Managing the Lower Gascoyne River water resource: Questions and answers
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Understanding your groundwater resources in the Lower Gascoyne area

Q: Where is groundwater located in the Lower Gascoyne area?
A: Groundwater in the Lower Gascoyne area comes from the River Bed Sands aquifer system and the Older Alluvium aquifer system. The Riverbed aquifer is only present along the banks and underneath the Gascoyne River channel. The Older Alluvial aquifer is present throughout the Lower Gascoyne River valley area, and also underlies the Riverbed aquifer.

Your licence will show that you are taking water from the Lower Gascoyne alluvial resource. This resource is from both the Riverbed and Older Alluvial aquifer. The department manages them together as one resource because they are hydraulically connected and recharged from the same source.

Q: Where does the groundwater that I use come from?
A: Depending on where your property is located along the river and where you take water from (using a bore, pump, or well) you may be accessing the River Bed Sands aquifer, the Older Alluvial aquifer or a combination of both. The fresh groundwater that you use is recharged from surface water when the Gascoyne River flows.

The Gascoyne River only flows after rainfall events (usually cyclonic) in the upper, outlying catchment, which then flow downstream. The amount of water that recharges each aquifer system depends on the height and duration of the river flow.

Q: Why does my water go salty when I over-pump it?
A: When you abstract groundwater you are using the freshwater that is stored in the sandy and gravel parts of the aquifer – known as the alluvial sands. If there is no river recharge event the amount of freshwater stored depletes over time. It is replaced by brackish or saline water from silty or clay parts of the aquifer system (alluvial silt and clay), or from adjoining aquifer systems, both underneath and alongside of the resource you are using.

The quality of water in the sand lens will improve once a freshwater recharge event occurs. If the aquifers are over abstracted, even temporarily, long term damage can occur. Without recharge, the water is not usable for irrigating many types of horticultural produce, given the soil types and low rainfall that we have in Carnarvon. This is why it is important to not take too much water from each individual bore and why water quality in Carnarvon is more constrained than in other parts of Australia.

Q: Why is my bore water salty and my neighbour’s bore water fresh?
A: Across the Lower Gascoyne area, the quality of water varies depending on where the water is taken from. Some properties will be able to access better water quality than others. This is a result of the way that the alluvial sediments were deposited over time, distributing the sand lens in pockets across the aquifers.
Q: How is the department improving our understanding of the resource?
A: The Lower Gascoyne area has a long history of groundwater monitoring and it is one of the most understood aquifer systems in Western Australia. We are confident in our conceptual understanding of groundwater in the Lower Gascoyne area and how it is modelled using the Gascoyne River Floodplain Aquifers Modelling System (GASFAMS). As more data becomes available, and new technologies for understanding groundwater evolve, we apply them to our management and understanding of the resource. This allows us to continually improve the precision of the groundwater model and redefine how much water is available for sustainable use.

Department of Water and Department of Agriculture and Food have several investigations and planning activities scheduled in Subarea B–L over the next three years. These investigations will help us to improve the precision of GASFAMS and the allocation limits for Subarea B L.

Q: Where can I find more information on groundwater and its availability?
A: For more information on groundwater and its availability you can contact the Department’ office in Carnarvon or visit our website: www.water.wa.gov.au/allocationplanning

Understanding your water licence

Q: If I have a licence for a certain volume of water can I take that full amount each year?
A: No. Your water licence is issued with an annual volume (entitlement) as well as percentage reliability. Your water licence provides the best security possible for your ongoing water access. However, all water licences in the Lower Gascoyne are issued with 80 per cent reliability. This reliability means that you can expect to access your full entitlement volume in 4 out of 5 years. This does not factor in the pumping restrictions that may apply to manage salinity levels.

