

# 24 Yarra Basin

## 24.1 Location of Water Resources

The Yarra River basin is located within the South East Coast Drainage Division. Melbourne Water harvests the basin's water in the Upper Yarra Reservoir, O'Shannassy Reservoir, Sugarloaf Reservoir and Maroondah Reservoir. The Yarra River originates in the Yarra Ranges National Park and flows through the heart of Melbourne before reaching Port Phillip Bay. A map of the river basin is shown in Figure 24-1.

Water supply protection areas (WSPAs) within the Yarra basin include the whole of the Wandin Yallock WSPA for groundwater and the Plenty River, Diamond Creek, Hoddles Creek, Olinda Creek, Stringybark Creek and 'Steels, Pauls and Dixons Creeks' WSPAs for surface water. Groundwater management areas (GMAs) within the Yarra Basin include part of the Kinglake GMA and Moorabbin GMA.

## 24.2 Responsibilities for Management of Water Resources

Melbourne Water as bulk water supplier and Yarra Valley Water, South East Water and City West Water as retail water suppliers are responsible for water supply in the Yarra basin. Melbourne Water is the licensing authority responsible for surface water licensed diversions and Southern Rural Water is the licensing authority responsible for groundwater licensed diversions within the Yarra basin.

Melbourne Water was responsible for waterway management in the Yarra Basin in 2004/05.

## 24.3 Seasonal Overview

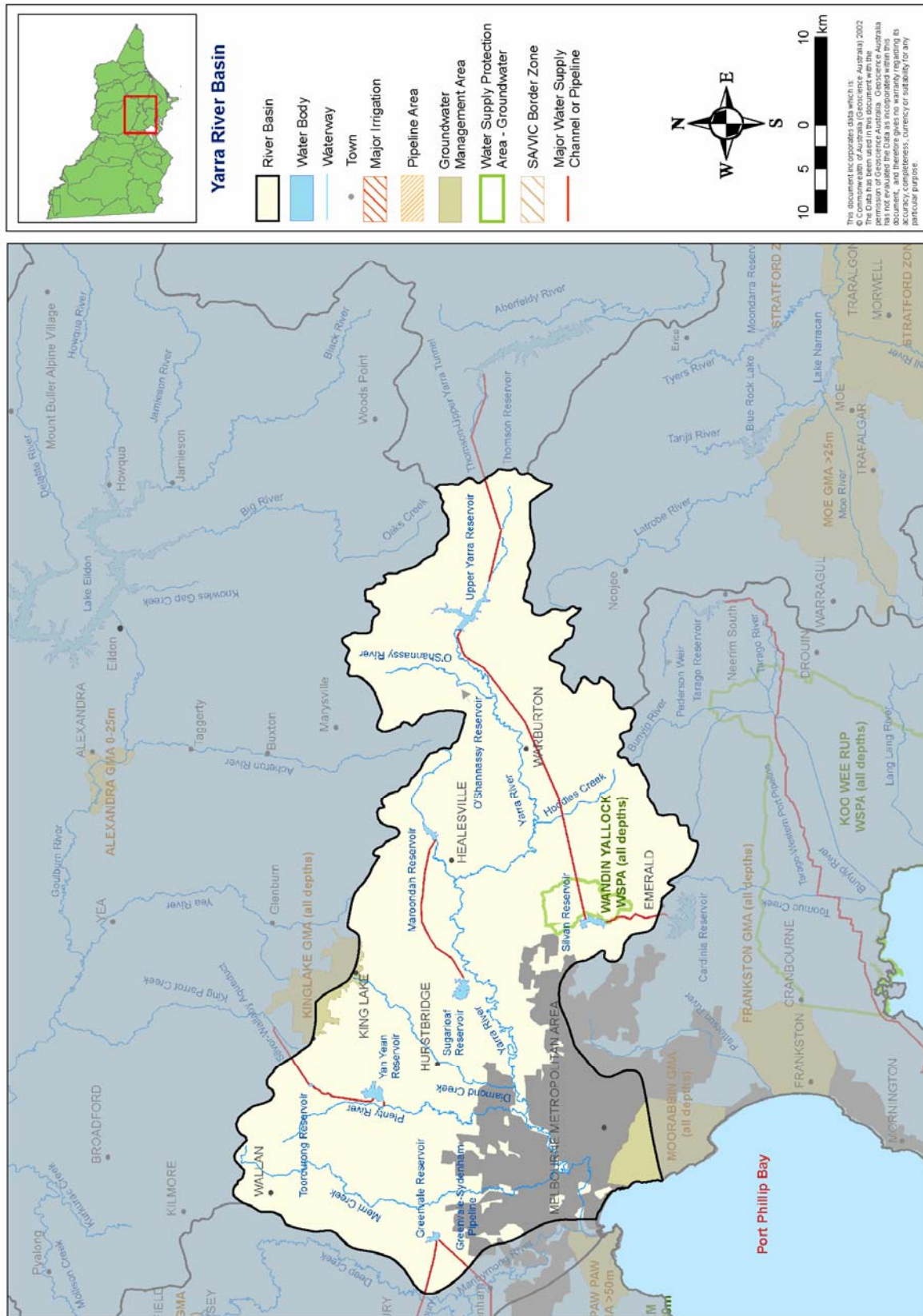
Average rainfall conditions prevailed across the Yarra basin in 2004/05. Rainfall levels were aided by a major flood event in February 2005, which flooded areas of Southbank and deposited a large volume of silt and debris into Port Phillip Bay. Total streamflows were slightly above the long-term average (110%) in 2004/05, and significantly above that recorded in 2003/04 (at an estimated 82% of the long-term average). However, certain individual streams recorded very low streamflows.

