South West Coastal groundwater allocation plan

Information Report February 2012

The Department of Water will release a water allocation plan for public comment for the South West Coastal area in 2012. This allocation plan will replace the South West Coastal groundwater area management review of 1989. The plan will outline the allocation limits for groundwater resources and set objectives and policy for water allocation.

This information report summarises the hydrogeology and environmental features of the South West Coastal area and outlines what the allocation plan will address. We invite you to contribute to the plan.
The South West Coastal plan area

The South West Coastal plan area extends along the Swan Coastal Plain from Mandurah to Myalup, and is bordered on the east by the Peel-Harvey Estuary. Management in the area is currently guided by the South West Coastal groundwater area management review of 1989.
What groundwater resources are present?

There are three aquifers present in the plan area – the superficial, Leederville and Cattamarra aquifers.

The superficial aquifer is an unconfined aquifer consisting mainly of porous and karstic limestone. It occurs at shallow depths with a maximum saturated thickness of 25 metres. The superficial aquifer is recharged directly by rainfall creating a ‘lens’ of fresh water over more saline groundwater in the majority of the plan area. While groundwater from the superficial aquifer is readily available, individual bore yields vary depending on the geology. The volumes of water allocated are generally limited to protect water quality.

The Leederville aquifer is a major regional confined aquifer. Aquifer thickness ranges between 140 metres and 180 metres. A sandy, green clay ‘marker bed’ divides the Leederville aquifer. Above this marker bed, there is some fresh to marginal groundwater. However, saline water also occurs due to the influence of the Peel Inlet and Harvey Estuary. Below the marker bed, groundwater is marginal to brackish and its salinity increases with depth.

The Cattamarra aquifer is deep and its groundwater is poor quality, due to the high salinity.

Water use

The superficial and Leederville aquifers are used to provide water for a number of activities such as public open space, sporting facilities, domestic gardens, agriculture and horticulture. The Leederville aquifer is also a source of public drinking water in the Preston Beach area. No abstraction occurs from the Cattamarra aquifer in the plan area.

A drying climate

Reduced rainfall, due to a drying climate, has a direct effect on recharge to the aquifers, reducing the volume of water that can be abstracted.

Groundwater level monitoring within most of the superficial, and some of the upper Leederville aquifers, indicates downward trends in water levels. The drying climate and abstraction pressure are possible causes of this. If too much fresh water is drawn from these resources salinity can increase.

Quick facts

- There are 162 groundwater abstraction licences approximately totalling six Gigalitres of water in the South West Coastal plan area.
- Parks, gardens and recreation are the highest amount of licensed allocations.
- Western Australia’s drying climate directly affects groundwater levels and increases the risk of saline intrusion.
Environmental values of the South West Coast area

The largest coastal reserve on the Swan Coastal Plain, the Yalgorup National Park, is an iconic feature in the plan area. Its ten lakes are part of the Peel-Yalgorup wetland system which is recognised as a “Wetland of International Importance” under the Ramsar Convention.

The park contains the critically endangered Lake Clifton thrombolites. These rare microbial communities are internationally significant as they are one of the few inland populations of thrombolites remaining. The park is significant for wetland and bushland bird species, including species protected under international migratory bird agreements.

The wetlands and remnant vegetation support several threatened ecological communities, declared rare and priority flora, and fauna species of conservation significance. Acid-sulphate soils are present in some of the plan area.

Environmental values of the South West Coastal area

*Data courtesy of the Department of Environment and Conservation.*
What environments do the groundwater resources support?

The shallow, transmissive characteristics of the superficial aquifer support groundwater dependent environmental features, including wetlands and vegetation complexes. While not all environmentally significant aspects of the area are groundwater dependent, the local hydrogeology is recognised as a major component of the health of the Yalgorup Lake system (EPA 2010).

It is therefore important to map and assess the values of the groundwater-dependent ecosystems in areas of existing or future abstraction. The plan will consider abstraction risks to these dependent ecosystems.

Two types of ecosystems are reliant, at least in part, on groundwater from the superficial aquifer:

- **wetland ecosystems** – sustained by groundwater discharge
- **vegetation ecosystems** – root systems utilising the watertable

The coastal lakes are groundwater sinks and so groundwater discharge flowing into them is important to maintain water levels and water quality.

