

Isisford

regional water supply security assessment



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Introduction

The town of Isisford is located next to the Barcoo River, approximately 100 km south of Longreach.

The main industries in the region are cattle and sheep production, and tourism. Based on projections provided by the Queensland Government Statistician's Office, it is estimated that Isisford's population is around 120 people (as at June 2019), and the population is predicted to remain relatively stable. However when climate conditions are more favourable for agricultural productivity, Isisford can experience an influx of additional workers and their families, which can significantly boost the town's population.

Safe, secure and reliable water is an essential resource for Isisford, not only providing for the health and wellbeing of the community, but also providing opportunities for economic and community development, and supporting tourism. Longreach Regional Council (Council) is the registered water service provider for Isisford's urban water supply system.

The Queensland Government, through the Department of Regional Development, Manufacturing and Water (DRDMW), and Council worked together to investigate and establish a shared understanding of the existing security of Isisford's urban water supply system and its capacity to support current demands and future growth. Arising from this partnership, this regional water supply security assessment (RWSSA) provides valuable information to the community and water supply planners about Isisford's urban water supply security, thereby providing a foundation for future water supply management by Council.

The assessment shows that Isisford's water supply, drawn from the weir on the Barcoo River, is able to meet Isisford's current and projected urban water requirements until at least 2041 with a moderate degree of reliability—however, at current and projected future demands the system may be at risk of falling to low water levels during extended periods of severe drought, with the potential for water supply shortfalls occurring, even with water restrictions being imposed.

The information presented in this RWSSA is based on the capacity of the existing water supply system and associated infrastructure.

Water supply sources

Isisford's primary water supply source is a weir on the Barcoo River.

The Barcoo River is within the Cooper Creek water plan area (Figure 1) and Longreach Regional Council owns the weir on the river at Isisford as shown in Figure 2. The 190 megalitre (ML) storage of the weir has a catchment area of approximately 35 000 km², which extends about 200 km northeast of Isisford. Located on the right bank just north of Isisford is a 257 ML off-stream dam where water is stored that has been extracted from the weir. Council hold a water licence to extract up to 100 ML per annum (ML/a) with a daily volumetric limit of 0.64 ML, for town water supply from the weir.