Q: Why does my licence restrict how much I can pump each month and set a maximum salinity level?
A: All groundwater users need access to a long term, sustainable water supply. To manage the depletion of freshwater storage and prevent over-use of the resource the Lower Gascoyne water allocation plan sets out local licensing rules, including:

• 10 000 kL/month groundwater pumping restrictions which limit how much water can be taken for each licence in Subarea A

• licence conditions to restrict pumping if monitoring shows that the salinity levels, in the water samples from each bore, are above the maximum stated on the licence (around 1000 ppm salinity for Subarea A).

These licensing rules, others stated in the plan, and your licence conditions are designed to maintain the equitable use and distribution of water across the Lower Gascoyne area and ensure the water resources sustainability into the future.

Q: Why is my water use metered and monitored?
A: Your water use is metered to understand the impacts to the resource from use, over time, compared with how much storage is still available for use.

Groundwater level and salinity measurements collected by the department are used to model changes in the resource and manage individual licensees’ conditions. The modelling includes estimates of aquifer storage and water quality – known as salinity contour mapping – in Subarea A. This information is reported publicly and to the local water user groups through the Quarterly Aquifer Status Reports.
Q: If I use less than my licensed allocation will I lose my water?
A: Not necessarily. Water use and quality are the key measures of sustainable abstraction on the Lower Gascoyne, as per the allocation plan. If water quality is maintained consistently this indicates that the licence entitlement is sustainable and does not need to be reduced. If, over several years of monitoring, water quality declines significantly before the full entitlement is abstracted this indicates that entitlement may need to be reduced.

To accurately determine where water entitlements may need adjusting, we need to collect three years of metered water use data, under normal (not low) storage conditions. In 2013, we deferred the proposed 2014 review of licenced entitlements as a result of the last three years of variable recharge conditions. We may resume reducing entitlements to a sustainable amount in 2017, provided that normal storage and salinity conditions occur for the next three years.

Q: Why is the Lower Gascoyne alluvial resource over-allocated?
A: The way that groundwater was allocated to users has changed significantly over the last 20 years. Originally horticultural properties held a conjunctive allocation of 72,000 kilolitres from Subarea A and Subareas B-L. When the supply from Subareas B-L was privatised the conjunctive licence was removed and the entitlement attributed to Subarea A. As these changes to supply and management occurred, and our understanding of the resource improved, it was classified as over-allocated.

The strategies put in place in 2004 to identify inactive users, and where abstraction was no longer viable (salinity impacts), reduced the amount of over-allocation at that time.

Through the 2011 water allocation plan we are continuing to improve management of groundwater abstraction to minimise the impacts on the resource, while still maintaining supply. This includes identifying where water entitlements may need adjusting.

Q: When can I access water under an unrestricted pumping declaration?
A: We declare unrestricted pumping when there is a large river flow event and the River Bed Sands aquifer will be fully recharged. Unrestricted pumping is declared within 24 hours of a 2.3 metre river flow event being recorded at Nine Mile Bridge. The 2.3 metre flow ensures that all prolongations in Subarea A have surface water flowing over them. Once unrestricted pumping is declared, existing Subarea A licensees can access this water and usage will not be accounted against the licenced entitlement.

Q: How much of my water licence can I access if there is no river flow?
A: If there is no river flow for an extended period (over 18 months), or the freshwater storage of the aquifer is significantly depleted, the amount of water available for access generally lessens across Subarea A. If this event occurs the department declares a Low Aquifer Storage situation. All licensees are notified when low aquifer storage is declared and informed about what changes are made to water access.

Q: What is Low Aquifer Storage and what does it mean for how much water I can access?
A: Low aquifer storage (LAS) is defined by the volume of freshwater stored in the River Bed sands aquifer. The department sets trigger levels for determining when a low storage event occurs.

Triggers for a low storage event are set out in the Lower Gascoyne water allocation plan and were recently improved through the 2014 plan evaluation. These triggers were set in consultation with the Carnarvon Water Allocation Advisory Committee.

