

**LONGREACH REGIONAL
COUNCIL**

96A Eagle Street
LONGREACH QLD 4730



**Registered Water Service
Provider No. 488**

**WATER CONSERVATION
&
DROUGHT MANAGEMENT PLAN**

Revision N^o. 6

Date: 10 December 2015

Prepared by John Roworth, Longreach Regional Council in consultation with George Bourne & Associates
Title Director of Infrastructure Services, Longreach Regional Council
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1	15 April 2009	John Roworth	Director of Infrastructure Services	Amendments to GBA draft for review by Council
2	21 May 2009	John Roworth	Director of Infrastructure Services	Minor amendments. Adopted by Council.
3	15 June 2010	John Roworth	Director of Infrastructure Services	Longreach Bore Water based on Council resolution in May 2009 Minor amendments as per DERM requests
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Longreach Water & Sewerage Supervisor	Electronic	
Ilfracombe Works Supervisor	Electronic	
Isisford Works Supervisor	Electronic	
Department of Environment and Resource Management	Electronic	
George Bourne & Associates	Electronic	

**CERTIFICATION OF
WATER CONSERVATION & DROUGHT MANAGEMENT PLAN**

Council Name: Longreach Regional Council

Service Provider Registered Number: 488

The attached document has been prepared as the Water Conservation & Drought Management Plan for Longreach Regional Council.

I certify that this Water Conservation & Drought Management Plan is appropriate for the infrastructure and the registered services of Longreach Regional Council and has been formally adopted by Council resolution N^o. 2009-05-252.

In determining the appropriateness of the Water Conservation & Drought Management Plan, I have taken the following matters into account:

1. The Water Conservation & Drought Management Plan complies with, and addresses, all requirements of Chapter 2 – Part 4 of the Water Supply (Safety & Reliability) Act 2008 and the Guidelines for the Preparation of a Water Conservation & Drought Management Plan; and
2. That the proposed financial arrangements put in place by the Longreach Regional Council should be sufficient/adequate to implement the Water Conservation & Drought Management Plan as presented; and
3. That the strategies, processes, procedures and actions in this plan will minimise the economic and social impacts on our customers.

This Drought Management Plan is accurate and appropriate for the townships of Longreach Regional Council.

Certified by: **Ian Bodill**
Chief Executive Officer
Longreach Regional Council

.....
(Signature)

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1 INTRODUCTION

Drought is a natural climatic condition that has occurred many times in the past and will occur again in the future. The purpose of Longreach Regional Council's Water Conservation and Drought Management plan is to provide a management strategy of appropriate responses to drought conditions in the event available water is drastically reduced.

To ensure an adequate water supply for the Council's water users, the Water Conservation & Drought Management Plan establishes the criteria for action at each stage of water supply reduction. The plan aims to minimise negative impact on water users and the economy. Water demand reduction includes all measures taken by the Longreach Regional Council to reduce the use of potable water in response to drought.

This document demonstrates Council's commitment to sustainable water management as well as constituting its Drought Management Plan for the purposes of complying with Chapter 2 of the Water Supply (Safety & Reliability) Act 2008. It includes water saving initiatives that will allow our community to achieve permanent water efficiency savings.

The "Operation Plan - Longreach Town Weirs" is included in Appendix H. This plan is intended for all other users of the Longreach's Town water source (ie the weirs on the Thompson River and the Thompson River itself). The plan is provided mainly for information purposes as it details the trigger points for all users of the water source.

The AACC Water Efficiency Management Plan is also included in Appendix I to provide information regarding the Agricultural Colleges direction for reducing their consumption.

2 POLICY STATEMENT

The Longreach Regional Council regards the long-term sustainability of our water resources as an issue of primary importance, requiring continual monitoring.

Council has set the following targets for per capita consumption and is committed to achieving these targets to ensure future generations have a cost effective, sustainable water supply system.

Based on historical analysis "dry" years, when water restrictions are implemented, have approximately 10% higher water consumption than other years. This can be seen in the difference in Raw Water usage in 2011-2012 (1,835.9ML) to 2013-2014 (2,015.4ML). For this Drought management plan dry years have been considered and the target water consumption is based on dry conditions.

Please find below a table summarising water usage in all townships over the past 5 years.

Scheme Name	Raw Water Usage 2010-2011 (l/p/d)	Raw Water Usage 2011-2012 (l/p/d)	Raw Water Usage 2012-2013 (l/p/d)	Raw Water Usage 2013-2014 (l/p/d)	Raw Water Usage 2014-2015 (l/p/d)
Longreach River Water Supply	1033	1290	1471	1453	1495 ¹
Ilfracombe River Water Supply	730 ²	810	995	1546	1155
Isisford River Water Supply	2445	1990	2168	2573	2952
Yaraka River & Bore Water Supply	776	1907	2562	3982	4096

¹This is the usage from March 2014 to February 2015.

²This value is based on estimated consumption and population.

3 PURPOSE

The purpose of this strategy is to:

1. Provide contingency plans to ensure that appropriate management resources are available to continue delivering an adequate, safe and reliable supply of high quality water to all customers.
2. Define the conditions under which water restrictions will be implemented and recommend a programmed response for each stage which would most effectively reduce water consumption to the available supply with the least adverse impact.
3. Identify strategies which will motivate the community to reduce normal water consumption.
4. To identify other water sources and actions that Council will consider during periods of extreme drought to maintain essential water services sufficient to ensure minimum health requirements; and
5. To comply with Water Supply (Safety & Reliability) Act 2008.

4 SERVICES & SYSTEMS OVERVIEW

4.1 Projected Demand

Longreach Regional Council includes the towns of Longreach, Ilfracombe, Isisford and Yaraka. The populations for the purpose of this report for the towns are deemed to be 3,800, 220, 130 and 15 people respectively.

Table 4.1 summarises the types of services provided by Longreach Regional Council to which this Drought Management Plan applies.

Table 4.1: Projected Demand

Scheme Name	Water Demand ML/annum				
	Current (2014)	5 years (2019)	10 years (2024)	15 years (2029)	20 years (2034)
Longreach River Water	2,015	2,065	2,116	2,166	2,217
Longreach Bore Water	0.02	0.02	0.02	0.02	0.02
Ilfracombe River Water	125	128	131	134	138
Ilfracombe Bore water	0.05	0.05	0.05	0.05	0.05
Isisford River Water	122	122	122	122	122
Yaraka River Water	25	25	25	25	25
Yaraka Bore Water	7.5	7.5	7.5	7.5	7.5

Note: The figures above show no reduction in consumption per capita, note that in 2034 that we are projecting to exceed our allocation from DNR&M. The projected demand for Longreach, Ilfracombe, Isisford and Yaraka assumes 0.5%, 0.5%, 0.0% and 0.0% population growth per year respectively.

4.2 Infrastructure Details

Tables below outline the infrastructure used for water supply.

Table 4.2.1: Summary of Water Supply Infrastructure for Longreach

	Longreach River Water	
	Name	Capacity
Source Facility Thomson River	Goodberry Hills Weirs	1,090ML
	Bimbah Weirs	1,650ML
	Fairmount Weirs	3,930ML
	Town Weirs	3,231ML
Treatment Plant Description	Longreach Water Treatment Plant	126 l/s
Source Facility	Wonga Street Bore – RN384	5.10 l/s free flow & 41.5m static pressure
	Water Treatment Plant Bore - NR146269	3.5 l/s free flow & 25m static pressure

Table 4.2.3: Summary of Water Supply Infrastructure for Ilfracombe

	Ilfracombe River Water	
	Name	Capacity
Source Facility	Murray/Macmillan Dam	369 ML
	Shannon Dam	93 ML
Treatment Plant	Ilfracombe Water Treatment Plant.	12.5 l/s
Source Facility	Town Bore – RN371	8.5 l/s free flow & 16.8m static pressure

Table 4.2.5: Summary of Water Supply Infrastructure for Isisford

	Isisford River Water	
	Name	Capacity
Source Facility Barcoo River	Off-stream Dam	267 ML
	Water Hole formed by Concrete Weir	190 ML
Treatment Plant	Isisford Treatment Plant	11 l/s

Table 4.2.6: Summary of River Water Supply Infrastructure for Yaraka

Scheme Name No.4A	Yaraka River Water supply	
	Name	Capacity
Source Facility Tributary of Kiama Creek	Earth Dams	59 ML
		45 ML
Treatment Plant	Yaraka Water Treatment (Plant was recommissioned in 2010)	1 l/s
Source Facility	Town Bore - RN 118167	0.63 l/s free flow & 0m static pressure

Please refer to the Water Asset Management Plan for the schematics of all Schemes listed above.

4.3 Water Sources Assessment

Please refer to the Water Supply Asset Management Plan for a list of previous reports / Assessments that have been commissioned by Longreach Regional Council and the former Longreach / Ilfracombe/ Isisford Shire Councils. The reports may not have been specifically commissioned to assess the Water source of each scheme; however all of the reports contain relevant information with respect to sources of water for the schemes.

4.3.1 Water Sources Assessment for Longreach

4.3.1.1 Current Water Sources of Longreach

River water

The primary source of water for Longreach is the Thomson River. The river flow is intermittent and water is stored in a system of weirs as stated in Table 4.2.1.

The Town Weir, 3km northwest of the water treatment plant, is the main weir. It contains the raw water pumps which deliver water to the treatment plant. As the water level in the Town Weir falls, it is supplemented by releases from the three weirs upstream:-

- Goodberry Hills, 48km upstream
- Bimbah, 24km upstream and
- Fairmount, 5km upstream

Currently, the allowance in Council's extraction license permits up to 2,200 ML/year from the Thompson River system. The current capacity of the weirs is approximately 10,000 ML. The effective capacity of the Longreach scheme has been back calculated from the time typically spent in lever 0 restrictions. These calculations are presented in the Drought Management Plan Calculations Report.

For the purpose of this report an effective capacity of Longreach's supply has been simplified to allow for an effective capacity of 4054ML has been adopted. This is to take into account the losses due to evaporation, ground infiltration, private irrigators and water that is unable to be pumped (dead water). Please refer to section 4.5.1 for details.

Based on the current water consumption of 2015 ML/year and considering the expected losses from evaporation the Thomson River system is expected to sustain 12 to 16 months of no flow conditions without enforcing water restrictions. It can sustain 20 months if water restrictions are enforced. (Refer to section 4.5.1 below for details). The raw water pumps located at the Thomson River main weir deliver water to the WTP at an average flow rate of 126 L/s. The plant at times of high demand operates 24 hours a day, and during low demand period can operate only a few hours a day. The treatment plant capacity is approximately 11 ML/d. The average usage is approximately 5.5 ML/d.