Figure 1: Cooper Creek Water Plan area

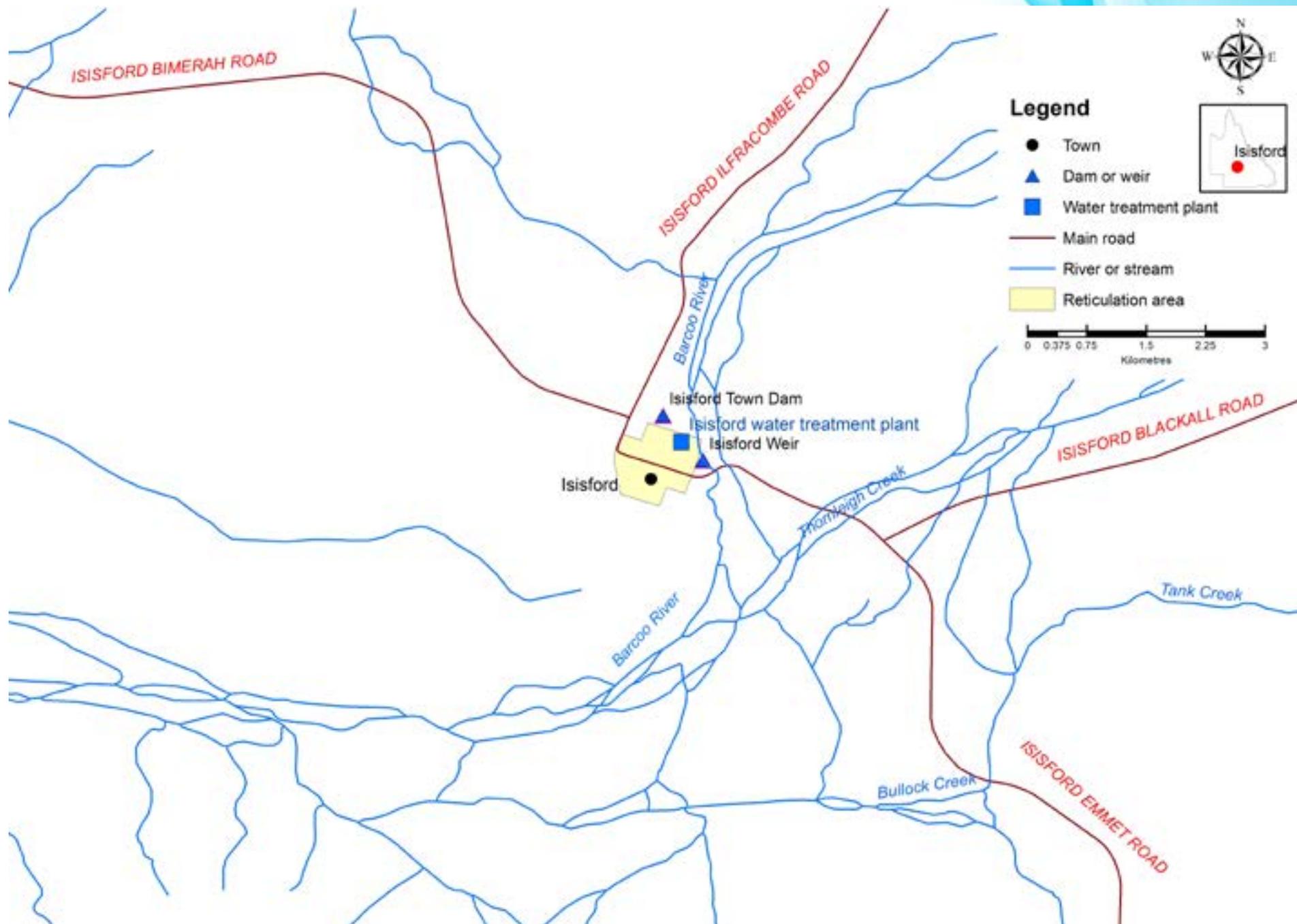


Figure 2: Location of Isisford and Council's associated water storage facilities.

Council does not operate a sewage treatment plant in Isisford and does not provide recycled water.

Water users and water demand

Isisford's reticulation networks extend throughout the developed area of the town and supplies water to about 120 people (as at June 2019).

Isisford's reticulation networks

Information reported by Council in the Statewide Water Information Management database shows that the total volume of water sourced by Council for the potable water reticulation network over the five years from 2013–14 to 2017–18 averaged 63 ML/a (ranging from around 40 ML/a to the entitlement limit of 100 ML/a). Over this five year period Council has also sourced an average of approximately 60 ML/a from the Barcoo River to supply non-potable (i.e. raw) water for use by Council and the community for irrigating parks and gardens.

Based on the total volume of water sourced for potable water supply and the serviced population for each year, the average total water demand during this period was approximately 1400 litres per capita per day (L/c/d), ranging from 900 L/c/d to 2100 L/c/d. This figure accounts for residential, and non-residential (commercial, municipal and industrial) water supplied from the potable water reticulation network, plus unmetered use and any system losses. It also includes water use by the transient population, such as tourists. Water use by the transient population is mostly accounted for under the category of commercial use; however, the transient population is not included in the serviced population figures.

The average residential potable water use for this period was approximately 765 litres per person per day (L/p/d). Non-residential potable water use for this period was approximately 145 L/p/d (or about 10% of Isisford's total potable water consumption, ranging from about 6–15%). This indicates the non-revenue potable water equates to approximately 490 L/c/d over the five year period.

In an effort to reduce water consumption and extend the duration of the available water supply during extended dry periods, Council has established a water restriction regime for Isisford based on the water levels (and storage volumes) in the weir. The water restrictions primarily target outdoor water uses including watering of gardens, washing cars, hosing or washing paved or concreted areas, and swimming pool use.

Table 1 shows the water levels in the off-stream dam near the weir at Isisford that trigger the various water restrictions, and the corresponding targeted urban demand levels.

Table 1: Isisford's water restriction levels

Restriction Level	Off-stream dam gauge level (m)	Percent of full demand	Targeted residential potable water demand* (L/p/d)
Level 1	Above 8	100.0 %	765
Level 2	8–6	80 %	612
Level 3	6–4	63.3 %	484
Level 4	4–2	43.3 %	331
Level 5	2–0	26.6 %	203

Note: Trigger levels and targeted reductions are subject to review and amendment as determined by Longreach Regional Council from time to time. Further details on water restriction rules are available on Council's website.