At times of low aquifer storage there is limited supplies of groundwater in Subarea A. Additional water to meet your supply needs can be accessed through the irrigation pipeline if it is available from Subarea B-L.
Q: Why has the department not declared an LAS event yet?
A: An LAS event is only declared when the triggers are reached. It is likely that this trigger will be reached if there is not a significant flow event between now and April 2015. Further detail on the aquifer status is available in the Gascoyne River quarterly aquifer status report for January 2015.

Understanding your water supply options

Q: What supply options are available to meet my water needs?
A: You can access groundwater and surface water to supply your water needs. This is dependent on your location, water availability and rainfall. Current water sources are:

- licensed pumping from the Lower Gascoyne alluvial resource – Subarea A
- irrigation pipeline water accessed through the Gascoyne Water Co-operative shares
- unrestricted pumping from the River Bed Sands during a large flow event
- Gascoyne River water through pumps located in post flow pools, under a surface water licence.

Q: What will happen if we don’t have a river flow this (2015) summer?
A: You will be informed if there will be a low aquifer storage event or if there are any changes to the volume of water that we can allocate for use. It is estimated that there will be 9.3 Gigalitres (GL) of water available for 2015 without a river flow. Of this, 6.2 GL will be sourced from the Water Corporation and Gascoyne Water Co-operative borefields, and there is an estimated 3.1 GL accessible in Subarea A.

The Minister for Water has requested all agencies work to determine if additional water can be provided to growers from the Gascoyne Water Co-operative’s northern borefield through infill drilling and/or extra volume from the Water Corporation’s southern borefield in 2015. These assessments will be provided to the Minister in mid-March 2015.

The Gascoyne Water Co-operative will make updated share announcements based on these assessments.

Q: How can I access more water to expand my business or improve my licence reliability?
A: The Lower Gascoyne water allocation plan sets out how water is allocated to licensees. If you would like to access more water than you are currently licensed for you may consider alternative solutions. This includes maximising your use of Gascoyne Water Cooperative shares, trading or leasing water from other licensees, capitalising on any unrestricted pumping declared and using surface water when it is present.

We recently improved the local licensing rules in Subarea A to facilitate better access to water under certain circumstances, to meet additional demands for more water. These changes are detailed in the 2014 plan evaluation statement, which will be available soon on the department’s website.
Q: Will water be available from the Gascoyne Foodbowl Initiative for supply to existing users?

A: The Department of Agriculture and Food is currently undertaking infill investigation drilling in the Gascoyne Water Cooperatives’ northern borefield. The Cooperative and the Department of Agriculture and Food will be in a position by Mid-March to inform Ministers’ of the probable volume of additional water located in, and directly adjoining, the Gascoyne Water Cooperative’s northern borefield.

Department of Agriculture and Food is committed to making all water accessed to supply the GFI project available for emergency use, if required. However, the long term goal is to extend the northern borefield to enable development of 400 ha of land to grow the Carnarvon economy.

If emergency supply is requested, to supplement the Gascoyne Water Cooperative’s irrigation system, the Minister for Agriculture and Food (with advice from the Ministers for Water and Regional Development) will need to approve its’ use. Any increase to supply through the Gascoyne Water Cooperative will need to be confirmed with appropriate price or access conditions.

Q: Can I trade water from other growers?

A: Yes. You may purchase more shares through the Gascoyne Water Cooperative or trade with other shareholders. There are also licensing rules outlined in the Lower Gascoyne water allocation plan that guide groundwater trading in Subarea A. Trading is generally restricted to piping traded water from an adjoining property.

Understanding your water future

Q: What is being done to manage current and future demand?

A: Groundwater resources in the Lower Gascoyne area are carefully managed to ensure that good water quality is maintained to meet seasonal water demands. The Lower Gascoyne water allocation plan sets out how the groundwater resource will be managed and made available to meet demand.

