

13 Avoca Basin

13.1 Location of Water Resources

The Avoca basin is located within the Murray-Darling Drainage Division. It includes the Avoca River plus a number of small tributaries such as Strathfillan Creek and Cherry Tree Creek. The Avoca River spills into the Kerang Lakes at Lake Bael Bael, as well as a number of distributaries that flood wetlands to the north-east and north-west of the river during high flow periods. A map of the river basin is shown in Figure 13-1.

There are no groundwater management areas or water supply protection areas located within the Avoca basin.

13.2 Responsibilities for Management of Water Resources

Central Highlands Water is responsible for urban water supply for towns in the southern part of the Avoca basin. Grampians Wimmera Mallee Water, formed by the recent amalgamation of Grampians Water and Wimmera Mallee Water, supplies towns in the northern part of the basin via water sourced from outside the basin.

Grampians Wimmera Mallee Water is also responsible for the delivery of rural water supplies to farms via the Wimmera-Mallee Channel system, the Northern Mallee Pipeline, the western end of the Waranga Western Channel, and diversions from rivers. Grampians Wimmera Mallee Water is the surface water and groundwater licensing authority across the basin.

The North-Central Catchment Management Authority is responsible for waterway management in the Avoca basin.

13.3 Seasonal Overview

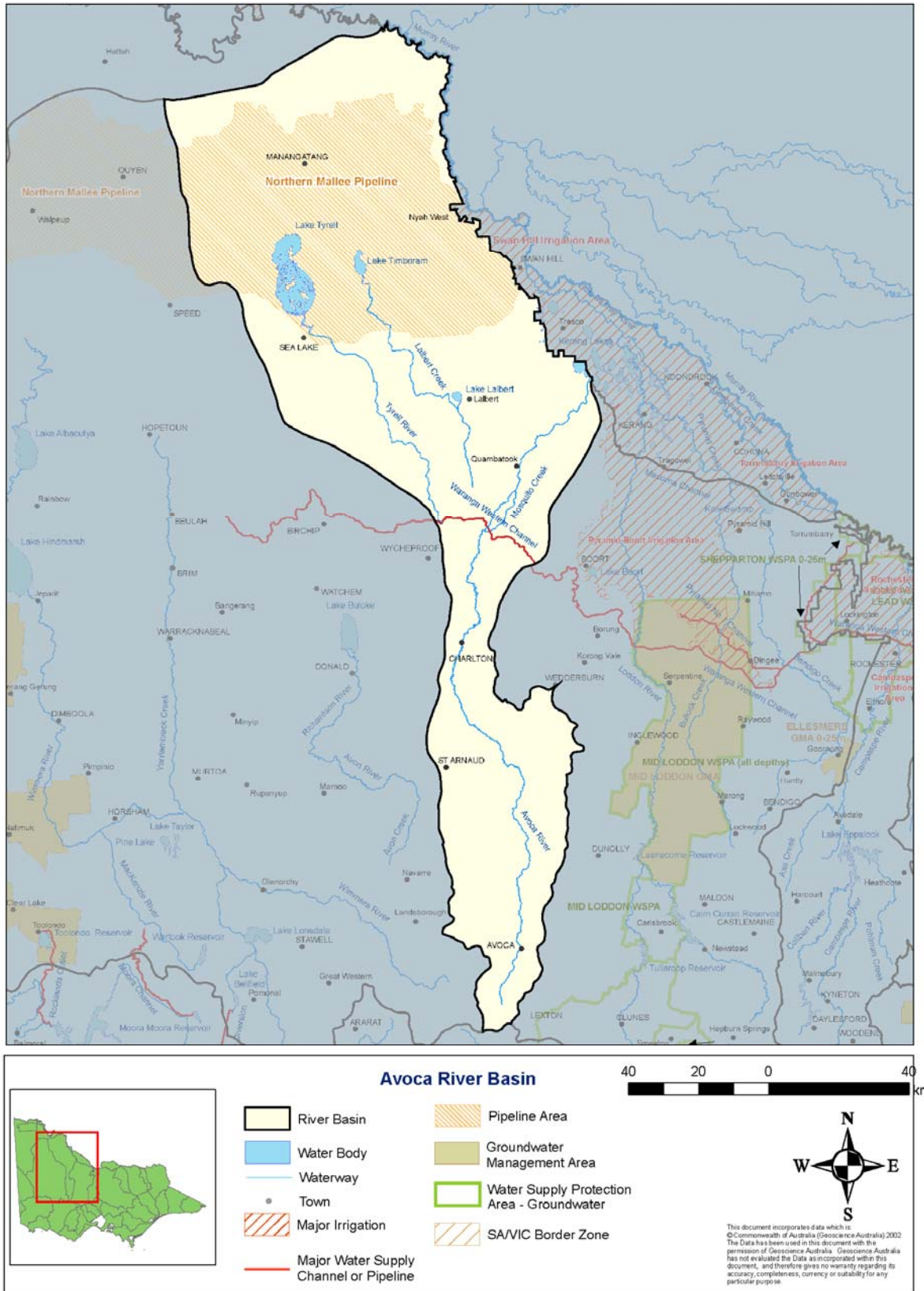
Rainfall conditions in the Avoca basin in 2004/05 were approximately equal to the long-term average across the basin. However, due to previously prolonged dry conditions this was not reflected in the basin's streamflows. For example, the streamflow recorded at Quambatook (streamflow gauge number 408203) for 2004/05 was less than 1% of the long-term average, whilst streamflows further upstream at Coonooer Bridge (streamflow gauge number 408200) were approximately 3% of long-term average flows at this location. The Avoca River flows into a terminal lake system, Lake Bael Bael and The Marshes that can overflow into the Murray system in wet years.