Bore Water

Currently the bore system is a non-potable water supply from two bores as stated in Table 4.2.1. The allowance in Councils' extraction license permits up to 800 ML/year. Based on the current capacity of the bores, the bores can yield approximately 280 ML/year.

Rain Water Tanks

Longreach residents currently use rain water tanks for mainly drinking water. In a survey performed for the report, approximately 90% of the 293 residences completing the survey have rainwater tanks. Refer to the Worley Parsons report (Water Supply Assessment – Bore Water Viability Study dated December 2008) for details.

4.3.1.2 Future Sources of Longreach

Construction of a New Weir

Building an additional weir is currently not an option due to current legislation.

Raising the existing weir could be an option and is to be investigated by Council Officers.

However if it were legally an option there are several factors that also make it unviable. It is assumed that DNR&M would not encourage this option if there are other means of increasing supply or reducing demand which generates less environmental stress.

Additionally, the cost of constructing a new weir with associated pumping and pipe work is expected to be in the range of \$3 to \$5 million (cost is dependent on river conditions). Therefore it is not expected to have a financial advantage when comparing capital cost of additional river water supply with other source of additional water supply such as bore water.

There may be an associated reduced cost in maintaining the weir when compared to the bore scheme; however it is believed that it would be unlikely that EPA would grant additional yield allowance from the river, therefore an additional weir may not guarantee additional allowable yield.

Using treated effluent, grey water or stormwater for Irrigation

Some of the reports listed in the Water Supply Asset Management Plan have addressed the feasibility of various options of sewer and stormwater reuse. Each option involves treating sewerage and delivering suitable quality effluent to various users. The current standard of treatment of the sewage is insufficient for any use, including irrigation, without further treatment.

Preliminary investigations indicate that the cost of infrastructure, pumping costs and operating cost for such system would outweigh the amount of water that could be saved.

The options for stormwater reuse have not been investigated.

Council has commissioned planning reports for sewer & stormwater reuse to exhaust all options available to Council. Where appropriate council will encourage the use of grey water and black water on 5 acre blocks.

Rain Water

Although reports have stated that this option is uneconomically viable the expansion of the use of rain water could form part of the strategy for future sources of water.

Council will work with other agencies to promote the use of rain water for other uses apart from drinking.

4.3.1.3 Emergency Source of Longreach

There are limited options for Emergency source of water for Longreach. A number of potential sources are explained below.

Longreach Bore Water

A bore was constructed at the water treatment plant with the intension of blending bore water with river water to be supplied as a treated water scheme. This scheme was implemented and then decommissioned due to concerns with its affects to evaporative air-conditioners and soil condition. Refer to the February 2014 council meeting for further detail.

A temporary reverse osmosis plant may be able to be used.

Carting Water

Trucking water would be the last resort as it is a costly and logistically difficult process. There are a number of sources that could be trucked or trained for Longreach. Winton, Barcaldine, Aramac & Muttaborra have bore supplies that are not affected by drought. There are other potential sources of surface water from Mt Isa or Emerald for instance. The choice of water source would need to be determined on a case by case basis as there are many parameters to consider. For example Winton may have a bore failure or Mt Isa's or Emerald's dam levels may be low which may discount these water sources as options.

Please refer to Appendix B for derived Target Consumption figures during an emergency. The purpose of these figures is to illustrate potential reductions in consumption to provide indicative costs for carting of water. The same rationale will be implemented for Ilfracombe, Isisford & Yaraka using the figures for Longreach.

Based on the Target Consumption figures in Appendix B 1,469 KL/day (would be required for Longreach. This equates to approximately:-

- Thirty two, 48KL water tankers per day; or
- Fifty nine, 25KLwater tankers per day.

Dependant on the water source, water cart capacity and based on calculations in Appendix C, carting of water would cost approximately:-

- \$33,000 to \$49,000 /day; or
- \$23 to \$33 /KL.

The purpose of the calculations in Appendix C is to illustrate the potential water sources and to provide indicative costs for carting of water from these sources. The following costs in Appendix C have not been considered:-

- The carted water would need to have some form of treatment, at the minimum dosed with chlorine;
- Water sources that may be closer than used in Appendix C; and
- Other costs associated with processing the water from source to reticulation mains.

Demand Management

Demand management does not provide an emergency source of water. However any measure that prolongs the use of the existing water source until rain replenishes the supply acts as an emergency source for all intents and purposes. The strict enforcement of trigger levels and the corresponding restrictions potentially avoids the sourcing of emergency water.

The water usage from evaporative air conditioning units, garden maintenance and unaccounted for water is contributing significantly to the daily water consumption. Council is committed to reducing unaccounted for water losses.

The Department of Natural Resources and Mines published a report in July 2003 on Queensland Evaporative Air Conditioning Water Usage. For Longreach the maximum household water consumption per unit was recorded to be 74.5 L/hr.

The report concludes that evaporative coolers can account for anywhere between 10-25% of yearly water demand in households in hot and dry climates.

The report also claims that the yearly water demand for the operation of evaporative coolers in Longreach is estimated at 239 ML/yr (approximately 170l/p/day or 400 l/connection/day). Therefore when comparing the residential water demand of 852ML/yr (42% of 2,015ML) for Year 2013/14, this equates to approximately 28% of total water household consumption.

The conversion to refrigerate air conditioners (note electricity costs for the consumer will increase), the annual river water consumption could be reduced by more than 10% and this will help to sustain a longer no flow period.

4.3.2 Water Sources Assessment for Ilfracombe

Refer to the George Bourne & Associates Ilfracombe Bore Water Feasibility Study and Drought Mitigation Options report dated August 2015 for further details.

4.3.2.1 Current Sources of Ilfracombe

River Water

The main water source for Ilfracombe is from Collumpton Creek. Information from the Department of Natural Resources and Water, advises that the size of the catchment of Collumpton Creek is approximately 90 km². Currently, the allowance in Councils' extraction license permits up to 770 ML/year from the Collumpton Creek system.

Ilfracombe has increased the off river water storage over a number of years. The most recent expansion was the removal of the wall between the Murray & the MacMillan Dams. The effective capacity of the Murray Macmillan Dam is approximately 357ML.

Once the water has been impounded by the levee structure a backwash is created. During times of high flow in Collumpton Creek, water is extracted via a large water harvesting pump from this backwater into the Murray/McMillan Dam. Water from Murray/McMillan Dam is later transferred to Shannon Dam (effective capacity = 93 ML) where it clarifies naturally to some degree.

Water from Shannon Dam is pumped into the water treatment plant and treated water is stored in a 350 kL ground level reservoir before is being pumped into a 228 kL elevated reservoir which heads the town water reticulation system.

Based on the current water consumption of 125 ML/year, the combined capacity of Murray/MacMillan and Shannon Dams are expected to sustain approximately 21 months without enforcing any water restrictions and 22 months if strict water restriction levels are enforced (no flow conditions). (Refer to section 4.4.2 below for details).

However, if the Shannon Dam is close to empty when the Murray/MacMillan Dam is filled by Collumpton Creek, this length of time is reduced by approximately 6 months.

Bore Water

The existing bore (RN 371) was drilled in 1897. The quality of the water has always been poor and the flow has reduced from 22 l/s in 1897 to 4.3 l/s in 1986. This bore was flow tested in May 2015 and was recorded at 5.7 l/s

Due to the quality of the bore water, it is only used for stock and domestic purposes. The bore supply water directly to the Golf Club, Town Pool; and Spa, town's gardens, town's common yards (Northern side) and holding paddock.

Water from bore is also stored in 3 different local storage systems as follows:

- a) Slope Hole – The bore fills the Slope Hole in the Top Depot yard by a float system. This small dam also collects used water from pool and spa;
- b) Turkey's Nest for stock water and town common yards usage (Southern side of Town);
- c) Storage Tanks for stock water usage (Northern side of Town).

There are no records of water consumption for the bore water supply as none of the connections are metered.

4.3.2.2 Future Sources of Ilfracombe

New Artesian Bore

In year 2006, George Bourne & Associates prepared a planning report on raw water supply upgrade for Ilfracombe Shire. This report suggested that a new bore is required to replace the present old bore which is over 111 years old and in a poor condition. With a new bore in place, it can ensure reliability of the town's water supply.

Previous study on the water quality from existing bores in the area indicates that it is unlikely that a potable bore supply is available to the town. At some stage in the future it is expected that it will be viable for Ilfracombe to treat a small portion of the bore water (Up to 7.3l/sec) by Reverse Osmosis to provide a reliable potable backup water supply.

The estimated cost to replace the existing town bore with a new bore is in the region of \$530,000 and the estimated capital costs for a Reverse Osmosis Treatment Plant is expected to be approximately \$1,000,000. Please note that these estimates are based on the Ilfracombe Bore Feasibility Study and Drought Mitigation Options Report and do not include any contingencies. A combined estimate with 35% contingency is \$2,025,000's is provided in the report.

With the additional bore water supply, it could reduce the consumption of river water & extend the minimum 25 months of river water supply.

Water Harvesting Gin Creek

In 2004 a concept was prepared by GBA for transferring water from Saltbush to Collumpton. Two schemes were considered, namely:

- pump harvesting by on stream dam to the west of the Isisford Road; and
- diversion of Black Gin Creek by weirs to the east of the Isisford Road.

Without conducting detailed investigations, capital expenditure is thought to be in the region of \$ 1.5 m to \$ 3 m.

Dam Covers

Covers for the Shannon Dam and Murray Macmillan Dam would reduce the losses due to evaporation. This would extend the time Ilfracombe could stay in each restriction level. It has been assumed that covers would reduce the evaporation by 80%. Table 4.3.2 summarises the increased length of time achievable with covers. Budget costs for covering both dams range from \$1.4m - \$4.3m.

Table 4.3.2: Remaining months for restriction levels with and without covers.

Restriction Level	Remaining Months (With Covers)	Remaining Months (Without Covers)	Difference	% Increase
1	36	22	14	64%
2	10	8	2	26%
3	5	5	1	14%
4	1	1	0	10%
5	0	0	0	7%

4.3.2.3 Emergency Source of Ilfracombe

Existing Bore Water

The existing bore (RN 371) which is non portable has been used on two occasions in the past 34 years due to drought effects.