* Based on the current average residential potable water demand of 765 L/p/d.

Water demand affected by climate variations

Urban water demand varies between years and within each year, depending on various factors including climatic conditions such as rainfall, with higher demand usually occurring during hotter, drier periods. However, during extended dry periods water levels in the weir may become low and, as a result of water restrictions being applied, water use may be lower than it would otherwise have been.

The period for which water use records are available for Isisford was drier than the historic period (average rainfall was 28% lower—refer to Table 2). The town's water demand has generally been higher in years with lower rainfall (refer to Figure 3). Therefore it is probable that the water demand was higher over the drier 2013–14 to 2017–18 period compared to the long term.

Table 2: Summary rainfall statistics for Isisford

Rainfall Station No: 36026 Isisford Post Office	Annual rainfall (mm)			
	Lowest	Average	Median	Highest
1885 to 2018	118	450	401	1309
1986 to 2005	118	451	406	873
2013–14 to 2017–18	237	324	298	431

Note: 1986–2005 denotes the climate change reference period

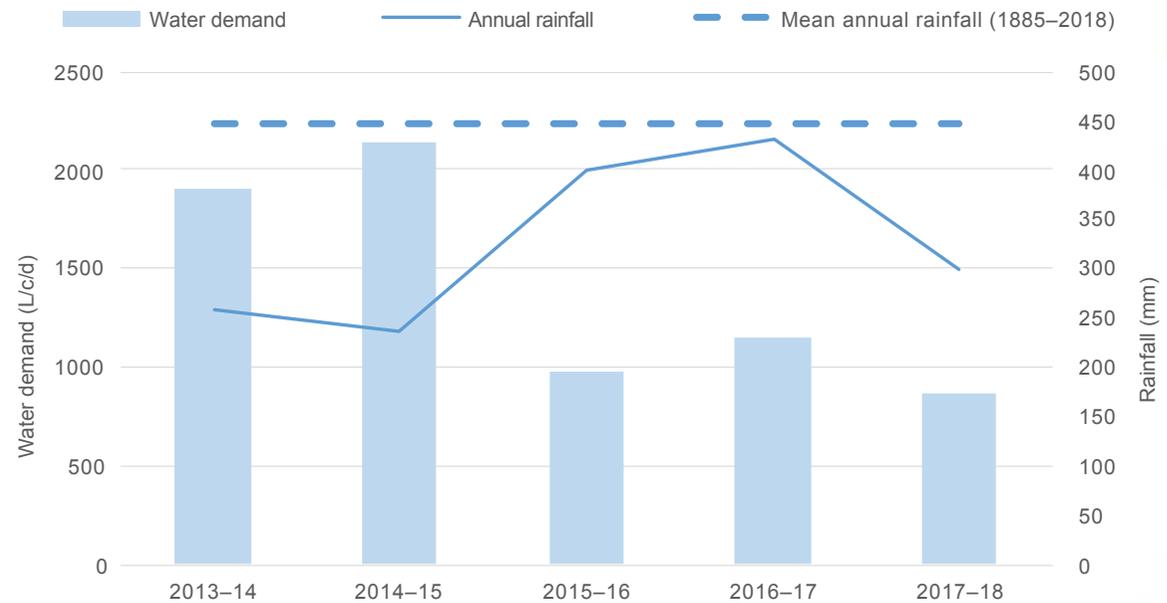


Figure 3: Annual rainfall and total potable water demand (Based on rainfall records at Isisford (Station 36026 Isisford Post Office) for the period 2013–14 to 2017–18).



Other users of the bulk water supply sources

Agriculture

The key agricultural industries in the Isisford region are cattle and sheep production. Between Council's point of take and the streamflow gauging station in Blackall approximately 150 km upstream, there are an additional four water entitlements on the Barcoo River (for stock and domestic purposes). These entitlements have annual volumetric limits totaling 52.5 ML, however due to their distance upstream and the potential flows in the Barcoo River they are unlikely to impact Isisford's weir replenishment. These entitlements equate to approximately half of Council's entitlement. Between Council's point of take and the streamflow gauging station at Retreat approximately 200 km downstream there are an additional four water entitlements on the Barcoo River. These entitlements have a combined annual volumetric limit of 73 ML with permitted uses including stock, domestic and irrigation.

