Marne Saunders water resources

#3 Water development and use

Water supports a wide range of values in the Marne Saunders Prescribed Water Resources Area (PWRA). This includes cultural and social values across the community, as well as water-dependent ecosystems throughout the area, and provision of ecosystem services such as erosion management and nutrient cycling.

Water is taken for a range of purposes including domestic use and stock use, which do not require a water licence in the area. It is also taken for a variety of licensed purposes, including irrigation of a range of crops, industrial use, intensive animal keeping, and recreational use.

This information sheet provides a summary on wells, dams and watercourse diversions in the Marne Saunders PWRA, including current numbers and history of development. It also gives information on volumes taken from different water resources for different purposes.

An information pack has been developed as an outcome of the Cambrai Water Forum in February 2022. There are 6 papers in the series as supporting information developed for the upcoming meetings in November 2022:

#1: History, Licences, and Allocations

#2: Hydrological cycle in the PWRA

#3: Water development and use

#4: Resource and ecosystem condition

#5: Frequently asked questions

#6: How to address concerns

Wells: current number & history

Up to September 2022, over 1,460 water wells had been drilled in the Marne Saunders PWRA according to the state wells database. Of these, 456 wells are still considered operational, around 310 have been abandoned, backfilled or similar, and the status of the remainder is unidentified. Of the currently operational wells, 318 of these have been drilled for purposes including irrigation or industrial use, although wells may have changed purpose since originally drilled.

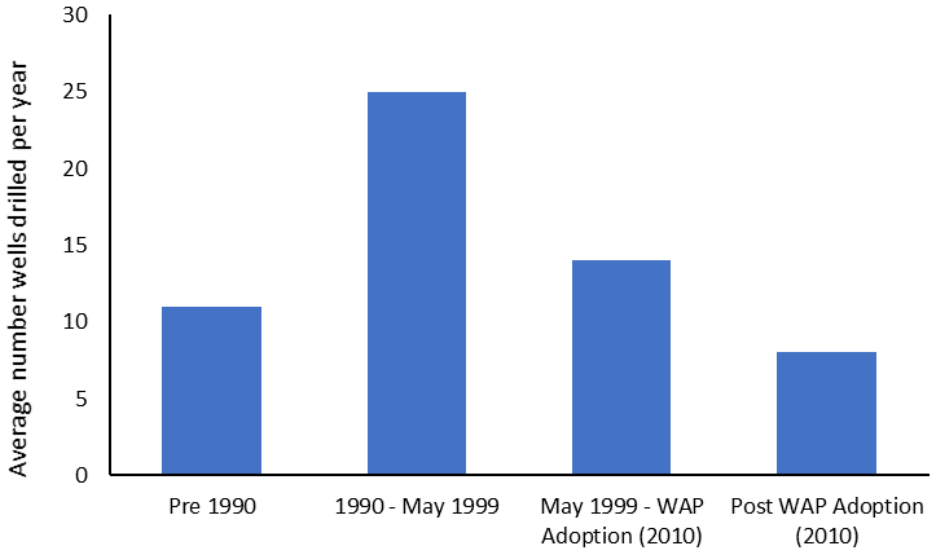

Figure 1: Average number of wells drilled per year in the Marne Saunders PWRA during the periods prior to, and following, moratoriums. Data obtained from the water drill holes database, maintained within DEW's Water Connect database

The rate of well drilling increased significantly in the years leading up to the moratoriums on water resource development in 1999 and 2002 (Figure 1, left). The year of well drilling can be established for around 1,380 of the wells in the area, and the oldest recorded well was drilled in 1909. As of September 2022, 179 wells access water for licensed purposes.

Dams: current number & history

The total dam capacity in 1991 in the Marne catchment was estimated at 1,123 ML. The current total dam capacity in the Marne is estimated at 3,225 ML. Dam capacity has not increased significantly since 1999 when the Notice of Restriction was placed in the area, meaning that dam capacity almost tripled in less than 10 years from 1991 to 1999. The Board is not aware of any approved increase in dam capacity since the requirement for a dam construction permit was introduced.

As of 2020, there are 964 dams across the Marne Saunders PWRA, 11% of which are licensed. The total estimated dam storage capacity is 3,779 ML, of which 56% is licensed dams.

It is important to note that the volume of dam storage capacity is not the same as the volume of use from dams, or a measure of the impact of dams on downstream flow. The amount of water taken by a dam will depend on the amount of runoff and use in the upstream catchment, the size of the dam, and how much water is already in the dam, which in turn is influenced by use and evaporation from the dam.

Watercourse diversions: current number

As of September 2022, there are 14 watercourse diversion points (e.g. pumps and weirs) where the water is used for licensed purposes. The number of watercourse diversion points for non-licensed use is not known.