The present bore flow is believed to be 5.7L/s. This flow is sufficient to supply non-portable water usage (e.g. toilet, bath/shower, laundry) which is approximately 80% of a typical household daily internal water usage. This could reduce the current treated water consumption by 10%.

A temporary Reverse Osmosis Plant may be able to be used.

Carting Water

Refer to Section 4.4.1.3 (Carting water) for full details. Adopting a 25% figure of current consumption in an extreme condition as per Longreach, 86 KL per day would be required for Ilfracombe. This equates to approximately:-

- Two, 47KL water tankers per day; or
- Four, 25KLwater tankers per day.

Dependant on the water source, water cart capacity and based on calculations in Appendix C, carting of water would cost approximately:-

- \$1,000 to \$4,000 /day; or
- \$12 to \$47 /KL.

Carting water for Ilfracombe is still a relatively costly and logistically difficult process. However, given the smaller scale in comparison to Longreach this is a relatively practical alternative. This scenario is quite achievable.

Demand Management

As stated for Longreach in Section 4.4.1.3, demand management does not provide an emergency source of water. However any measure that prolongs the use of the existing water source until rain replenishes the supply acts as an emergency source for all intents and purposes. The strict enforcement of trigger levels and the corresponding restrictions potentially avoids the sourcing of emergency water.

Refer to Section 4.4.1.3 for further details.

4.3.3 Water Sources Assessment for Isisford

4.3.3.1 Current Sources of Isisford

The primary source of water for Isisford is from a 267 ML (Effective Capacity of 262 ML) off-stream dam situated beside the Barcoo River and a 190 ML water hole formed by a concrete weir on the Barcoo River. The combined effective capacity of these storage systems is 428ML. The former Isisford Shire Council had an Order-in-Council extraction allowance of 100 ML/year from the Barcoo River system

A high flow/low head pumping unit is used during periods when the Barcoo River runs to pump water from a silt tank into the dam. Water from these storages is pumped into three raw water storage reservoirs with a combined capacity of 570 kL.

From these raw water storage reservoirs, the water is either pumped directly to consumers via untreated water reticulation mains or it is pumped through the water treatment plant.

Treated water is stored in a 195kL ground level reservoir before being pumped into the 120kL elevated water storage reservoir supported on a 16m high tower from where it is reticulated to town residents.

Based on the current water consumption of 122ML/year, the combined effective capacity of 428ML is expected to sustain a 18 months of water supply without enforcing any water restrictions and 22 months if strict water restriction levels are enforced. This is assuming no flow conditions. (Refer to Section 4.5.3 below for details).

4.3.3.2 Future Sources of Isisford

Currently, there is no research on future water source for Isisford as the current water supply source is fairly reliable and the projected population growth in Isisford is insignificant. However, if a new water source becomes necessity to Isisford, water sourced from Oma Waterhole could be considered.

Trialling the options of conditioning the water to reduce the effects of the corrosiveness of the water may be an option.

4.3.3.3 Emergency Source of Isisford

River Water from Oma Waterhole

The Oma waterhole which is approximately 15km to the west of Isisford is the town back-up supply with an effective storage capacity of approximately 405ML. Water pipelines have been previously connected to Oma waterhole for the town's water supply during the upgrading of the off-stream dam.

The water pipelines are currently not in use due to its poor condition. However, in the event of an extreme drought situation, Council could cart water from Oma waterhole via water trucks to supplement the town's water consumption.

Based on the effective storage capacity, Oma waterhole itself is capable of supplying up to 16 months of water supply based on the town's current water consumption of 122ML/year. However, assuming that this emergency source will not be utilised until the remaining capacity of the off-stream dam reached 17.5% of its effective capacity, the Oma waterhole is still capable of supplying 172ML of water (12 months of water supply) after deducting the evaporation loss for the duration required to reach 17.5% effective capacity of the off-stream.

As for a long term emergency source, Council could install new 150mm dia. PVC pipelines to reconnect the water source from Oma waterhole. The estimated cost of laying new pipelines and associated works is in the range of \$1.5 Million.

Carting Water

Refer to Section 4.4.1.3 (Carting water) for full details. Adopting a 25% figure of current consumption in an extreme condition as per Longreach, 84 KL per day would be required for Isisford. This equates too approximately:-

- Two, 47KL water tankers per day; or
- Four, 25KL water tankers per day.

Dependant on the water source, water cart capacity and based on calculations in Appendix C, carting of water would cost approximately:-

- \$2,000 to \$5,500 /day; or
- \$25 to \$65 /KL.

Carting water for Isisford is still a relatively costly and logistically difficult process. However, given the smaller scale in comparison to Longreach this is a relatively practical alternative. This scenario is quite achievable.

Demand Management

As stated for Longreach in Section 4.4.1.3, demand management does not provide an emergency source of water. However any measure that prolongs the use of the existing water source until rain replenishes the supply acts as an emergency source for all intents and purposes. The strict enforcement of trigger levels and the corresponding restrictions potentially avoids the sourcing of emergency water.

Refer to section 4.4.1.3 for further details.

4.3.4 Water Sources Assessment for Yaraka

4.3.4.1 Current Sources of Yaraka

Currently, town consumers are supplied with both treated dam water and untreated dam water via dual reticulation systems. The town also has one bore which supplies water to the untreated water reticulation if required in emergency conditions. All residences have rainwater tanks that provide the source of drinking water.

Two existing earth storage dams with a combined capacity of 103ML provide a water source for the Yaraka town water supply. Dams are replenished by surface water flows from a tributary of Kiama Creek. The muddied water in each dam settles out in between 4 to 7 days from when the dams are replenished.

Council commissioned a new water treatment plant in 2010, to supply the treated water reticulation. Stored dam water is pumped simultaneously to a 25kL raw water elevated storage reservoir (supported by a 5m height tower) and directly into the water treatment plant.

Water from the raw water elevated storage reservoir is pumped using a variable speed pump arrangement directly into the untreated dam water reticulation system.

Water that passes through the water treatment plant is pumped to a second 25kL elevated reservoir, supported by a 7m height tower. Water from this elevated reservoir is then reticulated into the town treated water supply reticulation system.

Based on the current water consumption of 22ML/year, the earth dams are expected to sustain approximately 20 months of water supply if no water restrictions are enforced. This time is increased to 21 months if strict water restriction levels are enforced. Calculations assume no flow conditions.

4.3.4.2 Future Sources of Yaraka

Currently, there is no research on future water source for Yaraka as the current bore and dam water supply are sufficient to cater for a very low populated town.

Trialling the options of conditioning the water to reduce the effects of the corrosiveness of the water may be an option.

4.3.4.3 Emergency Sources of Yaraka

Bore Water

Under normal conditions, Yaraka town bore (RN 118167) provides supplementary bore water supply to the residents. Bore water is pump directly into a 45kL ground storage tank. Stored bore water is then pumped into the 25kL elevated reservoir (supported by 5m height tower) and mixed with the river water before reticulating into the town water supply system.

The current daily yield of bore water is 0.63 L/s or 54 kL/day (based on capturing and utilizing volumes when bores operate 24 hrs per day).

In the event of an extreme drought period, the bore water supply itself can provide up to 90% (1,800L/p/day) of the town's current water consumption of 2,009L/p/day.

Carting Water

Refer to 4.4.1.3 (Carting water) for full details. Assuming an average use of 15 KL/day (reduced from normal consumption of 68KL) this would require approximately one 25KL water tanker per day which is quite achievable.

Dependant on the water source and based on calculations in Appendix C carting of water would cost approximately:-

- \$650 to \$1700 /day; or
- \$43 to \$115 /KL.

Demand Management

As stated for Longreach in Section 4.4.1.3, demand management does not provide an emergency source of water. However any measure that prolongs the use of the existing water source until rain replenishes the supply acts as an emergency source for all intents and purposes. The strict enforcement of trigger levels and the corresponding restrictions potentially avoids the sourcing of emergency water.

Refer to section 4.4.1.3 for further details.

4.4 Past Performance Review

Previous Report/ Assessments include:-

1. Fisher Stewart Pty Ltd. Preliminary Design Report for the Rebuilding of Fairmount Weirs (April 1999).
2. Longreach Shire Council. Water Future Study (Feb 2004).

4.4.1 Past Performance Review for Longreach River Water Supply

The effective capacity of the Thomson River system has been estimated for this report. Analysis of the falling water line over time has been used to calculate the time that level 0 restrictions lasted before level 1 restrictions were triggered in 2009 - 2015. The consumption by the town in this period has been used to calculate an effective capacity for the Thomson River system. These calculations are presented in the Drought Management Plan Calculation Report. Refer to Appendix D & J for some simplified Supply Period Calculations performed for this report. Losses through ground infiltration have not been considered as it is assumed to be negligible. The calculations are based on the current capacity of the town weirs of 3,231 ML, the current water consumption of 2,015ML/year & expected losses from evaporation. The calculations suggest that the Thomson River System is expected to sustain 15 months of no flow conditions without water restrictions provided that irrigation stops at DERM gauge 0. Although the capacity of all the weirs is 7,000 ML, 4,045 ML has been adopted as the effective capacity for the Longreach scheme to take into account the substantial losses due to evaporation, ground infiltration and dead water.

The analysis by Fisher Stewart and the calculations in Appendix D is consistent with anecdotal evidence referred in the Water Futures Study Report, where it states that:

“Nevertheless the 2002 experience tends to confirm that the Thomson River System can provide water for 15 months, or perhaps better considered as 12 months with a three months safety margin”

This so called safety margin of 3 months equates to 20% of the calculations in Appendix D, which was revised considering the Drought Management Plan Calculations report in Appendix J. This will be adopted for Ilfracombe, Isisford & Yaraka for the purpose of this plan.

