WATER CYCLE REPORT **Macquarie River - Regulated, New South Wales**

Scope

Physical water entity: Macquarie River - Regulated
Jurisdiction: New South Wales
WMA ID: NSW_SW_421R
Period: 1 July 2004 to 30 June 2005

	Surface Water (ML)	Groundwater (ML)	Total (ML)	Data source	Data currency	Data accuracy	Method used to derive data (eg hydrographic, rainfall, etc
Opening balance - water in store							
Major on-river reservoirs							
Burrendong Dam	146,300		146,300	State Water Daily Operational Sheet-CAIRO	Aug-05	A	Obtain directly from sheets
Windamere Dam	164,000		164,000	State Water Daily Operational Sheet-CAIRO	Aug-05	A	Obtain directly from sheets
Onstream minor and farm dams (unknown, record as zero - assume same at start and end of perioc			0				
Major off-river storages			0				
Offstream minor catchment dams			0				
Renewable non-saline groundwate (in GMUs) (< 3500 mg/l)							
		8,100,000	8,100,000	DNR	Oct-06	C	Saturated thickness, water table drawdown depth, area and a drainable porosity. This is estimated active volume in storage.
Renewable non-saline groundwater (outside GMUs) (< 3500 mg/l)		0	0				
Renewable saline groundwater (usually zero)		827,000	827,000	DNR	Oct-06	C	Saturated thickness, water table drawdown depth, area and a drainable porosity. This is estimated active volume in storage.
Non-renewable groundwater (capable of being mined)		0	0				
Soil - unsaturated zone		0	0				
Snowpack (no snow)	0		0			N/A	
River channels (record as zero - assume same at start and end of period)	2,000		2,000	State Water	Sep-06	B	Estimated from CAIRO Sheets - Travel time times river flows and key river sites.
Unaccounted for storage (error item)			0				
Total opening balance	**312,300**	**8,927,000**	**9,239,300**				

Fate of Rainfall (not part of supply based water balance)

Type of area	Area (km²)	Evapotranspiration (ML)	Rainfall (ML)	Deep Drainage (ML)	Runoff (ML)				
Forestry and plantations	4,621	1,599,470	1,610,928	21,683	2,673			BRS (Water 2010)	Sep-06		Modelled
Irrigated areas	348	151,850	155,594	2,753	1,690			BRS (Water 2010)	Sep-06		Modelled
Pasture	4,365	1,978,771	2,039,219	28,671	33,939			BRS (Water 2010)	Sep-06		Modelled
Dryland farming	2,806	1,140,171	1,159,055	47,281	587			BRS (Water 2010)	Sep-06		Modelled
Intensive use /urban	59	32,067	34,197	503	1,627			BRS (Water 2010)	Sep-06		Modelled
Bare ground	8	4,174	4,531	69	288			BRS (Water 2010)	Sep-06		Modelled
Water	87	42,786	44,844	659	1,401			BRS (Water 2010)	Sep-06		Modelled
Total	**12,294**	**4,949,288**	**5,048,368**	**101,618**	**42,205**						
Rainfall to surface water runoff						42,205		42,205	BRS (Water 2010)	Sep-06		Modelled
Rainfall to groundwater recharge							101,618	101,618	BRS (Water 2010)	Sep-06		Modelled
Inflow to Surface Water												
Rainfall to surface water runoff (this is inflow in reservoirs, rivers, channels excl. baseflow) (see note 1)												
Storages						254,000		254,000	State Water - CAIRO Sheets	Sep-06	A	Calculated from Change of storage + Inflows + Evaporation
Rivers/Channels						100,000		100,000	DNR IQQM	Oct-06	C	Modelled Inflow from IQQM
Discharge from Groundwater to Surface Water (baseflow)						22,000		22,000	DNR Groundwater			See Groundwater Outflows
Returns from economy inside entity												
Urban treated effluent						0		0			E	no data available
Return Flows						0		0			E	no data available
Surface inflow from other entities												
Inter Valley Transfers						0		0	DNR		A	No Intervalley transfers
Returns from the economy outside of entity								0				
Unaccounted for inflow (error item)								0				
Inflow to Groundwater												
Recharge to groundwater (excluding irrigation												
Cudgegong Alluvium							1,000	1,000	Estimated	Sep-06	D	
Upper Macquarie Alluvium							6,000	6,000	Estimated	Sep-06	D	
Lower Macquarie Alluvium							27,000	27,000	Modelled - DNR	Sep-06	C	
Recharge to groundwater from irrigatior												
Cudgegong Alluvium							0	0	Estimated	Sep-06	D	
Upper Macquarie Alluvium							0	0	Estimated	Sep-06	D	
Lower Macquarie Alluvium							19,000	19,000	Modelled - DNR	Sep-06	C	
System gains												
Seepage from Surface water features (e.g dams, wetlands, etc)							12,000	12,000	Modelled - DNR	Sep-06	C	
Conveyance losses (seepage from channels)							2,000	2,000	Modelled - DNR	Sep-06	C	
Seepage from streams to groundwater												
Cudgegong Alluvium							8,000	8,000	Estimated	Sep-06	D	
Upper Macquarie Alluvium							20,000	20,000	Estimated	Sep-06	D	
Lower Macquarie Alluvium							10,000	10,000	Modelled - DNR	Sep-06	C	
Inflow from aquifers outside of entity (small - assume zero)							5,000	5,000	Modelled - DNR	Sep-06	C	
Aquifer reinjection (e.g ASR)							0	0				
Unaccounted for inflow (error item)								0				
Total inflow to surface water and groundwate						**376,000**	**110,000**	**486,000**				