The average rainfall conditions resulted in a general easing of restrictions in this basin. Stage 2 urban restrictions were lifted from areas supplied by the retail companies in March 2005. These restrictions had previously been in place since August 2003.

The Yarra catchment had a number of irrigation bans imposed during 2004/05. These occurred in:

- Diamond Creek during July 2004, for most of August, October and January, and then from late March 2005 onwards;
- Pauls Creek, and Steels and Dixons Creeks from July to September 2004, November 2004 to January 2005, then again in June 2005;
- Plenty River during November 2004, then from March 2005 onwards;
- Darebin Creek from March 2005 to May 2005;
- Hoddles Creek for short periods in October 2004 and February 2005, part of January 2005, and from March 2005 onwards;
- Stringybark Creek during March and April 2005; and
- The Wandin Yallock Creek and Woori Yallock Creek during June 2005.

Figure 24-1 Map of the Yarra basin



In addition, extractions from the Little Yarra River were restricted from March 2005 to May 2005.

An assessment of the environmental health of rivers and streams in the Yarra basin is available in the Index of Stream Condition (Department of Sustainability and Environment, 2005). (Go to: [www.vicwaterdata.net](http://www.vicwaterdata.net)). A separate assessment of urban streams is available from Melbourne Water.

Details of works undertaken to improve the basin's long-term water quality and river health during 2004/05 are available from Melbourne Water.

## 24.4 Summary of the Total Water Resources in the Basin

The total volumes of water available and supplied from water resources in the Yarra basin are shown in Table 24-1. The total surface water available includes 81,000 ML of water transferred from the Thomson and Goulburn River basins to the Yarra River upstream of Upper Yarra Reservoir.

**Table 24-1 Summary of total water resource and water use in the Yarra basin, 2004/05**

Water Source	Total Water Resource (ML)	Total Use (ML)
Surface Water	1,098,600	483,900
Groundwater <sup>(1)</sup>	not available	not available
Recycled Water	9,200	210

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.

## 24.5 Water for the Environment

In 2004/05 there was no formal environmental water reserve established in the Yarra basin. Minimum environmental passing flows for habitat provision were delivered through the management of licensed extractions. An environmental flow study was completed during the year, which will be used to set environmental flows in the Yarra River.

The environment's share of total flow at the basin outlet was 607,700 ML, which is equivalent to about 55% of the inflows to the Yarra basin (Table 24-2). This amount consists of minimum passing flows managed by Melbourne Water and all other water flowing in the basin that was not taken out of the streams for consumptive uses.

At a catchment scale, there are issues related to the timing of diversions in unregulated streams of the basin. In many of the tributaries of the Yarra, private diversions during the irrigation season can have a significant impact on the flow regime, resulting in negative effects on aquatic habitats and populations. Streamflow management plans are being developed in these catchments to develop water sharing rules to minimise the impacts of such diversions and to ensure the water resources of the area are managed equitably and sustainably.

