

20 Thomson Basin

20.1 Location of Water Resources

The Thomson basin is located within the South East Coast Drainage Division. The Thomson Dam is located within the basin and is the largest water supply storage for Melbourne. The Thomson River and the Macalister River also supply the Macalister Irrigation District. The Thomson and Macalister Rivers join the Latrobe River before flowing into the Gippsland Lakes. The Avon River is included in the basin; this river flows directly into Lake Wellington. A map of the river basin is shown in Figure 20-1.

Water supply protection areas (WSPAs) in the Thomson basin include part of the Sale WSPA and Denison WSPA. Groundwater management areas (GMAs) within the Thomson basin include the Wa De Lock GMA, Rosedale GMA and Stratford GMA.

20.2 Responsibilities for Management of Water Resources

Melbourne Water is responsible for management of the Thomson Reservoir, which supplies water to Melbourne, and makes releases to the Thomson River for the Macalister Irrigation District and the environment.

Southern Rural Water is responsible for operation of Lake Glenmaggie and irrigation supplies to the Macalister Irrigation District. Southern Rural Water is also the licensing authority and manages groundwater and surface water licensed diversions in the basin.

Gippsland Water is responsible for urban water supply in the Thomson basin, which includes the towns of Sale, Maffra and Heyfield.

The West Gippsland Catchment Management Authority is responsible for waterway management in the Thomson Basin.

20.3 Seasonal Overview

Rainfall conditions in the Thomson basin in 2004/05 were slightly drier than average at around 80-100% of long-term average annual rainfall. Streamflows varied across the basin. In the streamflow gauge 225209 Macalister River at Licola, 2004/05 streamflows were 78% of the long-term average, whereas at streamflow gauge 225201 Avon River at Stratford, streamflows were only 33% of the long-term average. The reasons for this high variation are not clear, but may be due to localised rainfall conditions or quicker recovery of soil moisture from the recent extended drought in the wetter and steeper sloped alpine areas. Overall, total streamflows were significantly below average (49%), and were less than those estimated in 2003/04 (60%).

In 2004/05 the irrigation seasonal allocation (final announcement) for the Thomson basin was 140% of entitlement, and 125% was actually delivered. The allocation was the same for the Macalister and Thomson River licensed diverters as for the Macalister Irrigation District. Stage 1 (of four stages) urban water restrictions applied to all towns throughout the year in the Thomson basin, which was less severe than the previous year.

An amendment to Southern Rural Water's bulk entitlement in June 2005 recognised the conversion of 790 ML of system losses into water entitlement for irrigation use in the Macalister Irrigation District. The water was created by the generation of permanent water savings resulting from the Nuntin Pipeline Project and is to be auctioned in 2005/06. An amendment was also made to Gippsland Water's bulk entitlement for the Thomson-Macalister system in June 2005 to better align urban and rural restrictions in the Macalister Irrigation District, so that water shortages are more evenly shared across the two user groups.

An assessment of the environmental health of rivers and streams in the Thomson basin is available in the Index of Stream Condition (Department of Sustainability and Environment, 2005). (Go to: www.vicwaterdata.net). Details of works undertaken to improve the basin's long-term water quality and river health during 2004/05 are available from the West Gippsland Catchment Management Authority.

The designs for the modifications to the Glenmaggie Weir that will enable environmental flows to be released during the irrigation season were completed. The construction works on the weir have been scheduled for winter 2006.

20.4 Summary of the Total Water Resources in the Basin

The total volumes of water available and supplied from water resources in the Thomson basin are shown in Table 20-1. The total diversion includes 71,710 ML transferred from the Thomson basin to the Yarra basin by Melbourne Water.

Table 20-1 Summary of total water resource and water use in the Thomson basin, 2004/05

Water Source	Total Water Resource (ML)	Total Use (ML)
Surface Water	707,400	366,900
Groundwater	not available	not available
Recycled Water	550	510

Note:

(1) The total resource and use is not stated because not all GMAs or WSPAs in this basin have more than 90% of their surface area within the river basin boundary.