Changes in the water regime of the superficial aquifer are likely to affect groundwater-dependent ecosystems.

Conceptual diagram of how shallow groundwater supports vegetation and lakes throughout the area, with highest water use within the 0 m – 3 m and 3 m – 6 m categories. (DTGW – depth to groundwater)

Locating potential groundwater-dependent ecosystems

Depth to groundwater is used to define areas of possible groundwater dependency. Previous investigations have shown that vegetation situated on shallow groundwater is likely to be using groundwater to some extent. Froend and Loomes (2006) list three main categories of groundwater-dependent vegetation (figure below).

A depth to groundwater map was produced for the South West Coast and overlain with the available vegetation mapping. Where remnant terrestrial vegetation is growing in an area with a depth to groundwater of less than ten metres, the ecosystem is considered likely to be groundwater dependent. A wetland is considered to be groundwater dependent where the depth to groundwater is likely to be three metres or less.
Salinity management

Saline intrusion into the superficial and Leederville aquifers is a risk to users and the environment. Over-abstraction from individual bores can draw saline water into the freshwater lens, either from underlying saline waters or by lateral movement of seawater. Salt recycling is also a threat to the quality of groundwater from the superficial aquifer.

These effects can cause the superficial aquifer to become unsuitable for use. Reduced rainfall increases this risk as less freshwater recharges the freshwater lens. We currently manage these effects with local licensing rules which include spacing bores and limiting the yield from each bore. The allocation plan will deal with the management of salinity problems.

Conceptual diagrams of abstraction/irrigation induced:

(a) groundwater pumping next to salt water bodies causing the intrusion of salt water;
(b) groundwater pumping drawing up underlying saline water causing salt water upconing;
(c) evaporation after irrigation from groundwater leaving salts residue in soil, steadily increasing the salinity of direct recharge to the superficial aquifer.

Monitoring bore near Lake Clifton
Our role

The Department of Water is responsible for allocating and licensing abstraction of Western Australia’s water resources on behalf of the Minister for Water, consistent with the licensing powers of the Rights in Water and Irrigation Act 1914. We manage the amount of water taken from groundwater and surface waters through water allocation plans, which guide water licensing, monitoring and ongoing adaptive management.

Before a groundwater licence is issued, an assessment is undertaken to determine the potential for adverse effects on other users, other values and any groundwater dependent ecosystems within the area. Licensees may be required to undertake activities, such as monitoring, to demonstrate that their water use is not having any adverse cumulative or long term effect on the resource.

The allocation plan will address:

- How much water can be taken from the groundwater resources, taking into account the predicted drying climate
- How much water must be left in the system to support environmental, social and cultural needs
- What management policies are required to maintain the security of the resource for the future
- How we will monitor resources
- Future development in the area
- The high level of exempt unlicensed use from domestic bores.

The water allocation planning model
Be involved

More information on the water allocation planning process and how allocation limits are set is contained in our publication Water allocation planning in Western Australia 2011. This can be found on our website.

We will begin stakeholder consultation in early 2012. We would appreciate your involvement, especially your local knowledge.

Consultation activities will be advertised in local newspapers and on our website, but don’t wait – contact us to take part. Register as a stakeholder and request that notifications be sent to you as they arise.

How can I get more information?

For more information please visit <www.water.wa.gov.au/allocationplanning>, or contact our Kwinana-Peel regional office:

107 Breakwater Parade
Marine Operations Centre
Mandurah Western Australia 6210
Phone: 9550 4222
Email: allocation.planning@water.wa.gov.au

Questions

☐ Do you think there are water resource issues in the South West Coastal plan area?

☐ Have you ever experienced salinity problems with your groundwater abstraction?

☐ Are you concerned with the steady decline in rainfall in the south-west of Western Australia?

☐ Are you concerned your groundwater use may affect the environment?

☐ Have you ever wondered what groundwater is in your local area?

☐ Do you propose to increase your water use in the future?

If you answered ‘Yes’ to any of the above questions about groundwater management issues please let us know.