The quantity of water supplied to customers of the water provider. This comprises distributed water supply less: losses, environmental flows, and water used directly by the Water supply 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.

Raw water

Water extracted from the environment that has not been treated.

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 to the environment after use where that discharge does not match the natural flow regime of the receiving water body. For example, wastewater 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, rather than directly to the environment.

Residential connections

Number of residential connections was collected in the National Performance Report (Water Services Association of Australia and the National Water Commission), and in the Water Supply and Sewerage Services Survey by the ABS. In both cases, a residential connection is a residential unit, or dwelling, usually separately metered.

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. It excludes "on-site" recycling.

Rural distributed water

Water supplied via mains, open channels or natural water ways, carted untreated water, or treated effluent supplied by water suppliers (including industries other than the Water supply industry), for irrigation and other rural use.

SEEA

SEEA is the System for Environmental-Economic Accounts. 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.

SEEA-Water

The International System for Environmental-Economic Accounts 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. It was adopted as an interim international statistical standard by the United Nations in 2007.

Self-extracted water

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 suppliers via regulated systems.

Storm water

Rainfall that is collected after it has run off urban surfaces.

Supply Use Framework

Physical water supply and use tables provide information on the volumes of water abstracted, supplied within the economy and discharged back into the environment by economic activity and households.

Surface water

Water flowing or held in streams, rivers and other wetlands in the landscape.

Unaccounted water

Unaccounted water is the difference between the measured intake volume to a supply network and the total deliveries from the network. It includes unintended outflows (due to operational errors), evaporation, seepage, leakage, measurement error and theft. It does not include environmental flows or passing flows to downstream users who are not customers of the reporting Water Service Provider.

Urban distributed water

Treated water supplied to urban areas via mains water systems.

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 consumption

Water consumption is equal to distributed water use plus self-extracted water use plus reuse water use minus in-stream water use minus distributed water supplied to other users minus water supplied to the environment as 'environmental flows'. Note that in the Physical water supply and use tables, volumes of water supplied to the environment as 'environmental flows' are presented within the estimates for distributed, reuse water and in-stream water supplied and used by the Water supply, sewerage and drainage services and Electricity and gas supply industries. Consumption for these industries is not affected by this treatment of environmental flows volumes (i.e. these flows are defined as non-consumptive use).

Water losses

Water that enters the water distribution system of a water provider but 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 use

Water use is equal to distributed water use plus self-extracted water use plus reuse water use. Note that this definition differs to the water consumption definition (above) in that it is a gross measure, rather than netting out the volumes of water used in-stream, supplied to other users or supplied to the environment as 'environmental flows'.