20.5 Water for the Environment

In 2004/05, minimum passing flows for habitat provision were delivered in accordance with bulk entitlements, and through the management of licensed extractions. A formal environmental bulk entitlement was established in the Thomson basin soon after the 2004/05 year, but was not in operation during 2004/05. This bulk entitlement comes after much work over previous years by the Thomson Macalister Environmental Flows Task Force. Based on the Task Force report, over the next ten years the government will progressively improve the environmental flows and river habitat of the two rivers whilst maintaining the current capability to meet irrigator and Melbourne's water demands.

The environment's share of total flow in the Thomson River flows out of the basin into the Latrobe River and then into the Gippsland Lakes, which have high environmental values and are listed under the Ramsar Convention. In the Thomson basin, the environment's share of total flow in 2004/05 was 240,300 ML, which is about 34% of the total amount of water in the basin (Table 20-2). This amount consists of minimum flows released from the Thomson Reservoir and Lake Glenmaggie under bulk entitlements, and all other water flowing in the basin which was not taken out of the streams for consumptive uses.

20.6 Surface Water Resources

20.6.1 Water Balance

A water balance for the Thomson basin is shown in Table 20-2. Inflows to the basin were 49% of their long-term average of 1,414,000 ML (Department of Natural Resources and Environment, 2002). The largest diversions occurring within the basin were for irrigation usage and were equivalent to 100% of total inflows. The Thomson Reservoir supplies water to Melbourne. In 2004/05 Melbourne Water transferred 71,710 ML, or 10% of the basin inflows, from the Thomson basin to the Yarra basin.

As part of the water balance calculation, the estimation of inflows for the Thomson basin was based on the sum of diversions and outflows. The Resource Allocation Model (REALM) that incorporates the Thomson basin was used to estimate the in-stream losses to groundwater and evaporation. It should be noted that the basis of calculating those losses in 2004/05 has changed from the previous year to improve the accuracy of that loss estimation, which was previously largely unknown.

Table 20-2 Balance of surface water in the Thomson basin

Water Account Component	2004/05 (ML)	2003/04 (ML)
Storage Volume		
Volume in storage at start of year	465,300	364,000
Volume in storage at end of year	533,400	465,300
Change in storage	68,100	101,300
Inflows		
Catchment inflow ⁽¹⁾	688,800	843,900
Transfers from other basins	0	0
Return flow from irrigation	18,600	19,200
Treated effluent discharged back to river	40	50
Sub-total	707,400	863,100
Usage		
Urban diversions to towns in Thomson River Basin	2,000	86,500
Urban diversions to Yarra River Basin	71,710	
Irrigation district diversions	274,600	254,700
Licensed private diversions from unregulated streams	11,600	11,400
Small catchment dams	7,000	7,000
Sub-total	366,900	359,600
Losses		
Net evaporation losses from major storages	14,900	9,300
Losses from small catchment dams	2,500	2,500
In-stream infiltration to groundwater, flows to floodplain and evaporation ⁽²⁾	14,700	79,900
Sub-total	32,100	91,700
Water Passed at Outlet of Basin		
River outflows to the Latrobe River	168,600	260,200
River outflows direct to Lake Wellington	71,700	50,300
Environment's Share of Total Flow in the Thomson Basin	240,300	310,500

Notes:

(1) Inflows have been back-calculated from outflows plus diversions.

(2) Losses estimated based on loss functions within the Thomson-Macalister REALM. The volume of estimated losses reduced from the previous year primarily due to improvement in the calculation method.

20.6.2 Small Catchment Dams

The capacity of small catchment dams in the Thomson basin is estimated to be around 10,600 ML (Table 20-3). Usage in 2004/05 is estimated to be approximately equal to the average annual usage of 7,000 ML and, after allowing for losses, the total catchment run-off that is harvested as a result of the small catchment dams is estimated to be 9,500 ML.