Industry

There is no significant industrial water demand on Isisford's water supply source from outside of Isisford's urban area. The main industries within Isisford's urban area are associated with agribusiness, construction, transport, and tourism. The water use by these businesses is accounted for within the total water demand figures for the networks, generally under the category of 'non-residential' water use.

Future water demand

An understanding of likely and possible changes in water demand in the future is required for effective water supply planning.

Council and DRDMW agreed on key assumptions, such as population and associated water use, in developing a projection of Isisford's future water demand. The projections will remain subject to ongoing monitoring of actual population growth and variations in water use trends (e.g. changes in water use practices may increase or decrease consumption).

Isisford's reticulation networks

For the purpose of this assessment it is assumed that over the next 20 years (to around 2041) the population of Isisford remains around 120 people.

Based on Isisford's average daily water demand of approximately 1400 L/c/d over the five year period from 2013–14 to 2017–18, with a future population of around 120 people Isisford's average future potable water demand would be around 60 ML/a. With the average non-potable water demand also being about 60 ML/a, the total water requirement is around 120 ML/a from the town's weir on the Barcoo River

It is important to note that this projection represents average demand rather than high demand, and average demand levels may often be exceeded (e.g. during hotter dry periods of greater than 12 months duration when the quantity of total water sourced for supplying both the potable and non-potable networks has been in excess of 120 ML/a). However, the use of average demand figures provides a means of directly comparing future demand

projections to determine when demand is likely to exceed available supply. For planning purposes, this also means an appropriate balance can be reached between the cost of water supply and the demand for available water. These demand projections are based on historical demands during a period of relatively dry climatic conditions, and are therefore conservatively represent demands during the drier conditions projected for the future.

Other users of the bulk water supply sources

Agriculture

Future development in the Isisford area may result from some increase in in-stream storage capacity for which there is an upper limit of 1625 ML, with the volume of unallocated water reserves being 2200 ML in the Thomson-Barcoo subcatchment under the Water Plan (Cooper Creek) 2011. This upper limit of water reserves is made up of four components which include: Town Water Supply, State, General and Indigenous Reserves with the volumes for each being 500, 1300, 200 and 200 ML/a respectively. Should development occur upstream of Isisford there is the potential for it to impact Isisford's future urban water security. For the purposes of this RWSSA, this has been assumed not to occur, i.e. it has been assumed that agriculture will continue to not impact availability of urban water supply.

Industry

Industry in Isisford is primarily associated with its role as a support centre for the local area, as well as tourism. The water use by these businesses is accounted for within the total water demand figures for the network, generally under the category of 'non-residential' water use.

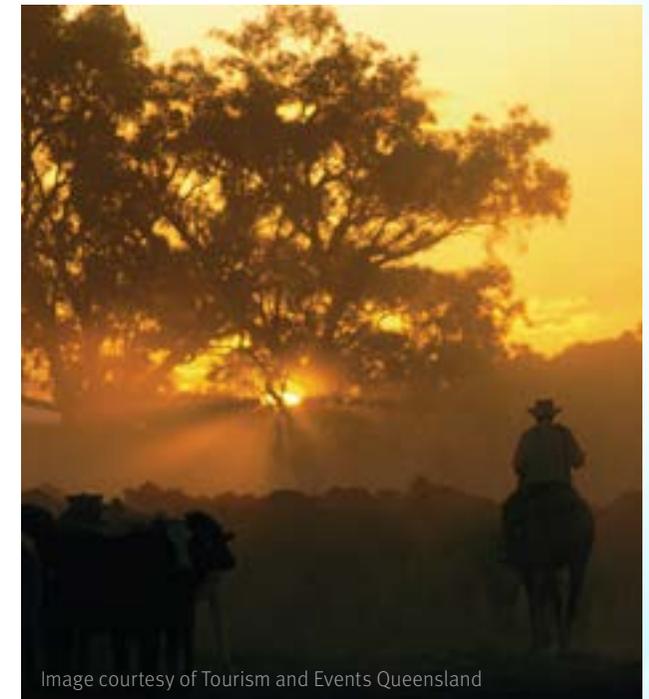


Image courtesy of Tourism and Events Queensland



Water supply system capability

An assessment has been undertaken to identify the capability of Isisford's existing bulk water supply system to meet current and projected future water demands.