How much water is taken?

Table 1 shows the annual volume of water measured or estimated to be taken in the Marne Saunders PWRA for licensed use and non-licensed (stock and domestic) purposes, from different water resources. The table also includes estimated annual values of evaporation from dams in the Marne Saunders PWRA.

Table 1: Annual volume of water taken from different water resources in the Marne Saunders PWRA.

Water resource and use type	Range of actual annual water use for 2010-11 to 2019-20 (ML/year)			Allocation limit (ML as of 2020/21)
	Average	Minimum	Maximum	
Underground				
Hills underground water				
Licensed use	387	136	610	1,976
Stock and domestic use	*NA			94
Plains underground water				
Licensed use	1,158	932	1370	2,088
Stock and domestic use	*NA			176
Surface water (including watercourses)				
Watercourse – licensed use (eg diversions)	50	5	115	179
Surface water – licensed use (eg dams)	403	179	638	1,276
Stock and domestic use (est.)	294	68	460	496
Dam evaporation (est.)	696	115	1081	Not applicable

Underground water

All underground water use volumes in Table 1 give separate values for the hills and plains zones. The licensed use data shows the range of annual metered usage available from the water resource status reports (2010-11 to 2019-20).

The allocation limit is the volume allocated as of 2020-21 (i.e. potential allowable maximum that could currently be taken). Stock and domestic use is not licensed or metered, so the allocation limit volume in the table is the estimated annual requirements from underground water for these purposes from the Marne Saunders WAP.

Surface & watercourse water

Table 1 shows the range of annual metered usage of licensed surface water and watercourse water available from the water resource status reports (2010-11 to 2019-20), with the allocation limt being the allocated volumes as of 2020-21 (i.e. potential allowable maximum that could currently be taken).

Stock and domestic use is not licensed or metered, so annual volumes of stock and domestic use of surface water for 2010-11 to 2019-20 have been estimated using surface water models. The allocation limit volume is estimated as 30% of the capacity of non-licensed (stock and domestic) dams in the PWRA, as given in the Marne Saunders WAP. These surface water models were originally built to support WAP development, and represent the pattern of dams, climate and water cycle parameters across the catchments. The models were used to estimate how much of the stock and domestic dams allocation limit value could have been used annually for 2010-11 to 2019-20, given the climate, upstream runoff and upstream use for each dam.

It is important to note that water may also be lost from dams by evaporation and seepage, which may be considered another form of surface water 'use'. Table 1 includes estimates of net annual evaporation from all dams, estimated for 2010-11 to 2019-20 via the above surface water models.

New development

Wells & bores

Permits may be granted for new wells or bores drilled for stock and domestic use and for licensed use, subject to a range of rules in the water allocation plan including buffer zones that generally can't be overlapped around existing wells and water-dependent ecosystems. These buffer zone rules don't apply to deepening an existing well, provided this doesn't cause the well to go into a different aquifer.

Dams

No new net dam capacity can be built under the rules of the Marne Saunders WAP. That is, approval will not be granted for new dam capacity, unless enough existing dam capacity has been removed beforehand (between 100-125% of dam capacity to be constructed). This requirement applies to new dams and enlargement of existing dams. This requirement also applies regardless of what the water will be used for (i.e. whether for licensed, stock and/or domestic use).

If sufficient dam capacity has been removed to allow construction of new dam capacity, then the construction will only be approved subject to a range of other rules in the water allocation plan. These rules aim to minimise the impact on other users, including ecosystems.

Note on dam removal

A permit is also required for removing a dam or reducing its volume. If a dam is removed or its volume is reduced for the purpose of providing environmental benefit, then the current Marne Saunders WAP does not allow that removed capacity to be reconstructed.

Watercourse diversions

A water affecting activities permit is required to construct a new watercourse diversion structure. The application would be assessed against the relevant rules in the Marne Saunders WAP, which includes provisions to minimise the impact of the construction on other users, including ecosystems. More information on water affecting activities can be found on the Boards website: https://www.landscape.sa.gov.au/mr/water/managing-water-resources/water-affecting-activities

Further information

Key information listed in the dot points below can be found in:

- Water Allocation Plan (WAP) for the Marne Saunders
- 2009 Guide to the draft Water Allocation Plan – a guide for consultation

- Outline of the WAP's key rules for well drilling and dam construction:
  - WAP - section 4.3
  - Guide - section 5

- The rules for well drilling and dam construction:
  - WAP sections 8.3 and 8.5

- Estimates of stock and domestic water use:
  - WAP section 4.1.2.1

More information

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https://www.landscape.sa.gov.au/mr/water/water-allocation-plans/marne-saunders