## 24.6 Surface Water Resources

### 24.6.1 Water Balance

A water balance for the Yarra basin is shown in Table 24-2. Melbourne Water operates seven major storages within the Yarra basin. Upper Yarra Reservoir, O'Shannassy Reservoir and Maroondah Reservoir all harvest water. Sugarloaf Reservoir, an off-stream storage, has a dual role to harvest water and to act as a seasonal balancing reservoir. Silvan Reservoir, Yan Yean Reservoir, and Greenvale Reservoir are off-stream storages and act as seasonal balancing

reservoirs. The volume in on-stream storages started and ended the 2004/05 year at just over 60% of capacity.

Across the whole basin the year's inflows were equivalent to 110% of the long-term average inflows. In Table 24-2 the inflows also include transfers from other basins. During the year there was a net transfer of water into the Yarra basin from other basins. Melbourne Water imported 71,712 ML from the Thomson basin and 9,300 ML from the Goulburn basin to supply Melbourne urban demands. Southern Rural Water utilised the Melbourne distribution system including Western Water's Sydenham to Melton Pipeline to transfer 2,390 ML to the Werribee Irrigation District via the Werribee River at Werribee Weir.

To calculate the water balance in 2004/05, the estimation of inflows for the Yarra basin were based on the sum of diversions, losses and outflows, minus inflows from other basins and treated effluent discharged to rivers, and taking into account the change in storage volume over the year.

**Table 24-2 Balance of surface water in the Yarra basin**

Water Account Component	2004/05 (ML)	2003/04 (ML)
<b>Storage Volume</b>		
Volume in storage at start of year <sup>(3)</sup>	133,600	218,100
Volume in storage at end of year	131,100	260,400
Change in storage	-2,500	42,300
<b>Inflows</b>		
Catchment inflow <sup>(1)</sup>	1,008,700	755,700
Transfers from other basins	81,000	87,600
Return flow from irrigation	0	0
Treated effluent discharged back to river	8,870	8,380
<b>Sub-total</b>	<b>1,098,600</b>	<b>851,700</b>
<b>Usage</b>		
Urban diversions	441,010	438,800
Licensed private diversions from unregulated streams	27,000	26,100
Small catchment dams	15,900	15,800
Transfers to Werribee Weir	2,400	0
<b>Sub-total</b>	<b>483,900</b>	<b>480,700</b>
<b>Losses</b>		
Net evaporation losses from major storages <sup>(3)</sup>	8,200	16,700
Losses from small catchment dams	1,300	1,400
In-stream infiltration to groundwater, flows to floodplain and evaporation <sup>(2)</sup>	0	6,100
<b>Sub-total</b>	<b>9,500</b>	<b>24,200</b>
<b>Water Passed at Outlet of Basin</b>		
River outflows to Port Phillip Bay	607,700	304,400
<b>Environment's Share of Total Flow in the Yarra Basin</b>	<b>607,700</b>	<b>304,400</b>

Notes:

- (1) Inflows have been back-calculated from outflows plus diversions
- (2) Losses estimated to be zero in the Yarra River REALM. The volume of estimated losses reduced from the previous year as 2003/04 losses were estimated by back-calculation.
- (3) Start storage of current year and end storage of previous year do not match because the off-stream storages of Sugarloaf Reservoir, Greenvale Reservoir and Silvan Reservoir are no longer included in the storage calculation in 2004/05. These storages were removed from the storage evaporation calculation in 2004/05.

### 24.6.2 Small Catchment Dams

The capacity of small catchment dams in the Yarra basin is estimated to be around 23,100 ML (Table 24-3). Usage in 2004/05 is estimated to be approximately equal to the average annual usage of 15,900 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 17,200 ML.

**Table 24-3 Small catchment dam information**

Type of Small Catchment Dam	Capacity (ML)	Usage (ML)	Total Water Harvested (ML)
Stock and domestic	10,500	5,300	n/a
Irrigation	12,600	10,600	n/a
<b>Total</b>	<b>23,100</b>	<b>15,900</b>	<b>17,200</b>

Note:

(1) n/a: information not available

### 24.6.3 Water Entitlement Transfers

There was no temporary or permanent transfer of water entitlements, diversion licences or sales water within the basin in 2004/05.

### 24.6.4 Volume Diverted

The volume of water diverted under bulk entitlements is shown in Table 24-4. Compliance with individual bulk entitlement volumes is deemed to occur in Table 24-4 if water use is not more than the maximum volume allowed to be diverted in 2004/05. However, as the bulk entitlement in the Yarra basin was not completed by the start of 2004/05, compliance is not assessed.