Table 20-3 Small catchment dam information

Type of Small Catchment Dam	Capacity (ML)	Usage (ML)	Total Water Harvested (ML)
Stock and domestic	5,600	2,800	n/a
Irrigation	5,000	4,200	n/a
Total	10,600	7,000	9,500

Note:

(1) n/a: information not available

20.6.3 Water Entitlement Transfers

Permanent and temporary transfers of irrigation entitlements occurred within the Macalister Irrigation District in 2004/05. This consisted of 87 ML that was permanently transferred, and 1,951 ML that was temporarily transferred.

20.6.4 Volume Diverted

The volume of water diverted under each water authority's bulk entitlement is shown in Table 20-4. Compliance with individual bulk entitlement volumes is deemed to occur if water use is not more than the maximum volume allowed to be diverted in 2004/05. Full details of compliance with bulk entitlements are provided in the resource manager's 2004/05 report for the Thomson basin (West Gippsland Catchment Management Authority, 2005). Bulk entitlements held by Melbourne Water and Southern Rural Water in the basin are applied over a five year period, where the five year rolling average usage must be less than the bulk entitlement volume.

Licences on unregulated streams are not currently metered and hence compliance has not been assessed. Licensed diversions from unregulated streams are estimated based on irrigation demand modelling and climate information.

Table 20-4 Volume of water diverted under surface water entitlements in the Thomson basin

Entitlement	Period of Bulk Entitlement (years)	Total Bulk Entitlement - 30 June 2005 (ML)	Net Temporary Transfer in 2004/05 (ML)	Maximum Allowable Diversion over Period (ML)	Total Volume Diverted over Period (ML)	Complied?	Volume Diverted in 2004/05 (ML)
<i>Gippsland Water</i>							
Thomson/ Macalister Urbans	1	n/a	0	n/a	1,998	n/a	1,998
<i>Melbourne Water</i>							
Thomson River	5	859,000	0	859,000	633,323	Yes	71,712
<i>Southern Rural Water</i>							
Thomson/ Macalister	5	1,374,000	0	1,374,000	1,182,636	Yes	274,588
Total Annual Volume of Bulk Entitlements		446,600	0	446,600	365,189		346,300
<i>Licensed Diversions from Unregulated Streams</i>		13,830	0	13,830	11,600		11,600

Notes:

- (1) For multi-year entitlements, the maximum allowable diversion is estimated based on bulk entitlement volume as at 1 July 2004, plus allowances for permanent transfers of entitlement (annual volume multiplied by period of bulk entitlement) and temporary transfers that occurred in the 2004-05 period. The *actual* maximum allowable diversion will depend on when permanent transfers occurred over the applicable period, and the inclusion of temporary transfers that may have occurred in previous years.

(2) n/a: bulk entitlement conversion order was not finalised at the beginning of 2004/05

20.6.5 Compliance with Passing Flow Obligations in Bulk Entitlements

Southern Rural Water is responsible for meeting a passing flow at the Wandocka Gauging station on the Thomson River at the Maffra Weir on the Macalister River. Melbourne Water must provide environmental flows to satisfy three compliance points in the 23 kilometre reach immediately downstream of the Thomson Dam. In 2004/05 Southern Rural Water and Melbourne Water complied with environmental flow requirements. Full details of compliance with environmental flows are provided in the resource manager's 2004/05 report for the Thomson basin (West Gippsland Catchment Management Authority, 2005).

20.6.6 Compliance with Streamflow Management Plans

There is no streamflow management plan currently in operation in the Thomson basin.

20.7 Groundwater Resources

A summary of the licensed entitlements and use for groundwater management areas that overlap the Thomson basin, excluding stock and domestic use, is presented in Table 20-5. An estimate of stock and domestic groundwater use is provided in Table 20-6. In the Thomson basin groundwater is used as an urban water supply for the townships of Sale, Briagolong and Boisdale. The licensed entitlements and metered use for these groundwater supplies is provided in Table 20-7.

