8 Groundwater licences, do I need one?
Within the Bunbury Groundwater Area, all bores must be licensed, with the exception of those which are used for domestic (house & 0.1ha of land) purposes only in the City of Bunbury, Eaton & Australind sub-areas and draw groundwater from the supercritical aquifer.

If a licence is required, the licence will stipulate the maximum amount of water that may be drawn from the bore/bores each year and may also contain conditions relating to bore depth, construction and monitoring.

Bore licensing provides a means of equitably regulating the use of groundwater so that it can meet the water supply requirements of the towns and of the private users. It is the means by which we ensure that water is shared between users and the community can enjoy the resource now and in the future.

9 How do I obtain a bore licence?
Groundwater bore licence application forms are available from the Water and Rivers Commission in Bunbury. The licence must be obtained before drilling starts and can be issued for a period of up to ten years.

Groundwater bore licences are currently issued free of charge.

10 Who approves bore licence applications?
The issue of a groundwater licence is not automatic but depends on the availability of groundwater. Decisions on well licence applications are made by officers of the Water and Rivers Commission. They are guided by the Bunbury Groundwater Area Management Plan, which sets out the amount of water available and policies by which the water is allocated.

Persons refused a groundwater bore licence have the right to appeal against the decision within 28 days.

11 Where to find out more
If you wish to find out more about how you can help protect our groundwater or apply for a licence, please contact the Water and Rivers Commission's Bunbury office.

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Caring for groundwater near Bunbury
1 Where does groundwater come from?

Water is evaporated from the ocean and transported over land as vapour in clouds. In the right weather conditions, the water falls to the land surface as rain, hail or snow. This rain either:

- evaporates directly back to the atmosphere
- is taken up by plant roots and transpired back into the atmosphere
- flows back to the ocean in streams and rivers, and is stored in lakes
- infiltrates into the ground and slowly flows as groundwater to be discharged into rivers, lakes, estuaries and the ocean.

Groundwater is therefore just one part of this continuous water cycle.

Groundwater is generally not found in underground lakes or rivers, as some people think. Groundwater is actually found in the spaces between sand grains and pebbles, or in rock fractures and cracks. Geological formations composed of sand, sandstone and limestone which contain useable quantities of groundwater are called aquifers.

There are two types of groundwater aquifers - unconfined and confined.

The **unconfined aquifer** is found in the surface geology which is composed mainly of loose sands and clays. In the Bunbury region the unconfined, or superficial aquifer, contains groundwater which is highly variable in quality and quantity, depending on the proportion of sand to clay in the formation. Confined groundwater is usually found below a confining layer of material, often consisting of silt and clay, that restricts vertical groundwater flow. The groundwater under this layer is confined. In the Bunbury region there are two major confined aquifers. In order of increasing depth, these are the Leederville and Yarragadee aquifers.

2 Why is groundwater so important?

The water supply system for the Bunbury region is drawn from two sources: surface water and groundwater. Surface water is obtained from dams on rivers in the Darling Range which supply the eastern region of the Bunbury Groundwater Area (see back page map). Groundwater is obtained from water stored within pores and cracks in rocks and soil. The groundwater is pumped to the surface out of holes (called a bore) drilled below the water-table.

THE NATURAL GROUNDWATER CYCLE NEAR BUNBURY

![Diagram of the natural groundwater cycle near Bunbury](image-url)
3 **Bunbury Groundwater Area**

The Bunbury Groundwater Area (see map) was proclaimed under the *Rights in Water and Irrigation Act* (1914) in June 1975, because of local concerns about the long term availability of groundwater. This Act allows for the proper management of the groundwater resources.

4 **How much groundwater is available?**

The availability of fresh groundwater in the superficial aquifer is difficult to evaluate. Both the quality and quantity vary considerably. In areas where there is not a lot of clay, as in the case of the “Big Swamp” in Bunbury, the quality of groundwater is usually good. Where the superficial aquifer consists predominantly of clay the salinities increase dramatically, such as to the east of the groundwater area near Boyanup, Dardanup, Roelands and Brunswick Junction.