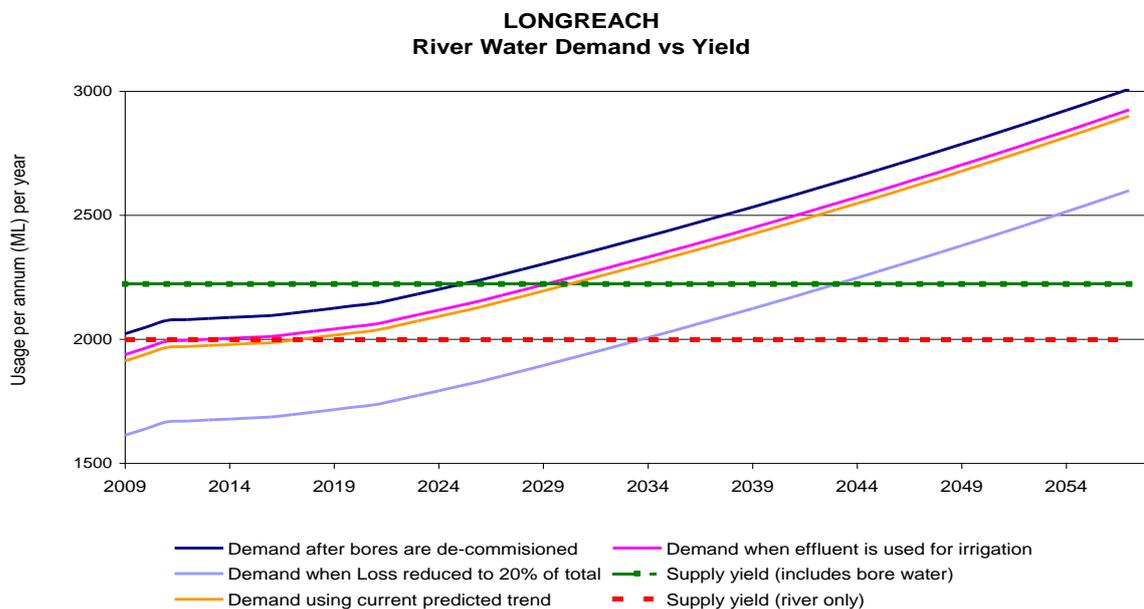
The Thomson River’s yield estimates were put to the test in 2002/03. There was no flow in the river (at the Town Weir) from 28 March 2002 to 15 February 2003, a period of 324 days or 10.7 months. Based on the historical data obtained from a level gauge at the Town Weir, dry periods of around 9 months are relatively common but 2002 was the first dry period that exceeded 10 months.

Analysis of the falling water level line versus the duration of no flow periods in 2002 indicates that supply could have been maintained for another 4.5 months up to the lowest pump intake level.

Building a new weir was not a viable option. The blending of the bore water was implemented and then decommissioned.

The following graph depicts the various methods of reducing demand and increasing supply (extract from Water Supply Assessment – Bore Water Viability Study by Worley Parsons report (December 2008))

Therefore it is suggested that Council continue to plan on the basis of extracting up to 2000 ML/year from the Thomson River assuming a maximum no-flow period of 12 months. Please note the allocation for Longreach is 2200 ML per year.



4.4.2 Past Performance Review for Ilfracombe River Water Supply

Refer to Appendix D & J for some simplified Supply Period Calculations performed for this report. Losses through ground infiltration have not been considered as it is assumed to be negligible. The calculations are based on the current capacity of the dams of approximately 462 ML, the current water consumption of 125ML/year & expected losses from evaporation. The calculations suggest that the Collumpton Creek System is expected to sustain 22 months of no flow conditions.

Adopting a safety margin of 20% as per Longreach (Refer to Section 4.5.1) the Collumpton Creek System can provide water for 22 months, or perhaps better considered as 18 months with a 4 month safety margin.

There is no official performance review conducted for the water supply system in Ilfracombe. However, based on the experience in year 2004 where the dam capacities reached alarmingly low levels, it is recommended that the capacity requirement of dams (or some other form of available water source) should be available to maintain a minimum 25 months no flow period.

The implementation of a drought management plan in section 5.0 will extend the period of available water supply to the residents. This can be achieved by reducing the daily water consumption of individual usage based on different levels of restriction. This can be implemented whilst sourcing for the available funding for a new Artesian Bore as stated in section 4.4.2.2 is occurring.

4.4.3 Past Performance Review for Isisford River Water Supply

Refer to Appendix D & J for some simplified Supply Period Calculations performed for this report. Losses through ground infiltration have not been considered as it is assumed to be negligible. The calculations are based on the current capacity of the dam and weir of approximately 457 ML, the current water consumption of 122ML/year & expected losses from evaporation. The calculations suggest that the Barcoo River system is expected to sustain 22 months of no flow conditions. Anecdotal evidence suggests that the supply for Isisford is reliable as the Barcoo River flows regularly (ie at least once every 12 months).

Adopting a safety margin of 20% as per Longreach (Refer to Section 4.5.1) the Collumpton Creek System can provide water for 22 months, or perhaps better considered as 18 months with a 4 month safety margin.

There is no official performance review conducted for the water supply system in Isisford. The current water source from Barcoo River and the availability of an additional source of water supply from Oma Waterhole are fairly reliable to cater for the water consumption of a low populated town.

Although Isisford's Water supply has not suffered significantly due to drought and/or low rainfall, the implementation of a drought management plan in section 5.0 will provide a good water conservation strategy and allow for future population growth.

4.4.4 Past Performance Review for Yaraka River Water Supply

Refer to Appendix D & J for some simplified Supply Period Calculations performed for this report. Losses through ground infiltration have not been considered as it is assumed to be negligible. The calculations are based on the current effective capacity of the dams of approximately 102 ML, the current water consumption of 22ML/year & expected losses from evaporation. The calculations suggest that the Tributary of Kiama Creek System is expected to sustain 21 months of no flow conditions. Anecdotal evidence suggests that the supply for Yaraka is reliable as the Tributary flows regularly (i.e. at least once every 12 months).

Adopting a safety margin of 20% as per Longreach (Refer to Section 4.5.1) the Tributary of Kiama Creek System can provide water for 21 months, or perhaps better considered as 17 months with a 4 month safety margin.

There is no official performance review conducted for the water supply system in Yaraka. Considering the very low population, the available water supply from bore water, the measures introduced by this Water Conservation and a Drought Management Plan should provide the town with a drought proof condition.

4.5 Water Consumption

4.5.1 Historical Consumption for Longreach Regional Council

4.5.1.1 Longreach (Raw River Water)

Year	Annual Water Consumption (ML)	Average Day Demand (ML)
2004/05	1,474	4.03
2005/06	1,875	5.13
2006/07	1,785	4.89
2007/08	1,981	5.43
2008/09	1,823	5.01
2009/10	1,827	4.96
2010/11	1,470	4.03
2011/12	1,836	5.03
2012/13	2,040	5.59
2013/14	2,015	5.52
2014/15	2,074 ¹	5.50 ¹

¹These values are based on the plant output from March 2014 to February 2015

4.5.1.2 Ilfracombe (Raw River Water)

Year	Annual Water Consumption (ML)	Average Day Demand (ML)
2005/06	100	0.27
2006/07	100	0.27
2007/08	137	.25
2008/09	475	1.3
2009/10	318	0.87
2010/11	255	0.7
2011/12	109	0.30
2012/13	105	0.29
2013/14	125	0.34
2014/15	93	0.25

4.5.1.3 Isisford (Treated & Untreated River Water)

Year	Annual Water Consumption (ML)	Average Day Demand (ML)
2004/05	157	0.43
2005/06	179	0.49
2006/07	176	0.48
2007/08	141	0.39
2008/09	144	0.39
2009/10	123	0.33
2010/11	107	0.29
2011/12	91	0.25
2012/13	103	0.28
2013/14	122	0.33
2014/15	140	0.38

4.5.1.4 Yaraka (Untreated River Water & Untreated Bore Water)

Year	Annual Water Consumption (ML)	Average Day Demand (ML)
2004/05	8.5	0.07
2005/06	17.4	0.05
2006/07	25	0.07
2007/08	25	0.07
2008/09	ND	ND
2009/10	13	0.04
2010/11	8.5	0.02
2011/12	17.4	0.05
2012/13	18.7	0.05
2013/14	21.8	0.06
2014/15	22.4	0.06

4.5.2 Projected Consumption for Longreach Regional Council

Refer to Table 4.4 above.

5 WATER CONSERVATION & DROUGHT MANAGEMENT PLAN

5.1 General

This Water Conservation & Drought Management Plan addresses both Council's ongoing water conservation strategy and its drought response plan. It is important that the community understands the difference between the two. Restrictions which are part of the Water Conservation Plan are ongoing and intended to ensure that we adopt sustainable water use practices as part of our normal way of life. Restrictions which are introduced in response to a drought or other temporary water shortage event will only be implemented to various levels during the drought or event and will be lifted when conditions return to normal.

Residents in Longreach Regional Council are informed of water restrictions and drought conditions via a mail drop to every residential home and business, radio stations 4QL (ABC) and 4LG, plus weekly notices in the Longreach Leader under the council notices where appropriate.

5.2 Analysis of Water Consumption

5.2.1 Analysis of Water Consumption in Longreach

It is evident from the consumption figures below, the main water consumption is from the residents of Longreach. Council have planned to upgrade the existing water mains and this would reduce the unaccountable losses substantially. By assuming that the unaccountable losses could reduce from 25% to 15% after the replacement of old water mains, the water consumption from residents are estimated to contribute approximately 50% of the total water consumption.

Metered River water consumption figure 2013-2014 (Total 2015ML per annum)

Sectors	Percentage (%)
Residential	42%
Unaccountable Losses	25%
Commercial Industrial	16%
Pastoral College	7%
Community & Stables	6%
Council	4%
TOTAL	100

5.2.2 Analysis of Water Consumption in Ilfracombe, Isisford and Yaraka

Water supplies in Ilfracombe are metered. Residential consumption is recorded to be 59% of the total town water consumption.

Water supplies in Isisford and Yaraka are not metered. However, residential use is expected to be the major percentage of overall consumption.

5.3 Restrictions Trigger Levels

Refer to Appendix E for Trigger Levels for Longreach, Ilfracombe, Isisford & Yaraka.

The most effective way to reduce water consumption is to introduce water restrictions. Water restrictions theoretically allow the water source to last longer under a variety of usage and drought scenarios taking into account future population growth. Under the Water Supply (Safety & Reliability) Act 2008, Section 41 and 42, Council has the legal power to determine, implement and enforce water restrictions.

Specific drought triggers and responses are listed according to stages. Stages are dependent on the ability of the Council to supply the demand. Restrictions will apply to the use of potable water.

The CEO with the advice from the Drought Management Response Team Members is authorised to implement any and all drought measures necessary to achieve the needed outcome. Measures placed in effect at lower drought stages will remain in effect at more stringent response levels. Additional measures may be added when determined necessary by the CEO.

Target daily consumption at base level of restriction for Longreach, Ilfracombe, Isisford and Yaraka are 5.0ML, 0.31ML, 0.30ML and 54kL respectively. Remaining months of supply for each scheme at different level of restrictions are adjusted in accordance with the targeted water consumption.