Assessment of Isisford's water supply system

The Barcoo River generally only flows on a seasonal basis. Flows are often very significant when they do occur, and can result in flooding. With minimal extraction from the Barcoo River upstream of Isisford, annual flows as measured at the Blackall gauging station (003303A) indicate the weir at Isisford would potentially be filled near annually.

Figure 4, below, shows the monthly streamflow at the gauging station at Blackall, located about 150 km upstream of Isisford. These streamflow records indicate that longer periods of reduced flow have recently occurred with average streamflow across the three years from 2013 to 2015 being the lowest since gaugings began around 1970, with the annual flow for 2013 amounting to only 17 ML.

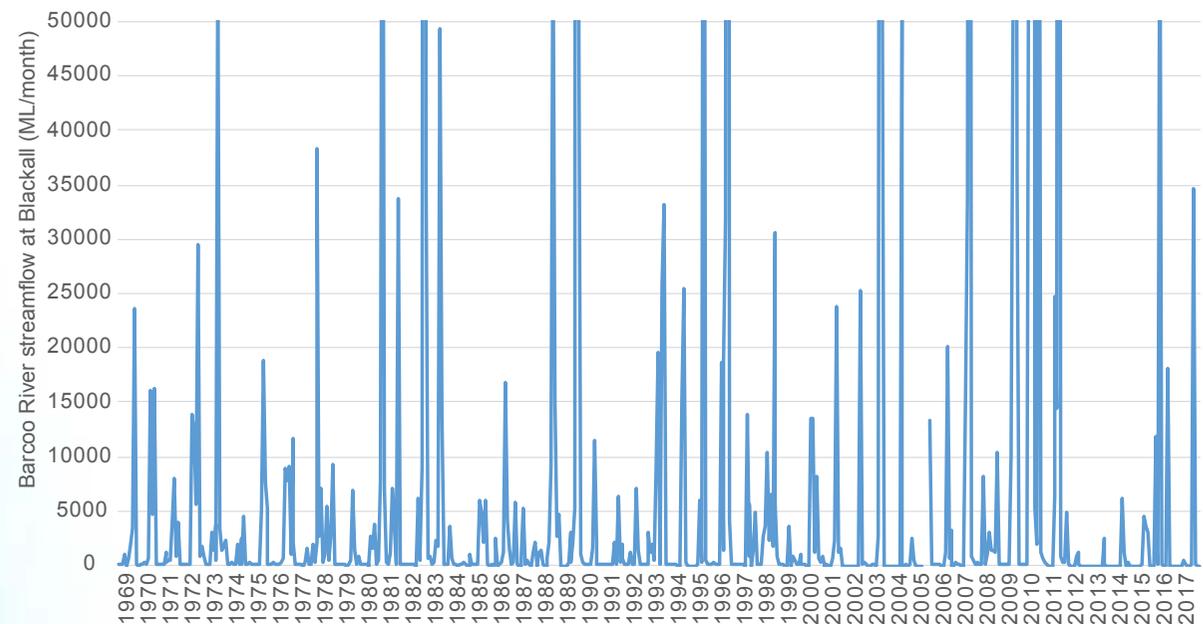


Figure 4: Streamflow from 1970 to 2018 at Blackall 150km upstream of the weir at Isisford.

There is no gauging station at Isisford Weir and there is limited available data on water extraction from the weir, so detailed analysis of water security is not possible at this stage.

Frequency of water supply shortfalls

For this assessment, Isisford is considered to have experienced a water supply shortfall when its water supply system (the storage of the weir and the off-stream dam) is unable to meet the water demands placed on the system by Isisford's community. This could, for example, occur as a result of the weir reaching minimum operating volume due to severe or extended drought, or as a result of the demand on the available supply source exceeding the entitlement volume, both of which have occurred in recent years. During such events Council has carted water from the reliable Oma waterhole located 15 km downstream to supply the town (this water hole is used as a contingency supply for the town). Level 2 restrictions and above have occurred for durations of up to eight months each year since 2015.