To meet demand in the medium to longer term, Government is investigating the potential supply of additional groundwater resources in the area (Gascoyne Foodbowl Initiative, Water for Food Middle Gascoyne water investigations) and working to ensure that there are efficient water supply systems to deliver water to where it is needed via Gascoyne Cooperatives Pipeline.
Q: What management changes has the Department made since releasing the 2011 plan?

A: Since releasing the plan in 2011 the Department of Water undertook annual evaluations against the plan. We evaluate against the plan so that useful adjustments to our management can be carried out as needed. A statement documenting the outcomes of the evaluations and any changes made to the plan are published every three years.

The most recent evaluation against the plan was undertaken during the first half of 2014. Through this evaluation the department made the following changes:

- deferred the implementation of the triennial water licence recouping program from 2014 until 2017;
- improved the triggers for when Low Aquifer Storage is declared to include both the quality and quantity of water stored; and
- adapted several local licensing rules.

The department worked with a broad range of stakeholder groups to make these changes. This included the Carnarvon Water Allocation Advisory Committee, Carnarvon Ministerial Advisory Committee, Low Aquifer Storage Working Group, grower industry groups, Water Corporation and the Minister for Water’s office.

All of the changes are designed to improve the flexibility around water licensing and to maximise use of the resource. The 2014 evaluation statement provides more detail on what the evaluation showed and how the department is adapted our management.

Q: Will the results of Gascoyne Foodbowl Initiative drilling and investigations change how much water is available through the plan?

A: The department will be using the results generated from the Department of Agriculture and Food’s drilling, and associated hydrogeological investigation work, to improve the precision of the allocation limits in Subarea B L. The outcomes of these activities will be implemented through licensing the new borefield and reported in the 2017 water allocation plan evaluation statement.

Some of the productive bores drilled under the Gascoyne Foodbowl Initiative provided additional infrastructure to supply temporary ‘relief water’ to support the Gascoyne Water Cooperative and irrigators during LAS conditions in 2012 and 2013. In the long term, it is expected that new water available through the Gascoyne Food Bowl Initiative will be set up to supply a new 400 ha irrigated horticulture land development.

Q: Will our supply be limited this year by infrastructure issues from the pipeline?

A: The Cooperative pipeline was able to provide water to all growers including peak demand periods during 2014. This was a significant improvement in 2013 where access to water was constrained for many growers. Through improved management and infrastructure upgrades, the supply reliability was improved. Further management and infrastructure improvements will be put in place over the next year or two, as the Carnarvon Ministerial Advisory Committee recommendations regarding infrastructure improvements are implemented. We expect the pipeline will equitably distribute allocated water to growers.
Q: What is the Carnarvon Ministerial Advisory Committee?
A: The Carnarvon Ministerial Advisory Committee was established in October 2013 to assess and provide recommendations on the short and long term management of the Carnarvon Irrigation District to the Minister for Water and the Minister for Agriculture and Food. The Committee, independently chaired by Dr Des Lord, has delivered two reports, a Short Term Response to the peak water demand prior to Christmas 2013, and the key findings for a Medium Term Review in September 2014. The Committee will deliver its final reports by April 2015. This includes an engineering review, pricing and economic study, co-operative due diligence and seasonal response plan.

Q: Are there going to be changes to the co-operatives following on from the Carnarvon Ministerial Advisory Committee findings?
A: Government will release its public response to the committee recommendations in mid-2015. Through consultation with growers we will look at the best solutions to improve the co-operatives – both how they are managed and how they supply water to growers.

Q: How can I get involved in water management decision making for Carnarvon?
A: There are a number of regulatory and advisory groups or committees active in the Carnarvon area that you can get involved in. They are the Carnarvon Water Allocation Advisory Committee, the Gascoyne Water Co-operative and the Gascoyne Water Asset Mutual Cooperative.

To find our information about these committees contact the Department of Water’s Carnarvon District Office or the Gascoyne Water Cooperative’s Office, or both organisations’ websites.