Water samples shall be collected frequently and tested by an independence laboratory approved by National Association of Testing Authorities (NATA) in order to determine the water quality at different level of restrictions. Based on the Water Analysis Report, chemical dosing rate at treatment plant and settling time at sedimentation lagoon shall be adjusted to ensure water supplying to residents complies with the NHMRC (2004) drinking water quality standard.

Following each drought event the targets should be reviewed against actual performance and modified where necessary. Target consumptions also provide a useful community education tool during droughts. The targets can be used to easily communicate to the community whether their water saving efforts are working.

Declaration of drought at any stage will initiate an intensive public education and information program to advise and educate customers impacted by the water shortage and the need for possible drought measures. At more severe drought stages, this public education and information program will also be utilized to communicate required drought measures and the penalties for non-compliance.

5.4 Details of Restrictions

The allowable watering usage or restrictions for Longreach, Ilfracombe, Isisford & Yaraka are outlined in Appendix F. Exemptions may be applied for see Section 6.4 below for details.

In addition to the information contained in Appendix F it should be noted that:-

A Thomson River Users group (Sam Coxon – Private Irrigator, Peter Scott – Longreach Pastoral College, Former Longreach Shire Council, Representatives of the Rural Estate: Acacia Estate, Sandalwoods Estate, Coolibah Estates, DPIF –Fisheries, EPA, Tourist Operators & NR&W) was formed in late 2002 and meetings were conducted over the years.

NRW has responsibility for other licensed users of the water sources. Some users have restrictions on their licences that require them to cease at certain levels.

6 IMPLEMENTATION

6.1 Drought Management Response Team

As a guide the Drought Management response team should consist of the following positions:-

Chairperson:	Chief Executive Officer – Longreach Regional Council
Team Members:	Mayor – Longreach Regional Council
	Director of Infrastructure – Longreach Regional Council,
	Branch Manager – Isisford Branch,
	Branch Manager – Ilfracombe Branch,
	Senior Works Supervisor – Longreach Branch
	Work Supervisor – Isisford Branch
	Work Supervisor – Ilfracombe Branch
	Water & Sewerage Officer - Longreach Branch

Longreach Regional Council has established the above Drought Management Response Team. The team members are responsible to advise the CEO on the implementation of restrictions, review performance, conduct post event reviews and recommend any changes to the Water Conservation and Drought Management Plan.

6.2 Authorising Provisions

Approval to impose water restrictions must be sought via a report from the Drought Management Response Team Members to the CEO for the implementation of water restriction under the Water Supply (Safety & Reliability) Act 2008.

6.3 Enforcement

Longreach Regional Council will enforce the Water Restrictions by:-

- Notification to all Longreach Regional Council staff that any observed breaches of the water restrictions are to be formally reported to the authorised officer within Longreach Regional Council Drought Management Response Team
- Regular patrols by Longreach Regional Council authorised officer
- Rapid response to report misuse and breaches by authorised officer
- First time offenders are to be given a warning and provided with information on the restrictions and water conservation practices
- Repeat offenders and those obviously and blatantly disregarding the restrictions are to be issued with an infringement notice or the issue of a fine in accordance with Section 43 of the Water Supply (Safety & Reliability) Act 2008.

Enforcement is the essential tool or mechanism that Council can use to implement demand management.

6.4 Exemptions

Where an exemption or amendment to water conservation measures is sought, applicants shall apply for each individual property or circumstance.

Applications shall be in writing on the Exemption Request form (Appendix G) and forwarded to the Chief Executive Officer. An application fee is required on submitting the form and is non-refundable (refer to Longreach Regional Councils Fees & Charges of the current period).

Applications will only be considered where reasonable grounds for such an exemption have been presented. In considering exemption applications, Longreach Regional Council will, wherever possible:

- Not permit watering between the hours of 10:00am and 5:00pm; and
- Assess listed water saving strategies.

Applications may be:-

- approved unconditionally; or
- approved subject to certain conditions; or
- not approved.

Longreach Regional Council reserves the right to:

- inspect properties to audit compliance with exemptions conditions;
- revoke or suspend an exemption if water use contravenes exemption conditions; or
- revoke or suspend an exemption if information provided in support of the exemption application is found to be false or misleading.

Approval, if granted, will be in writing and takes effect as of the date of such approval. Approvals will be processed within 14 days of receipt of Application.

Approvals can be applied for Levels 1 – 3 at the same time. Levels 4 and 5 need to be applied for at each level. Generally the approach for approvals is to have the same amount of hours watering per week, but at alternate times, and considering the Hierarchy of Private and Public Spaces in Appendix A.

Establishing new turf will require a recommendation from the turf supplier for consideration.

Approvals may be modified or withdrawn at any time Longreach Regional Council sees fit. Any such approval is final and binding upon acceptance by the applicant.

Exemption Request Form as shown in Appendix G provides an Application for water conservation exemption.

Approved Applications will be issued with an Exemption Permit with the approval. The exemption permit is to be displayed in a prominent position on the fence (fronting the street), of the approved property, and is to be removed on the expiry of the permit and returned to Council.

Displaying an expired exemption permit or an exemption permit on any property other than the approved property will be considered to be an offence.

Exemption validity is for the length of time that the applicable trigger level lasts.

6.5 Communications Plan

Longreach Regional Council, as part of the Water Conservation Strategy, will actively promote permanent water conservation measures and, when required, the introduction of water restrictions.

The communications Plan will:-

- Changes to restriction levels will require two weeks notice to residents;
- Inform the community of the current water supply situation and the reasons for introducing water restrictions;
- Provide an explanation of the water restrictions requirements;
- Provide an explanation of the enforcement procedures;
- Include an educational campaign to encourage water conservation practices; and
- Provide ongoing feedback to the community on the water supply situation - as minimum comparing target consumption versus actual consumption in percentages and expected months of remaining supply and current level in the:
 - Longreach Regional Council Newsletter;
 - Monthly on local Radio; and
 - Monthly in the Longreach Leader.

Generally, the communications plan will include direct mail, public notice published in the Longreach Leader and on radio, ABC, West FM and 4LG and the OutbackLRC App.

6.6 Monitoring Plan

The Water Conservation & Drought Management Plan must be responsive, effective and flexible. In order to achieve this, it is very important to monitor the water supply systems on a regular basis to allow proper implementation of the plan.

As a guide the following monitoring and its frequency should be performed as per the table below.

	Frequency				
Trigger Level	1	2	3	4	5
Volume/Level of supply source	1M	M	F	W	D
Consumption	1M	M	F	W	D
Rainfall, Temperature & rate of evaporation	1M	M	F	W	D
Water Quality	AR	AR	AR	AR	D
Investigations of consumption and impact of restrictions	M	F	W	D	D
Review Exemptions	NA	NA	NA	NA	NA

Legend

2M = every 2 months
 M = monthly
 F = Fortnightly
 W = Weekly

D = Daily
 AR = As Required
 NA = Not Applicable

Data collected from the monitoring shall be compared with the base criteria/assumptions used to develop the Water Conservation & Drought Management Plan. All collected data shall be well recorded and reported in the Council's General Meetings as required.

Recorded water consumption with respect to different levels of restrictions shall be communicated to all residents. The notice will specify current status of water usage compared with the targeted water consumption used at different water restriction levels. Notice will also include an outline of permitted hours and use of water, the period of operation of the declaration, penalties for contravention and contacts for further information.

Additional media release of information and individual customer/private irrigator notification pertaining to water restrictions may be made as appropriate.

6.7 External Assistance

Organisation	Contact Person	Contact Details	Type of Service/Role
Department of Natural Resources, Mine and Water, Longreach	Daniel Larsen	(07) 4650 1930	Non-compliance with License allocation
Department of local Government, Planning, Sport and Recreation	General Line	(07) 4967 0900	Drought assistance funding
Environmental Protection Authority	General Line	1300 130 372	Access to water from environmentally sensitive areas
Lake Eyre Basin Community Advisory Committee	General Line	(03) 6331 8406	Matters relevant to the management of water

Appendix A

Hierarchy of Private and Public Spaces

Hierarchy of Private & Public Spaces

Why we water them

It is important in times of drought to have green spaces for recreation purposes. Both private and public. These spaces provide areas for our children to play and participate in sports, families and organisations to meet. It provides areas of respite in dire times.

The value of private and public spaces have been grouped in order of importance in the list below for use by Council in managing drought conditions.

High Priority

- Longreach Family Day Care
Requires some lawn area for children to have outside play areas.
- Longreach Showgrounds –
this facility is controlled by council and can be utilised by all of the community in times of drought (Schools, Sports Clubs & community events). Events can be scheduled through a central office. Ilfracombe can use this facility as well as it is only 27klm from Longreach.
- Edkins Park -
provides a green space for the community to meet and children to play.
- Longreach Memorial Pool & Aquatic Centre -
Undercover Pool only – provides the community with a cool place in times of extreme heat. This pool is undercover and will have the least amount of evaporation (the other pools will not be utilised).
- Lioness Park -
This Park is utilised by the Longreach Playgroup. It is the only fenced park in Longreach and provides a safe environment for small children (Edkins park is not fenced and on the main Highway).
- Isisford Park -
provides a green space for the community to meet and children to play. Only park in town
- Ilfracombe Memorial Pool
provides a green space for the community to meet and children to play. Only park in town
- Ilfracombe Recreational Centre
provides a green space for the community – only sporting facility in town.
- Isisford Pool -
provides the community with a cool place in times of extreme heat.
- Yaraka Park -
provides a green space for the community to meet and children to play. Only park in town.
- Yaraka Pool -
provides the community with a cool place in times of extreme heat. (approximately 20kL/month usage)
- Business that rely on water as an intrinsic part of their business (e.g. Car Wash, Longreach Bowls Club, but not lawns and gardens)
These types of businesses will suffer extreme financial hardship if water was restricted to their business. For instance the Bowls Club as the bowling green is the core element of their business and the Car wash as it is the only component of their business.