Climate change

The Queensland Government provides climate change projections¹ for Queensland local government areas (LGAs), which are referenced against the historical period 1986–2005 for temperature, evaporation and rainfall (among other climatic variables). The climate change projections are reviewed and revised as new data and improved methodologies become available.

In general, Queensland's future climate is projected to be warmer and drier, with increased evaporation and a potential increase in the annual and inter-annual variability. These same trends are also projected for the Longreach LGA. Additionally, under an unchanged greenhouse gas emission scenario, the projected climatic changes for Isisford indicate that by 2050 seasonal variations may include:

- slightly wetter summers, with drier winter, autumn, and spring (the median projection is for 3.6% reduction in annual rainfall)
- warmer temperatures for each season (average, minimum, and maximum), and
- higher evaporation rates for each season (the median projection is for 17% increased evaporation).

Importantly, one of the key elements of nearly all climate change projections is a change to extreme events—in terms of both frequency and magnitude. This suggests that major events, such as droughts and flooding, may become more extreme. The possibility of more extreme and longer-duration droughts than have previously been recorded for Queensland poses a unique challenge for water service providers, and highlights the need for long-term water supply planning processes to be adopted, implemented, and regularly reviewed.

As shown in Table 2, while the climate change reference period was consistent with historical long term rainfall, the period for which water use records are available was drier on average. Isisford's average water demands over the drier recent period may therefore be reflective of water demands during the drier conditions projected for the future. Potential impacts include limitations to

water supply availability and increased water demand within the region. Further, an increase in the annual and inter-annual climatic variability may result in longer dry periods, consequently increasing the duration of higher demand periods.

Water supply system capability outcomes

Isisford's future potable water demand is anticipated to be on average 60 ML/a across the period to 2041. The assessment showed that the weir and off-stream dam are usually able to meet Isisford's urban water requirements, with the use of water restrictions. However, the system is at moderate risk of falling to very low water levels during extended periods of severe drought, with the potential for water supply shortfalls occurring, even with water restrictions being imposed. As the contingency supply the Oma waterhole helps to offset this risk.

Council have suggested that the non-potable supply might cease in the future, which could result in an increased demand on the potable water supply. To further improve the water supply security position of Isisford, Council should investigate permanent access to the Oma waterhole, rather than relying on carting, and consider undertaking reticulation leakage investigations and demand management measures.

¹ <https://app.longpaddock.qld.gov.au/dashboard/#responseTab1>

Moving forward

This regional water supply security assessment represents a collaborative approach between the Queensland Government and Longreach Regional Council to establish a shared understanding of the existing security of Isisford's water supply and its capacity to support future growth.

Longreach Regional Council recognises that a secure and reliable water supply is essential for supporting Isisford's current and future population, as well as local businesses, industry and tourism. Council is committed to undertaking the steps required to achieve this outcome for the community, and is planning for the long-term water supply needs of the community.

Council has worked closely with the Queensland Government to collate data from historical records, to better ascertain the potential water supply security risks that council and the community currently face.

Council will continue to proactively investigate, develop and implement solutions to maintain water supply security for the Isisford community, including:

- Replacing the deteriorated Isisford Weir (as soon as possible)
- Constructing a pipeline from the Oma waterhole (by 2025)
- Continuing and improving work to monitor, detect and reduce water losses within the town's supply network
- Demand management through optimisation of the reticulation system and community education on water saving measures

Council acknowledges that it has an important role to play in educating the community regarding water conservation and ensuring that the available water resources are effectively managed. Council will work with the community to identify an appropriate level of service for water supply security in Isisford, which will involve balancing an acceptable level of water availability with the lifestyle and expectations of residents. The viability of any water supply option will, among other things, consider the economic, environmental, hydrologic and community outcomes, as well as statutory requirements.

By continuing to pursue an appropriate level of water supply security for Isisford, Council is working to ensure that the right environment exists for the community, businesses, industry and tourism to continue to thrive in Isisford.



For more information on the Regional Water
Supply Security Assessment program please visit

business.qld.gov.au