The Thomson basin contains all of the Wa De Lock GMA as well as part of the Denison WSPA, Sale WSPA, Stratford GMA and Rosedale GMA. The volumes described in Table 20-5 and Table 20-6 are totals for the management areas and include the area that falls outside the Thomson basin. Groundwater entitlements and use for unincorporated areas have not been included in the 2004/05 water accounts.

Table 20-5 Compliance with licensed groundwater volumes, Thomson basin 2004/05

Water Supply Protection Area/ Groundwater Management Area (1)	GMA/ WSPA Depth Limits (m) (2)	Allocation Limit (ML/year) (3)	Licensed Entitlement Allocated (ML/year) (4)	Metered Use (ML)	Estimated Use in Unmetered Bores (ML) (5)	Total Licensed Groundwater Use (ML)	Total Groundwater Resource (ML)
Rosedale GMA (35%)	50-150	9,000	21,241	9,920	0	9,920	Not Available (6)
Stratford GMA (42%)	>150	0	31,553	17,230	0	17,230	Not Available (6)
Wa De Lock Zone GMA (100%)	0-25	11,500	26,865	0	9,403	9,403	11,500
Denison WSPA (51%)	0-25	13,733	13,733	6,500	0	6,500	Not Available (6)
Sale WSPA (72%)	25-200	21,574	21,574	7,680	0	7,680	Not Available (6)

Notes:

- (1) The percentage of the GMA/WSPA by surface area within the river basin is given in the parentheses.
- (2) This column indicates the aquifer depth limits for which the GMA/WSPA applies.
- (3) The allocation limit represents either the sum of licensed entitlements for WSPAs or the permissible annual volume (PAV) for GMAs, and does not include groundwater resources from unincorporated areas within the basin.
- (4) Includes domestic and stock usage in those cases where this forms part of a licensed allocation.
- (5) For unmetered bores, usage is estimated using the average percentage of licensed entitlements that was used in metered areas across the State. In 2004/05 this was 36%.
- (6) No estimate of the total groundwater resource is provided when >10% of the GMA/WSPA is located outside the river basin.

Table 20-6 Number of stock and domestic bores and estimated use

Water Supply Protection Area/ Groundwater Management Area	No. of Stock and Domestic Bores (1)	Estimated Stock and Domestic Use (Assuming 2ML/bore) (ML)
Rosedale GMA	1	2
Stratford GMA	410	820
Wa De Lock Zone GMA	482	964
Denison WSPA	297	594
Sale WSPA	919	1,838

Note:

- (1) There are a number of licensed groundwater allocations that also incorporate stock and domestic use. The estimated use for these bores is included in the licensed allocation in the previous table.

Table 20-7 Urban groundwater usage

Town Supplied	Licensed Allocation ML	Metered Use
Sale	3,500	2,046
Briagolong	160	93
Boisdale	37	18

20.8 Recycled Water

Gippsland Water operates four sewage treatment plants in the Thomson basin. Recycled water is applied to a number of different uses including irrigation of pasture and reuse at recreational reserves such as the Maffra Recreational Reserve. All effluent was reused, except for effluent from the Rawson treatment plant (Table 20-8). A total of 93% of effluent was reused in the basin.

Table 20-8 Volume of recycled water

Treatment Plant	Volume Produced (ML)	Volume Reused (ML)	End Use Type for Effluent Reuse (ML)				Volume Discharged to the Environment (ML)	Other (ML) (3)
			Urban & Industrial	Agriculture	Beneficial Allocation (1)	Within Process (2)		
Heyfield	96	96	0	96	0	0	0	0
Maffra	279	279	10	269	0	0	0	0
Rawson	40	0	0	0	0	0	40	0
Stratford	135	135	0	135	0	0	0	0
Total	550	510	10	500	0	0	40	0

Notes:

- (1) Volume used to deliver specific environmental flow benefits.
 (2) Water that is reused in sewage treatment processes, e.g. backflushing of filters.
 (3) Other refers to a change in on-site effluent storage, ocean discharge, or other item affecting the annual water balance for recycled water that is not otherwise accounted for.