Similar to the previous season, Stage 3 (of eight stages) restrictions were in place at Redbank, and voluntary restrictions applied in Ampitheatre and Avoca throughout 2004/05. No restrictions on water use by licensed diverters were reported in the Avoca basin.

A statewide assessment of stream condition found that 35% of streams in the Avoca basin are in poor condition. The full report is available in the Index of Stream Condition (Department of Sustainability and Environment, 2005).

Details of works undertaken to improve the basin's long-term water quality and river health during 2004/05 are available from the North Central Catchment Management Authority.

Figure 13-1 Map of the Avoca basin



13.4 Summary of the Total Water Resources in the Basin

The total volumes of water available and supplied from water resources in the Avoca basin are shown in Table 13-1.

Table 13-1 Summary of total water resource and water use in Avoca basin 2004/05

Water Source	Total Water Resource (ML)	Total Use (ML)
Surface Water	25,200	14,400
Groundwater ⁽¹⁾	Not available	Not available
Recycled Water	340	310

Note:

(1) There are no GMAs or WSPAs in this river basin. Groundwater use from unincorporated areas is not known.

13.5 Water for the Environment

There was no formal environmental water reserve established in the Avoca basin in 2004/05. However, the Murray-Darling Basin Cap, which is a limit imposed on the volume of water that can be diverted from the rivers for consumptive use, applies in the Avoca basin. The cap on the Avoca is accounted for as part of the Wimmera-Mallee river valley system. Whilst the cap restrains further increase in water diversions, it does not constrain new developments provided the water for them is obtained by using water more efficiently, or by purchasing water from existing developments.

The Avoca River is one of the few rivers in Northern Victoria which does not have a major reservoir or diversion weir in its upper reaches. Because of this, it has a flow pattern which is very close to natural.

The ongoing drought continues to impact significantly on flows within all streams in the Avoca basin. No flow was recorded in 2004/05 at the basin outlet to the Kerang Lakes, which outflow to the River Murray during wet years. The main use of water for the environment in the Avoca basin is the periodic flooding of wetlands coinciding with major flood events. No such events occurred in 2004/05. In its lower reaches, the Avoca River is a perched river that loses substantial volumes to groundwater, particularly during bank overflow events when water spreads across the floodplain.

No significant natural or environmental flows were recorded in the Tyrrell or Lalbert Creeks, apart from some channelled flows from the existing Wimmera Mallee stock and domestic system.

13.6 Surface Water Resources

13.6.1 Water Balance

A surface water balance for the Avoca basin is shown in Table 13-2.

It can be seen from the water balance that small catchment dams are the main source of water supply in the catchment.

Urban use of surface water resources decreased significantly in 2004/05 as the water supply for the township of Avoca was switched to groundwater. In-stream losses to groundwater, the floodplain and evaporation losses also decreased significantly in 2004/05 due to reduced streamflows in comparison to the previous year.

The estimate of in-stream losses to groundwater and evaporation is the volume of water that is unaccounted for after separately estimating inflows, outflows, change in storage and consumptive use.