Appendix A

Medium Priority

- Schools
- Businesses that rely on amenity (gardens and lawns) (e.g. motels & hotels)
These businesses will not be affected if they do not have lawns and gardens.
- Race Clubs
- Town feature trees (established trees in a Community space) – Longreach, Ilfracombe, Isisford, Yarka
- Botanical Walkway -
Most of the trees and shrubs are established and may survive not being watered regularly

Low Priority

- Longreach Skate Park -
Skate Park can be used without greenery.
- Ilfracombe Machinery Mile -
Will not be affected by not watering lawns
- Rotary Park -
Edkins Park is a high priority park that is less than 1 block away.
- Qantas Park -
Is only used by the community for markets held once per month
- Roundabouts on Eagle Street (3) -
These roundabouts are in the centre of the business district and on the Highway. If in extreme drought these gardens can be let go and either replanted when conditions allow or alternatively structures (art) can be placed on them that they will no longer require water. The 2nd alternative is more ideally suited to our climate.
- Residential lawns
this may look unsightly but can be re-established once conditions improve.
- Nature Reserves on streets
This may look unsightly but can be re-established once conditions improve.

Appendix A

Public Spaces	Private Spaces
Edkins Park - Longreach	Longreach State School
Lioness Park - Longreach	Longreach State High School
Rotary Park – Longreach	Our Lady’s Primary School
Qantas Park – Longreach	AACC Rugby Union Oval
Skate Park – Longreach	Longreach Bowls Club
Apex Riverside Park - Longreach	Isisford Race club
Memorial Park – Ilfracombe	Longreach Race club
Isisford Park	Ilfracombe Race club
Yaraka Park	Pioneers Home
Iningai Nature Park - Longreach	Longreach Motor Inn
Longreach Showgrounds (oval and common areas)	Jumbuck Motel
Longreach Memorial Pool & Aquatic Centre	Albert Park Motor Inn
Ilfracombe Pool & Heated Artesian Spa	Qantas Founders Museum
Isisford Pool	Kinnon & Co Outback Lodges
Yaraka Pool	Stockmans Hall of Fame
Isisford Bowls Club	Longreach Lodge
Ilfracombe Sports Centre	Wellshot Hotel
Longreach Saleyards	Coopers on Cassowary (boutique house accommodation)
Longreach Wash-down facility	Longreach Tourist park
Ilfracombe Wash-down facility	Lyceum Hotel – Beer Garden
Ilfracombe Recreation Centre	Clancy’s Overflow Hotel
	Golden West Pub

Appendix B

Target Consumption Calculations for Longreach in an Emergency Situation

Appendix B

Category	Residential	Pastoral college	Commercial Industrial	Community & Stables	Council	Unaccounted for Losses	Totals
total consumption KL	852,228	134,439	312,941	116,575	86,297	498,014	2,000,493
total connections	1,298	1	223	45	45		1600 Note 1
average consumption l/con/ day	1,799	368,326	3,845	7,097	5,254	846	3,400
Target consumption l/con/day based on 1600 Connections	450 Note 2	55,249 Note 3	1,269 Note 4	710 Note 5	1314 Note 6	122 Note 7	750 l/con/day
Revised Totals KL	584,100	55,249	282,933	31,938	59,108	196,278	1,209,605
Total l/con/day not including air conditioners	816 Note 8	Note 1 Total connections on 1 September 2015					
Evaporative air conditioners l/con/day	200 Note 9	Note 2 Based on a population of 3800 and 150 l/person/day this equates to approximately 440l/connection/day for the 1298 connections. The 150 l/person/day target for residential use was based on similar targets implemented for Brisbane. It did not include the use of evaporative air conditioners.					
Total usage l/con/day	1016 Note 10	Note 3 Based on estimate from Director of Infrastructure Services approximately 15% of current usage					
		Note 4 Based on estimate from Director of Infrastructure Services approximately 33% of current usage					
Total KL/day without air conditioners	1,210	Note 5 Based on estimate from Director of Infrastructure Services approximately 10% of current usage					
		Note 6 Based on estimate from Director of Infrastructure Services approximately 25% of current usage					
Total KL/day with air conditioners	1,469	Note 7 Target wastage is assumed to be 20% of consumption					
		Note 8 Approximately 24% of total consumption of 3,4005 l/con/day					
		Note 9 Evaporative air conditioner use reduced from 400 l/connection estimates see section 4.4.1.3 (Demand management)					
		Note 10 Approximately 30% of total consumption of 3,400 l/con/day					

Refer to the Drought Management Plan Calculation Report for details of consumptions.

Appendix C

Truck Carting Estimates

Appendix C

Cost Estimates for Water Carting from Varies Location to Longreach Regional Council during Emergency Stage

Township	Capacity of truck (KL)	Water Required (KL/day)	Trips required	Source	Return Travel Distance (km)	Travel Time (Hr)	Breaks fill & Dump (Hr)	Total Hrs/trip	Hire (\$/Hr)	Hire Cost (\$/trip)	Water (\$/KL)	Water (\$/trip)	Total cost (\$/trip)	Total cost (\$/day)	Total Cost (\$/KL)
Longreach	25	1469	59	Winton	358	4	0.5	5	180	810	0.75	18.75	829.00	\$48,911	\$33.30
	25	1469	59	Barcaldine	214	3	0.5	4	180	630	0.75	18.75	649.00	\$38,291	\$26.07
	25	1469	59	Aramac	254	3	0.5	4	180	630	0.75	18.75	649.00	\$38,291	\$26.07
	47	1469	32	Winton	358	4	1	5	250	1,250	0.75	35.25	1,286.00	\$41,152	\$28.01
	47	1469	32	Barcaldine	214	3	1	4	250	1,000	0.75	35.25	1,036.00	\$33,152	\$22.57
	47	1469	32	Aramac	254	3	1	4	250	1,000	0.75	35.25	1,036.00	\$33,152	\$22.57
	Ilfracombe	25	86	4	Winton	414	5	0.5	5.50	180	990	0.75	18.75	1,009.00	\$4,036
25		86	4	Barcaldine	160	2	0.5	2.50	180	450	0.75	18.75	469.00	\$1,876	\$21.81
25		86	4	Aramac	198.8	2	0.5	2.50	180	450	0.75	18.75	469.00	\$1,876	\$21.81
25		86	4	Longreach	54.8	1	0.5	1.50	180	270	0.75	18.75	289.00	\$1,156	\$13.44
47		86	2	Winton	414	5	1	6.00	250	1,500	0.75	35.25	1,536.00	\$3,072	\$35.72
47		86	2	Barcaldine	160	2	1	3.00	250	750	0.75	35.25	786.00	\$1,572	\$18.28
47		86	2	Aramac	198.8	2	1	3.00	250	750	0.75	35.25	786.00	\$1,572	\$18.28
47		86	2	Longreach	54.8	1	1	2.00	225	450	0.60	45.00	495.00	\$621	\$6.61

Cost Estimates for Water Carting from Varies Location to Longreach Regional Council during Emergency Stage

Appendix C

Township	Capacity of truck (KL)	Water Required (KL/day)	Trips required	Source	Return Travel Distance (km)	Travel Time (Hr)	Breaks fill & Dump (Hr)	Total Hrs/trip	Hire (\$/Hr)	Hire Cost (\$/trip)	Water (\$/KL)	Water (\$/trip)	Total cost (\$/trip)	Total cost (\$/day)	Total Cost (\$/KL)
Isisford	25	84	4	Winton	594	7	0.5	8	180	1,350	0.75	18.75	1,369.00	\$5,476	\$65.19
	25	84	4	Barcaldine	294	3	0.5	4	180	630	0.75	18.75	649.00	\$2,596	\$30.90
	25	84	4	Aramac	378	4	0.5	5	180	810	0.75	18.75	829.00	\$3,316	\$39.48
	25	84	4	Blackall	244	3	0.5	4	180	630	0.75	18.75	649.00	\$2,596	\$30.90
	25	84	4	Longreach	234	3	0.5	4	180	630	0.75	18.75	649.00	\$2,596	\$30.90
	47	84	2	Winton	594	7	1	8	250	2,000	0.75	35.25	2,036.00	\$4,072	\$48.48
	47	84	2	Barcaldine	294	4	1	5	250	1,250	0.75	35.25	1,286.00	\$2,572	\$30.62
	47	84	2	Aramac	378	5	1	6	250	1,500	0.75	35.25	1,536.00	\$3,072	\$36.57
	47	84	2	Blackall	244	3	1	4	250	1,000	0.75	35.25	1,036.00	\$2,072	\$24.67
	47	84	2	Longreach	234	3	1	4	250	1,000	0.75	35.25	1,036.00	\$2,072	\$24.67
Yaraka	25	15	1	Winton	794	9	0.5	10	180	1,710	0.75	18.75	1,729.00	\$1,729	\$115.27
	25	15	1	Barcaldine	496	6	0.5	7	180	1,170	0.75	18.75	1,189.00	\$1,189	\$79.27
	25	15	1	Aramac	580	6	0.5	7	180	1,170	0.75	18.75	1,189.00	\$1,189	\$79.27
	25	15	1	Blackall	330	4	0.5	5	180	810	0.75	18.75	829.00	\$829	\$55.27
	25	15	1	Longreach	436	5	0.5	6	180	990	0.75	18.75	1,009.00	\$1,009	\$67.27
	25	15	1	Oma Waterhole	232	3	0.5	4	180	630	0.75	18.75	649.00	\$649	\$43.27

Appendix D

Supply Period Calculations

Appendix D

Note the calculations below are based on 2013-2014 consumptions, indicative only and do not consider ground infiltration.

Table D.1: Supply Period Calculations

System	Total Capacity (ML)	Effective Capacity (ML)	Annual Water Consumption (ML)	Average Daily Water Consumption (ML)	Average Daily Evaporation Losses (ML)	Total Daily Water Consumption (ML)	Months of available water supply (No Restrictions Implemented)
Longreach Thomson River System	9,946	4,045	2,015	7.0	1.75	9.24	15
Ilfracombe Shannon Dam & Murray/McMillan Dam	461.9	49.7	125	0.31	0.32	0.82	21
Isisford Off-Stream Dam & Weir at Barcoo River	456.7	27.8	122	0.33	0.16	0.50	18
Yaraka Combine Earth Dams	103.3	102.0	22	0.060	0.07	0.13	20

Note: 1 The consumption volume for Longreach river system has been derived from monthly telemetry readings of water produced at the water treatment plant from July 2013 to June 2014.

2 The consumption volume for Ilfracombe river water system has been derived from monthly meter readings of treated and untreated water supplied to the town from July 2013 to June 2014. Meters located at the water treatment plant.

3 The consumption volume for Isisford river water system has been derived from monthly meter readings of treated and untreated water supplied to the town from July 2013 to June 2014. Meters located at the water treatment plant.