Approximately one-third of licences on unregulated streams are metered. Compliance for these individual water users is not included in the aggregated values for the water accounts. Total licensed diversions from unregulated streams are estimated based on irrigation demand modelling and climate information.

**Table 24-4 Volume of water diverted under surface water entitlements in the Yarra 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?
<i>Melbourne Water</i>						
Melbourne Supply System	1	n/a	0	n/a	441,010	n/a
<b>Total Annual Volume of Bulk Entitlements</b>		<b>n/a</b>	<b>0</b>	<b>n/a</b>	<b>441,010</b>	
<i>Licensed Diversions from Unregulated Streams</i>		35,982	0	35,982	27,000	

Note:

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

### 24.6.5 Compliance with Passing Flow Obligations in Bulk Entitlements

In 2004/05 there were no bulk entitlements operating in the Yarra basin.

### 24.6.6 Compliance with Streamflow Management Plans

There are two completed streamflow management plans (SFMPs) within the Yarra basin: Diamond Creek and Hoddles Creek.

Very dry conditions were noted in the annual report for the Diamond Creek Streamflow Management Plan in 2004/05, resulting in prolonged bans in extracting water resources. The Streamflow Management Plan specifies that a permanent ban occur from 1 January to 31 March in each year. Due to an implementation oversight, streamflows were managed based on normal low-flow period environmental flows, resulting in only partial bans over the permanent ban period in 2005. The maximum volume of licences under the plan was exceeded in 2004/05 by almost 40% due to higher than previously estimated farm dam volumes following the completion of the farm dam registration process. No other non-compliances were reported.

No non-compliances were reported by Melbourne Water for the Hoddles Creek Streamflow Management Plan in 2004/05. Very dry conditions were also recorded in this catchment.

The following SFMPs are also being developed in the Yarra basin:

- Plenty River;
- Paul, Steels, Dixons Creek;
- Olinda Creek;
- Stringybark Creek;
- Woori Yallock Creek; and
- Little Yarra/Don Rivers.

## 24.7 Groundwater Resources

A summary of the licensed entitlements and use for groundwater management units that overlap the Yarra basin, excluding stock and domestic use, is presented in Table 24-5. An estimate of stock and domestic groundwater use is provided in Table 24-6.

The Yarra basin contains the whole Wandin Yallock WSPA as well as part of the Kinglake GMA and Moorabbin GMA. The volumes described in Table 24-5 and Table 24-6 are totals for the management areas and include the area that falls outside the Yarra basin. Groundwater entitlements and use for unincorporated areas have not been included in the 2004/05 water accounts.

**Table 24-5 Compliance with licensed groundwater volumes, Yarra 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)
Kinglake GMA (22%)	ALL	3,830	1,840	0	644	644	Not Available (6)
Moorabbin GMA (37%)	ALL	4,305	2,071	0	725	725	Not Available (6)
Wandin Yallock WSPA (100%)	ALL	3,043	3,043	300	0	300	3,043

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 24-6 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)
Kinglake GMA	342	684
Moorabbin GMA	238	476
Wandin Yallock WSPA	163	326

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.

## 24.8 Recycled Water

Yarra Valley Water operates nine sewage treatment plants within the Yarra basin. Two of the plants, Avonsleigh and Emerald, were closed during the year and were replaced with a pumped connection to the Eastern Treatment Plant operated by Melbourne Water.

Effluent was reused at three of the plants in 2004/05. Overall, 2% of effluent was reused in the basin. New projects are planned to increase the proportion of water recycled by Yarra Valley Water, including reuse projects at Whittlesea and Epping North.

Table 24-7 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)		
Brushy Creek	4,138	38	0	38	0	1	4,100	0
Craigieburn	1,057	91	0	76	0	15	967	-1
Emerald - Ferres Road	45	0	0	0	0	0	45	0
Avonsleigh - Symons Road	75	0	0	0	0	0	75	0
Healesville	390	0	0	0	0	0	390	0
Lilydale	2,572	0	0	0	0	0	2,572	0
Monbulk	15	0	0	0	0	0	15	0
Upper Yarra	710	0	0	0	0	0	710	0
Whittlesea	198	77	0	77	0	0	0	121
<b>Total</b>	<b>9,200</b>	<b>206</b>	<b>0</b>	<b>190</b>	<b>0</b>	<b>16</b>	<b>8,874</b>	<b>120</b>

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.