The deeper Leederville aquifer is primarily used as a water supply for the town of Australind. The Yarragadee aquifer found below the Leederville aquifer contains the largest groundwater resource and is used to supply the City of Bunbury. Parts of the aquifer however, are overlain by the Bunbury Basalt which requires specialised drilling techniques to penetrate.

For management purposes, the Bunbury Groundwater Area has been divided into seven sub areas which reflect the presence or absence of aquifers, the location of the Bunbury Basalt and the quantity of groundwater used. The availability of groundwater in the superficial, Leederville and Yarragadee aquifers in the various sub areas is given in the following table:

**Groundwater availability in the Bunbury Area.**

<table>
<thead>
<tr>
<th>Sub Area</th>
<th>Superficial Aquifer</th>
<th>Leederville Aquifer</th>
<th>Yarragadee Aquifer</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Bunbury</td>
<td>Small</td>
<td>None</td>
<td>Minimal</td>
</tr>
<tr>
<td>East Bunbury</td>
<td>Small</td>
<td>Good</td>
<td>Abundant</td>
</tr>
<tr>
<td>Stratham-Gelup</td>
<td>Small</td>
<td>None</td>
<td>Abundant</td>
</tr>
<tr>
<td>Boyanup</td>
<td>Small</td>
<td>Good</td>
<td>Good</td>
</tr>
<tr>
<td>Dardanup</td>
<td>Small</td>
<td>Minimal</td>
<td>Good</td>
</tr>
<tr>
<td>Eaton</td>
<td>Small</td>
<td>None</td>
<td>Good</td>
</tr>
<tr>
<td>Australind</td>
<td>Small</td>
<td>None</td>
<td>Good</td>
</tr>
</tbody>
</table>

This is most likely to occur near the coast and estuaries, where excessive groundwater abstraction can increase infiltration of salt water (see diagram). Areas with predominantly clay soils, particularly where they overlie the Bunbury Basalt, are also likely to have groundwater of higher salinity. Where there is a danger of saline intrusion, such as near Eaton and Australind, bores should be sunk to just penetrate the water table and pumped at low rates to avoid drawing saline water into bores.

**Reduced pumping rates**

Where there is a concentration of groundwater bores pumping in one area, competition between bores can increase, which may result in reduced pumping rates. To avoid this interference, bores need to be located as far as is practicable from one another and depths of bores varied within the aquifer.

**Pollution**

Pollution of groundwater resources has occurred on a limited basis in the Bunbury Groundwater Area. Nevertheless, even minor localised groundwater pollution must be treated seriously, because the cumulative effect of many minor pollution incidents could create a serious problem.

Removal of pollutants from groundwater is a slow and often expensive operation. Where there is a threat of groundwater pollution, new projects must obtain development approvals containing the necessary safeguards for groundwater protection. Examples of industries that can cause pollution include:

- Petroleum Stations
- Intensive Horticulture
- Refuse Disposal Sites
- Industry

5 **What are the potential risks to the groundwater resource?**

If more groundwater is pumped out than goes into (recharge) the aquifer annually, serious problems may arise such as declining water levels or increased salinity. Therefore it is important that the limits of groundwater abstraction are not exceeded.

**Drainage of wetlands**

Over pumping may also result in declining water levels in wetlands, causing the wetland to dry up, damaging local flora and fauna.

6 **What is groundwater used for?**

Particular areas are susceptible to pollution and need special consideration. The Yarragadee aquifer in areas west of the basalt in the Gelup and South Bunbury subareas is vulnerable, as these are areas of recharge to the Yarragadee aquifer.

**Excessive pumping of groundwater will cause water levels to fall and environmental problems to occur. To prevent this happening the total amount of groundwater that is pumped must be controlled so that it does not exceed the amount that is replenished by rainfall.**

7 **Additional Information**

In December 1994, a management plan for the Bunbury Groundwater Area was prepared. This management plan is an assessment and review of groundwater resources on a local scale and allows allocation that is in line with sustainable water resource management.

The management plan reflects the policies of the Water and Rivers Commission. It describes groundwater availability, current allocations, future use, monitoring networks and requirements, environmental concerns and subarea management.

Copies of the management plan are available for sale at the office of the Water and Rivers Commission in Bunbury. Copies are also available for viewing at public libraries at Capel, Dardanup, Bunbury and Harvey.