

# Carnarvon irrigation district water availability outlook - October 2015

## Summary

The average annual water demand over the last 10 years for irrigated horticulture is 10.6 GL/year. The predicted supply for 2016 is 12.4 GL.

If no river flows occur in 2016, groundwater availability is adequate to meet the projected demand for that year. By mid to late 2016, some Subarea A users will have diminished supplies and the bulk of their needs will be sourced from the scheme. As a result the northern and southern borefields will need to be carefully managed to ensure peak season demand for late 2016 can be met.

In the event of no flows in 2017 and 2018, Low Aquifer Storage will be declared and additional water will be released from the scheme borefields to meet increased scheme demand as per the *Lower Gascoyne water allocation plan (2011)*.

If no flows continue into 2019 and 2020, water availability will be constrained and seasonal shares may need to decrease. However, if the lands for the Gascoyne Food Bowl are not fully developed, this borefield could supplement supply.

The five year seasonal forecast is summarised in the following table.

**Table 1**  
Predicted water availability for a five year no flow period

Year	Subarea A (GL)	Subarea B-L Predicted Seasonal Share Announcement
2016	4.18	100%
2017	3	100%
2018	2.0	100%
2019	2.0	80-100%
2020	< 1.5	60-80%

Based on the historical flow data there is a 99 per cent probability of having a significant flow before 2019 when reductions in seasonal share could be triggered.

# Background

The Carnarvon Ministerial Advisory Committee recommended that medium-term outlooks are generated annually to inform growers and water service providers on current, short-term and medium-term water availability.

The seasonal outlook for 2015 was guided by the Borefield Managers Group, which has representatives from the Water Corporation, Department of Water, Gascoyne Water Cooperative, Gascoyne Water Asset Mutual Cooperative, Department of Agriculture and Food, and growers. Initially formed in April 2014 as a continuation of the Low Aquifer Storage Working Group, its' role is to ensure short- and medium-term water supply security for horticultural users.

The *Lower Gascoyne water allocation plan* (2011) defines the available allocations and surety of supply under different seasonal conditions. Actual supply is a mix of Subarea A and B-L, with growers often using their Subarea A supplies and then relying on the scheme, and that overall abstraction is less than the licensed entitlements.

## Forward projections

### Annual demand

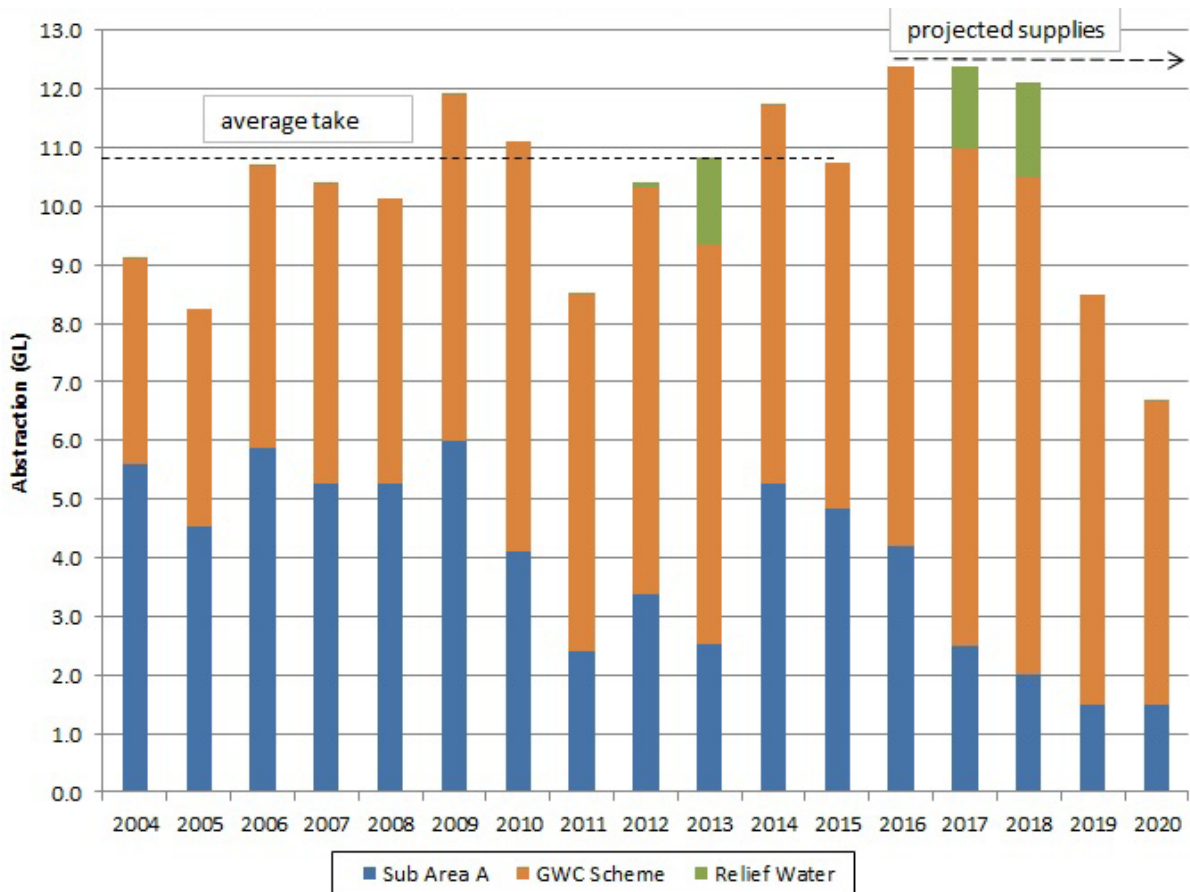
Average historical take has been 10.6 GL/year over the last 10 years, with an increasing trend (see Figure 1). The predicted supply for 2016 is 12.4 GL. An increase in supply and demand will occur when the land is released through the Gascoyne Food Bowl Initiative.