Table 13-2 Balance of surface water in the Avoca basin

Water Account Component	2004/05 (ML)	2003/04 (ML)
Storage Volume ⁽¹⁾		
Volume in storage at start of year	0	0
Volume in storage at end of year	0	0
Change in storage	0	0
Inflows		
Catchment inflow	25,200	33,900
Transfers from other basins	0	0
Return flow from irrigation	0	0
Treated effluent discharged back to river	20	30
Sub-total	25,200	33,900
Usage		
Urban diversions ⁽²⁾	20	170
Licensed private diversions from unregulated streams	1,700	1,600
Small catchment dams	12,700	12,700
Sub-total	14,400	14,400
Losses		
Net evaporation losses from major storages	0	0
Losses from small catchment dams	9,700	9,700
In-stream infiltration to groundwater, flows to floodplain and evaporation ⁽³⁾	1,100	9,800
Sub-total	10,800	19,500
Water Passed at Outlet of Basin		
Avoca River outflow to Kerang Lakes	0	0
Environment's Share of Total Flow in the Avoca Basin	1,100	9,800

Notes:

- (1) Excludes wetlands in the Avoca basin.
- (2) Urban water supply for the township of Avoca was sourced from groundwater in 2004/05.
- (3) Back calculated as the difference between inflows and outflows.

13.6.2 Small Catchment Dams

The capacity of small catchment dams in the Avoca basin is estimated to be around 19,400 ML (Table 13-3). Usage in 2004/05 is estimated to be approximately equal to the average annual usage of 12,700 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 22,400 ML.

Table 13-3 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	8,900	7,400	n/a
Total	19,400	12,700	22,400

Note:

- (1) n/a: information not available

13.6.3 Water Entitlement Transfers

There were no records of water entitlement transfers to or from the Avoca basin in 2004/05.

13.6.4 Volume Diverted

The volume of water diverted under each water authority's bulk water entitlement is shown in Table 13-4. 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.

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 13-4 Volume of water diverted under surface water entitlements in the Avoca 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>Central Highlands Water</i>						
Amphitheatre	1	25	0	25	12	Yes
Avoca ⁽¹⁾	1	233	0	233	0	Yes
Redbank	1	20	0	20	5	Yes
Total Annual Volume of Bulk Entitlements		278	0	278	17	
<i>Licensed Diversions from Unregulated Streams</i>		3,512	0	3,512	1,700	

Note:

(1) Urban water supply for the township of Avoca was sourced from groundwater in 2004/05.

13.6.5 Compliance with Passing Flow Obligations in Bulk Entitlements

The bulk entitlements in the Avoca basin have various passing flow requirements. No instances of non-compliance with passing flows were reported in 2004/05 by Central Highlands Water.

13.6.6 Compliance with Streamflow Management Plans

No streamflow management plans (SFMPs) are currently being developed in the Avoca basin. None were in operation in the Avoca basin in 2004/05.

13.7 Groundwater Resources

There are no groundwater management areas or water supply protection areas located within the Avoca basin. However, groundwater is used to supply urban water for the townships of Avoca and Redbank. The licensed entitlements and metered use for these groundwater supplies is provided in Table 13-5. The bore used to supplement the urban water supply of Redbank has no licensed allocation because it is a shire drought relief bore. Like stock and domestic bores, drought relief bores generally do not have an allocation associated with them. Central Highlands Water has an agreement with the shire for the temporary use of this bore.

Groundwater entitlements and use for unincorporated areas have not been included in the 2004/05 water accounts.

Table 13-5 Urban groundwater usage

Town Supplied	Licensed Allocation ML	Metered Use
Avoca	200	175
Redbank	0	5

13.8 Recycled Water

Around 93% of the volume of effluent passed through treatment plants in the basin was recycled for consumptive use (Table 13-6).

The Avoca treatment plant is designed to recycle all wastewater received. During 2004/05, a new irrigation system was installed at the site. Whilst some wastewater was recycled during the commissioning of the new system, the remainder was stored in a winter storage lagoon for use during 2005/06.

Table 13-6 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)		
Avoca	32	8	0	8	0	0	0	24
Charlton	37	37	0	37	0	0	0	0
Sea Lake	55	55	0	55	0	0	0	0
St. Arnaud	171	171	1	170	0	0	0	0
Wycheproof	41	41	0	41	0	0	0	0
Total	336	312	1	311	0	0	0	24

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, or other item affecting the annual water balance for recycled water that is not otherwise accounted for.