4 The consumption volume for Yaraka has been calculated from the monthly meter reading of water leaving the dam in 2014-2015

Appendix E

Trigger Levels for Longreach, Ilfracombe, Isisford & Yaraka

Longreach Trigger Levels**Mode of Operation of Weirs**

1. All water is allowed to gravity feed down the weir system.
2. The weirs furthest upstream are pumped down as required.
3. The Fairmount Weirs are the last to be pumped.

Storage Capacity Calculations

The method used to determine the effective capacity is described in the Drought Management Plan Calculations Report in Appendix J.

The intention is to manage the weirs such that all the water in the weirs upstream of the town weirs is utilised prior to adopting Restriction Level 2.

Note the volume of the town weirs when full has been calculated from recent Bathymetric survey data to be 3,231 ML.

Table E.1: Trigger Levels & Consumption Targets for Longreach

Restriction Level	Trigger Guide		Effective Capacity ML	Remaining Months (With Restriction Levels)	Remaining Months (No Restrictions)	Target Town Consumption
	DERM Gauge	Depth below full				
1	1.3 m to 0m Water is still gravity feeding down from upstream weirs. Gravity feeding ceases and pumping of water commences from Fairmount weirs	0 to 1.3 m (Note 1.3 m is equivalent to the top of the Town Weirs)	4,045	20	15	4.9 ML/day 1,310 L/p/day (2015) 1,245 L/p/day (2018) 1,180 L/p/day (2023) 1,125 L/p/day (2028)
2	0 m to -1m	1.3 to 2.3 m	2,409	14	9	4.3 ML/day 1,133 L/p/day
3	-1 to -2m	2.3 to 3.3m	1,637	11	6	3.6 ML/day 955 L/p/day
4	-2 to -3m	3.3 to 4.3m	1,099	9	4	3.0 ML/day 778 L/p/day
5	-3m to Empty	4.3m to 10.3m	652	5	2	2.3 ML/day 600 L/p/day

Note: EC = Effective Capacity (refer to section 4.5.1 for details)

DERM gauge reading can be obtained at the following website:

www.nrw.qld.gov.au/water/monitoring/current_data/map_details.php?group=bulloo

Note that the DERM gauge does not provide a reading below 0m. The two Council gauges measure water depths from 0m (lowest pump intake level) to 6.8m (Top of weir level) and correlates with the DERM gauge.

Ilfracombe Trigger Levels**Mode of Operation of Dams**

1. Water is harvested by means of gravity as well as pump from the creek to Murray Macmillan Dam. Although the Murray Macmillan Dam has a TWL of 10.7 m it very quickly reduces to 8 m.
2. Although the Shannon Dam has a TWL of 16.0 m it has a leak at around 15.0 m, therefore the Shannon Dam is only filled to 14.0 m. Water is pumped from Murray MacMillan Dam to Shannon to keep it at 14.0m until the Murray Macmillan Dam is empty. The WTP is supplied by Shannon Dam.
3. The harvest pumps at the Murray Macmillan Dam and Shannon Dam are turned on whenever it is possible.

Storage Capacity Calculations for Ilfracombe

The method used to determine the effective capacities is described in the Drought Management Plan Calculations Report in Appendix J.

The capacity of Shannon dam has been calculated from a 2015 survey.

The capacity of Murray MacMillan dam has also been calculated from a 2015 survey.

Appendix E

Table E.2: Trigger Levels & Consumption Targets for Ilfracombe

Restriction Level	Trigger Guide	Effective capacity ML	Remaining Months (With Restriction Levels)	Remaining Months (No Restrictions)	Target Consumption
1	Base Level MMD Gauge = 10.3 to 0m SD Gauge = 14.0m	356.8 92.9 Total of: 449.7	22	21	0.31ML/day (2015) 1,395 L/p/day (2015) 1,245 L/p/day (2018) 1,180 L/p/day (2023) 1,125 L/p/day (2028)
2	MMD Gauge = 0 to -1.7m SD Gauge = 14.0 to 11m	13.3 92.9 Total of: 106.2	8	7	0.26ML/day 1,196 L/p/day
3	MMD Gauge = -1.7m SD Gauge = 11 to 5m	0 49.4 Total of: 49.4	5	4	0.22ML/day 997 L/p/day
4	MMD Gauge = -1.7m SD Gauge = 5 to 3m	0 6.8 Total of: 6.8	1	1	0.18ML/day 799 L/p/day
5	MMD Gauge = -1.7m SD Gauge = 3m to Empty	0 1.4 Total of: 1.4	0	0	0.13ML/day 600 L/p/day

Note: EC = Effective Capacity
MMD = Murray/McMillan Dam
SD = Shannon Dam

Isisford Trigger Levels

Mode of Operation of Dams & Weirs

1. Harvest pumps are used to pump into the off-stream dam until the depth of water in the weir is too low. This is approximately 1.2 m below the weir level. The weir has a capacity of 160ML from full weir level to 1.2m below weir level. The dam is kept full from the weir until it can not be pumped any more
2. A smaller pump is then used to pump from the weir to the WTP until the water is 1.3m below the weir level. The weir has a capacity of 7 ML from 1.2m to 1.3m below weir level.
3. Water is supplied from Off Stream Dam when the weir is below 1.3m below the weir level.

Storage capacity Calculation for Isisford

The method used to determine the effective capacity is described in the Drought Management Plan Calculations Report in Appendix J.

The capacity of the off stream dam has been derived from a 2015 survey of the dam. There is no gauge at the dam. Trigger levels are based on a proposed new gauge zeroed at 194.0 AHD.

The storage capacity of the Isisford weir has been determined from a depth/volume curve shown on GBA drawing 1986-53 (Isisford). It is assumed this curve has been calculated from depth and width measurements at intervals along the river.

Appendix E

Table E.3: Trigger Levels & Consumption Targets for Isisford

Restriction Level	Trigger Guide	Effective capacity ML	Remaining Months (With Restriction Levels)	Remaining Months (No Restrictions)	Target Consumption
1	Base Level CWBR = Full to Empty OSD Gauge = 11.0 to 8m	166.2 261.6 Total of: 427.8	22	18	0.30 ML/day 2,314 L/p/day (2015) 2,260 L/p/day (2018) 2,205 L/p/day (2023) 2,155 L/p/day (2028)
2	CWBR = Empty OSD Gauge = 8 to 6m	150.0	15	11	0.24 ML/day 1,886 L/p/day
3	OSD Gauge = 6 to 4m	92.7	11	7	0.19 ML/day 1,457 L/p/day
4	OSD Gauge = 4 to 2m	47.4	7	4	0.13 ML/day 1,028 L/p/day
5	OSD Gauge = 2m to Empty	12.9	3	1	0.08ML/day 600 L/p/day

Note: EC = Effective Capacity
 CWBR = Concrete Weir at Barcoo River
 OSD = Off-Stream Dam

Yaraka Trigger Levels

Mode of Operation of Dams & Weirs

1. North Dam and South Dam are gravity fed from the catchment dam. Water can be pumped from the catchment dam at anytime until it is empty by means of a mobile pump. Non-return flap valves prevent water from returning to the catchment dam.
2. The optimum high water level has a gauge depth of 12.5m at North dam and a gauge depth of 6.0m at South Dam. These levels are at the same elevation relative to each other. Water above these levels drop quickly.
3. Water is pumped alternately from each dam so that water levels generally remain at the same elevation relative to each other. The bottom level at South Dam is higher than that of North Dam. North Dam will have a gauge depth of 6.5m when South Dam becomes empty.

Storage Capacity calculation for Yaraka

The method used to determine the effective capacity is described in the Drought Management Plan Calculations Report in Appendix J.

Capacity of both the north and south dam has been calculated from a 2015 survey. The south dam currently do not have a gauge and levels are estimated from the North dam's gauge.

Table E.4: Trigger Level & Consumption Targets for Yaraka

Restriction Level	Trigger Guide	Effective capacity ML	Remaining Months (With Restriction Levels)	Remaining Months (No Restrictions)	Target Consumption
1	ND Gauge = 12.5m to 7m SD Gauge = 12.5m to 7m	57.7 44.3 Total of: 102.0	21	20	54.2 kL/day 3,616 L/p/day (2015) 3,500 L/p/day (2018) 3,390 L/p/day (2023) 3,280 L/p/day (2028)
2	ND Gauge = 7m to 6m SD Gauge = 7m to 3.3m or empty	10.9 5.7 Total of: 16.7	8	6	43kL/day 2,862 L/p/day
3	ND Gauge = 6m to 3.5m SD Gauge = Empty	7.4 2.8 Total of: 10.2	6	4	31.6kL/day 2,108 L/p/day
4	ND Gauge = 3.5m to 2.5m SD Gauge = Empty	1.4 0 Total of: 1.4	1	1	20.3kL/day 1,354 L/p/day
5	ND Gauge = 2.5m to Empty SD Gauge = Empty	0	0	0	9.0kL/day 600 L/p/day

Note: EC = Effective Capacity of Combined Dams

ND = North Dam
SD = South Dam

Appendix F

Restrictions on the Water Supply for Longreach, Ilfracombe, Isisford & Yaraka

Appendix F

Residential Water Restrictions

	Water Conservation	Demand Management	Demand Management	Drought Management	Critical Water Supply
	Level 1	Level 2	Level 3	Level 4	Level 5
1. Hand-held hoses	Any Day Unlimited Hours	Any Day Unlimited Hours	Specified Days/Hours	Banned	Banned
2. Sprinklers and Soaker Hoses	Sprinklers or Soaker Hoses Any Day 6:00–9:00am 5:00-8:00pm	Sprinklers or Soaker Hoses Any Day 6:00-8:00am 6:00-8:00pm	One Sprinkler or Soaker Hose Only 6:00-8:00pm Odd Numbers – Monday, Wednesday, Friday Even Numbers – Tuesday, Thursday, Saturday	Banned	Banned
3. Buckets / Watering Cans	Any Day Unlimited Hours	Any Day Unlimited Hours	Any Day Unlimited Hours	Any Day 6:00pm-6:00am	Banned
4. Dripper Systems	Any Day 6:00pm-6:00am	Any Day 6:00pm-6:00am	Any Day 6:00pm-6:00am	Banned	Banned
5. Micro spray irrigation systems	Any Day 6:00pm-6:00am	Any Day 6:00pm-6:00am	Any Day 6:00pm-6:00am	Banned	Banned
6. Internal Use	No restriction	No restriction	No restriction	Evaporative Air-conditioners only to be used while residents are physically in the house	Evaporative Air-conditioners only to be used while residents are physically in the house
7. New Turf	As Per supplier recommendations	Must seek approval	Must Seek Approval	Banned	Banned