		Surface Water (ML)	Groundwater (ML)	Total (ML)	Data source	Data currency	Data accuracy	Method used to derive data (eg hydrographic, rainfall, etc
Outflow from Surface water								
Extraction to the Economy inside entity								
Distributed water (excl. losses and unaccounted for water)								
Urban Diversions - River		14,800		14,800	State Water	Sep-06	A	Watyer Use Data
Irrigation diversions		0		0	State Water	Sep-06	A	Estimated
Self extracted water (irrigation, excl. losses)								
Minor catchment dams		0		0			E	no data available
Private diversions		28,500		28,500	State Water	Sep-06	A	Water Use Data less Seepage to Groundwater from irrigation
S&D Rights		1,000		1,000	DNR	Sep-06	B	Estimated
Environmental - Wetland Diversions		25,000		25,000	State Water - Water Balance	Sep-05	A	Water supplied to Macquarie Marshes
Subtotal extractions to economy inside entity	69,300							
System losses								
Evaporation from major storages		54,000		54,000	State Water CAIRO Sheets & IQQM	Jul-05	B	Calculated from Evap, Surface Area of Storages
Evaporation from open water and wetlands (excluding major storages and minor catchment dams)		0		0			E	no data available
Losses from minor catchment dams		0		0			E	no data available
Seepage from Irrigation to groundwater		19,000		19,000	DNR GW Model	Sep-06	C	See Groundwater Inflow section.
Seepage from streams to groundwater (losses excluding surface evaporation)		38,000		38,000	DNR Modelled	Sep-06	C	See Groundwater Inflow section.
Other Losses from streams eg evapotranspiration, floodplain, unknown diversions and extractions etc.		189,500		189,500	DNR Estimated		C	The balancing value for the water balance. But it matches well with IQQM modeled inflow.
Subtotal system losses	300,500							
Surface flow out of entity								
Urban Diversions		0		0	DNR	Jul-05	A	None for 04/05
Irrigation diversions		0		0	DNR	Jul-05	A	No intervalley transfers
Unregulated flow (floods)		0		0	State Water - Cairo Sheets	Jul-05	B	Calculated from data on Cairo sheets
Water leaving system		7,500		7,500	State Water - Cairo Sheets	Jul-05	A	Sum flow passing Corrong + Willandra Homestead
Requirement		0		0	State Water - Cairo Sheets	Jul-05	B	Calculated from data on Cairo sheets
Subtotal surface flow out of entity	7,500							
Aquifer reinjection (eg ASR								
Unaccounted for outflow (error item)								
Outflow from groundwater								
Discharge from groundwater to surface water (baseflow								
Cudgegong Alluvium			8,000	8,000	DNR Estimates	Sep-06	D	
Upper Macquarie Alluvium			12,000	12,000	DNR Estimates	Sep-06	D	
Lower Macquarie Alluvium			2,000	2,000	Modelled - DNR	Sep-06	C	
Groundwater discharge to Springs			0	0				
Groundwater discharge to ET(does not include unsaturated zone usage by vegetatior								
Extraction to the Economy inside entity								
Distributed water (excl. losses and unaccounted for water)								
Urban Diversions			0	0				
Irrigation diversions			0	0				
Self extracted water (e.g irrigation, commercial, industrial, mining, etc)								
Groundwater extractions								
Cudgegong Alluvium			1,000	1,000	NSW State Water Accounts 2004/05	Sep-06	A	
Upper Macquarie Alluvium			14,000	14,000	NSW State Water Accounts 2004/05	Sep-06	A	
Lower Macquarie Alluvium			55,000	55,000	NSW State Water Accounts 2004/05	Sep-06	A	
Stock and Domestic Use								
Cudgegong Alluvium			0	0	DNR Estimates	Sep-06	B	
Upper Macquarie Alluvium			1,000	1,000	DNR Estimates	Sep-06	B	
Lower Macquarie Alluvium			2,000	2,000	DNR Estimates	Sep-06	B	
Aquifer reinjection (eg ASR			0	0				
Subtotal extractions to economy from groundwate	73,000							
Aquifer flow out of entity			10,000	10,000	Modelled - DNR	Sep-06	C	
Extraction to economy outside entity		0	0	0				
Unaccounted for outflow (error item)				0				
Total outflow from surface water and groundwate		**377,300**	**105,000**	**482,300**				
Closing balance - water in store								
Major on-river reservoirs								
Burrendong Dam		181,500		181,500	State Water Daily Operational Sheet-CAIRO	Aug-05	A	Obtain directly from sheets
Windamere Dam		127,500		127,500	State Water Daily Operational Sheet-CAIRO	Aug-05	A	Obtain directly from sheets
Non-renewable aquifers and groundwater(capable of being mined)			8,105,000	8,105,000	DNR Estimate		D	Estimated as Start of year plus unaccounted GW to balance
Renewable non-saline groundwater(outside GMUs) (< 3500 mg/l)			0	0				
Renewable saline groundwater(usually zero)			827,000	827,000	DNR Estimate		D	Same as start of year
Non-renewable groundwater(capable of being mined)			0	0				
Soil - unsaturated zone			0	0				
Snowpack (no snow)		0		0			N/A	
River channels		2,000		2,000				
unaccounted for storage (error item)				0				
Total closing balance		**311,000**	**8,932,000**	**9,243,000**				

CHECK on WATER BALANCE			
Change in Storage from: ending storage - beginning storage	-1,300	5,000	3,700
Change in storage (inflows - outflows)[1]	-1,300	5,000	3,700
Unaccounted for inflow or outflow Balancing item: ((total inflows - total outflows[1] - (Ending - beginning storage)	0	0	0
Check: (Total inflow- Total outflow) - (ending- beginning storage	0	0	0
Unnacoounted flow as % of total inflow	0%	0%	0%

Note 1 : Excludes unaccounted for inflows and outflows

N/A = not applicable 0' = no data available with code E and reason to be given