### Water availability

The aquifer status report for October 2015 identifies that groundwater availability is high in all aquifers and subareas from effective recharge in 2015. This provides a high level of confidence that supplies will be able to be maintained in 2016 without flows.

In the event of no flows by early 2017, there will be diminished supplies from Subarea A, requiring low aquifer storage to be implemented for 2017 and 2018.

If no flows continue into 2019 and 2020, water availability may become constrained and seasonal shares may need to decrease. However, if the lands for the Gascoyne Food Bowl are not fully developed, this borefield could be used to avoid, or offset, seasonal reductions in shares.



\*Projected supplies for 2017–2020 doesn't include the Gascoyne Food Bowl Initiative borefield.

Figure 1 Usage history and projected availability for 2016–2020\*

### Supply capacity

The cooperative has issued shares totalling 8.5 GL/year. The current combined Gascoyne Water and Water Corporation licensed entitlement is 7.8 GL/year. However, this can be increased to 8.6 GL/year when Gascoyne Water demonstrate that they have the infrastructure capacity to take an additional 0.8GL from the northern borefield. With a predicted abstraction of 4.2 GL from Subarea A in 2016, a total of 12.4GL will be available from across the irrigation area.

### Peak demand (September–December)

Presuming no river flow in 2016 there will be an increased reliance on scheme water in later half of 2016 resulting in elevated demand over the 2016 peak season with average scheme demand about 1 GL/month or (33 ML/day) (see Appendix 1). Careful planning of peaking capacity and demand management will be required. The Borefield Managers Group will produce a 'Peak Demand Response Plan' by 31 August to address these supply and demand issues.

Implementation of demand management strategies will require clear communication to users. Communications must be structured to ensure the need is transparent and the methods are timely and equitable.

## Gascoyne Food Bowl Initiative

The Gascoyne Food Bowl Initiative aims to increase horticultural production through developing an additional 400 hectares, matched with a 4 GL/year water supply.

Land release will commence in 2016. For planning purposes it is presumed that water will be required in low volumes in 2017, ramping up to full production in 2020. However this schedule is dependent on a range of factors and may not be realised. As a result if an extended no flow period occurred, unallocated water could be temporarily used to supplement existing growers. Conversely, if the new lands are in full production by 2020 they would be subject to whole of industry changes in seasonal allocations. This issue will be considered in further detail in the water availability outlook for 2016.

### Probability of an extended drought period

Based on available records the Gascoyne River has a high-flow reliability. Only on two occasions, one hundred years apart, has there been four years between significant flows. Table 2 below shows that while there is a moderate chance of having a two year no flow period, the probability of three, four and five years of no flows is extremely low.

Table 2

#### Probability of extended no flow periods

Year	Years since river flow event	Probability
2016	1	30%
2017	2	9%
2018	3	3%
2019	4	0.8%
2020	5	0.2%

Based on the available data there is an 99 per cent probability of having a significant flow before 2019, when reductions in seasonal shares may be required. Further still, the probability of having a four year no river flow period is less than 1 per cent.

## Conclusions

- 100 per cent Gascoyne Water Cooperative seasonal shares are recommended for 2016.
- Subarea A supply will diminish in late 2016.
- Plans for the management elevated peak capacity demand must be in place by August 2016. Low Aquifer Storage response will be triggered in early to mid-2017 and 2018 if no flows are experienced for the next three years.
- Provision of Low Aquifer Storage water will allow the district water budget to be maintained above the historical average until the end of 2018.
- The probability of having a four year no river flow period that triggers a reductions in allocations in 2019 is less than 1 per cent.

# Appendix 1

2016 monthly supply projections (kilolitres)