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8. Hosing or Washing Paved or Concrete Areas	Any Day Unlimited Hours	Any Day Unlimited Hours	6:00-7:00am 6:00-8:00pm Odd Numbers – Monday, Wednesday, Friday Even Numbers – Tuesday, Thursday, Saturday	Banned	Banned
9. Swimming Pools, Spas & Water features	MAY be emptied/refilled 6:00-9:00am 5:00-8:00pm Topping up Allowed	MAY be emptied/refilled 6:00-9:00am 6:00-8:00pm Topping up Allowed	NO Filling Topping up Allowed	NO Filling OR topping up allowed	NO Filling OR topping up allowed
10. Motor Vehicle Washing	Trigger hose or high pressure cleaners	Trigger hose or high pressure cleaners for rinsing	Bucket for washing Trigger hose or high pressure cleaners for rinsing	Bucket for washing and rinsing	Only mirrors and windscreens – bucket only
11. External Building cleaning <i>Including concrete verandahs, Sheds and Driveways</i>	High Pressure Cleaners only	High Pressure Cleaners only	Buckets for windows only	Buckets for windows only	Banned
12. Construction Activities – Occupier Only	High Pressure Cleaners Hose with trigger nozzle	High Pressure Cleaners Hose with trigger nozzle	Bucket Only	Bucket Only	With Council Approval
13. Other – not listed above	To be considered by Council on an individual basis after written application. Council shall use the Queensland Water C guidelines to provide guidance where individual circumstances are not covered by the above requirements.				

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Business, Industry and Non Residential Water Restrictions

	Water Conservation	Demand Management	Drought Management	Drought Management	Critical Water Supply
	Level 1	Level 2	Level 3	Level 4	Level 5
1. Evaporative Air-conditioners	No restriction for internal use	No restriction for internal use	Only to be used during business hours	Only to be used during business hours	Only to be used during business hours
2. Health Care <ul style="list-style-type: none"> • Hospitals, • Aged Care Facilities • Health Clinics • Medical Centres 	No restriction for internal use Gardens Any Day 6:00-9:00am 4:00-7:00pm	No restriction for internal use Gardens Any Day 4:00-7:00pm	No restriction for internal use Gardens Monday, Wednesday & Friday 4:00-7:00pm	No restriction for internal use Gardens Monday, Wednesday & Friday 4:00-6:00pm Buckets Only	No restriction for internal use Gardens Banned
3. Business & Industry <ul style="list-style-type: none"> • Food Service Industry • Hotels & Motels • Plant Nurseries • Commercial Market Gardens 	No restriction for internal use Gardens Any Day 6:00-9:00am 4:00-7:00pm	No restriction for internal use Gardens Any Day 4:00-7:00pm	No restriction for internal use Gardens Monday, Wednesday & Friday 4:00-7:00pm	No restriction for internal use Gardens Monday, Wednesday & Friday 4:00-6:00pm Buckets Only	No restriction for internal use Gardens Banned
4. Home based businesses <i>(gardens to be as per Residential Water Restrictions)</i>	No restriction for internal use for business related activities Gardens Any Day 6:00-9:00am 4:00-7:00pm	No restriction for internal use for business related activities Gardens Any Day 4:00-7:00pm	No restriction for internal use for business related activities Gardens Monday, Wednesday & Friday 4:00-7:00pm	No restriction for internal use for business related activities Gardens Monday, Wednesday & Friday 4:00-6:00pm Buckets Only	No restriction for internal use for business related activities Gardens Banned

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5. Schools & Child Care Centres	No restriction for internal use Gardens Any Day 6:00-9:00am 4:00-7:00pm	No restriction for internal use Gardens Any Day 4:00-7:00pm	No restriction for internal use Gardens Monday, Wednesday & Friday 4:00-7:00pm	No restriction for internal use Gardens Monday, Wednesday & Friday 4:00-6:00pm Buckets Only	No restriction for internal use Gardens Banned
6. Vehicle businesses <ul style="list-style-type: none"> • Car Dealers & repairs • Hire Car Businesses • Panel Beaters • Business Vehicles • Car Wash 	Trigger hose or high pressure cleaners anytime	Trigger hose or high pressure cleaners Anytime	Trigger hose or high pressure cleaners anytime	Buckets for washing At designated wash down facilities	Buckets for washing At designated wash down facilities
7. Truck Washing – Hygiene & Safety Only <i>(exterior panels as per residential Motor Vehicle Washing)</i>	Unlimited	Unlimited	Unlimited	High Pressure Water at designated wash down facilities	High Pressure Water at designated wash down facilities
8. Animal Keeping <ul style="list-style-type: none"> • Vet Clinics • Kennels (excluding Domestic Pets) 	Permitted any time for drinking, washing with trigger nozzle. Cleaning of pens Trigger hose or high pressure cleaners	Permitted any time for drinking, washing with trigger nozzle. Cleaning of pens Trigger hose or high pressure cleaners	Permitted any time for drinking, washing with trigger nozzle. Cleaning of pens Trigger hose or high pressure cleaners specified hours	Permitted any time for drinking, washing with trigger nozzle. Cleaning of pens Trigger hose or high pressure cleaners specified hours	Permitted any time for drinking, washing with trigger nozzle. Cleaning of pens Trigger hose or high pressure cleaners specified hours
9. Other Requests	To be considered by Council on an individual basis after written application. Council shall use the Queensland Water Commission Guidelines to provide guidance where individual circumstances are not covered by the above requirements.				

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Public Spaces Water Restrictions

	Water Conservation	Demand Management	Demand Management	Drought Management	Critical Water Supply
	Level 1	Level 2	Level 3	Level 4	Level 5
1. Evaporative Air-conditioners	No Restriction	Only to be used during business hours	Only to be used during business hours	Only to be used during business hours	Only to be used during business hours
2. Public Spaces <ul style="list-style-type: none"> • parks • garden beds 	No restriction for internal use Gardens & Lawns 6 hours maximum between 6:00pm-6:00am	No restriction for internal use Gardens & Lawns 5 hours maximum between 7:00pm-5:00am	No restriction for internal use Gardens & Lawns 5 hours maximum between 8:00pm-4:00am	No restriction for internal use Gardens & Lawns No more than 15 hours per week at night time only between 8:00pm-4:00am	No restriction for internal use Gardens & Lawns No more than 15 hours per week at night time only between 8:00pm-4:00am
3. Public Swimming Pools <ul style="list-style-type: none"> • Longreach • Isisford • Ilfracombe • Yaraka 	No restriction for internal use Gardens Any Day 8:00-11:00am 3:00-6:00pm 6 hours per day preferably at night, but no watering between 10:00am-5:00pm	No restriction for internal use Gardens No Watering on Mondays unless specifically stated below Odd Numbers – Tuesday, Thursday, Saturday Even Numbers – Wednesday, Friday, Sunday 8:00-10:00am 3:00-5:00pm 5 hours per day preferably at night, but no watering between 10:00am-5:00pm	No restriction for internal use Gardens No Watering on Mondays unless specifically stated below Odd Numbers – Tuesday, Thursday, Saturday Even Numbers – Wednesday, Friday, Sunday 8:00-9:00am 3:00-4:00pm 5 hours per day preferably at night, but no watering between 10:00am-5:00pm	No restriction for internal use Gardens No Watering on Mondays unless specifically stated below Odd Numbers – Tuesday, Thursday, Saturday Even Numbers – Wednesday, Friday, Sunday 3:00-4:00pm Buckets Only 15 hours per week maximum preferably at night, but no watering between 10:00am-5:00pm	No restriction for internal use Gardens Banned Banned

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<p>4. Racecourses</p>	<p>No restriction for internal use</p> <p>Gardens</p> <p>Any Day</p> <p>8:00-11:00am</p> <p>3:00-6:00pm</p> <p>6 hours per day preferably at night, but no watering between 10:00am-5:00pm</p>	<p>No restriction for internal use</p> <p>Gardens</p> <p>No Watering on Mondays unless specifically stated below</p> <p>Odd Numbers – Tuesday, Thursday, Saturday</p> <p>Even Numbers – Wednesday, Friday, Sunday</p> <p>8:00-10:00am</p> <p>3:00-5:00pm</p> <p>5 hours per day preferably at night, but no watering between 10:00am-5:00pm</p>	<p>No restriction for internal use</p> <p>Gardens</p> <p>No Watering on Mondays unless specifically stated below</p> <p>Odd Numbers – Tuesday, Thursday, Saturday</p> <p>Even Numbers – Wednesday, Friday, Sunday</p> <p>8:00-9:00am</p> <p>3:00-4:00pm</p> <p>5 hours per day preferably at night, but no watering between 10:00am-5:00pm</p>	<p>No restriction for internal use</p> <p>Gardens</p> <p>No Watering on Mondays unless specifically stated below</p> <p>Odd Numbers – Tuesday, Thursday, Saturday</p> <p>Even Numbers – Wednesday, Friday, Sunday</p> <p>3:00-4:00pm</p> <p>Buckets Only</p> <p>15 hours per week maximum preferably at night, but no watering between 10:00am-5:00pm</p>	<p>No restriction for internal use</p> <p>Gardens</p> <p>Banned</p> <p>Banned</p>
<p>5. Sports Fields (active playing surfaces)</p> <ul style="list-style-type: none"> Dedicated sporting fields, including schools sporting fields Council public spaces 	<p>6:00pm – 6:00am</p>	<p>6:00pm – 6:00am</p>	<p>6:00pm – 6:00am</p>	<p>25 hours per week maximum preferably at night, but no watering between 10:00am-5:00pm</p>	<p>Banned</p>
<p>6. Sports Fields (<i>inactive playing areas</i>)</p> <ul style="list-style-type: none"> Garden beds Lawns public areas 	<p>No restriction for internal use</p> <p>Gardens</p> <p>Any Day</p> <p>8:00-11:00am</p> <p>3:00-6:00pm</p> <p>6 hours per day preferably at night, but no watering between 10:00am-5:00pm</p>	<p>No restriction for internal use</p> <p>Gardens</p> <p>No Watering on Mondays unless specifically stated below</p> <p>Odd Numbers – Tuesday, Thursday, Saturday</p> <p>Even Numbers – Wednesday, Friday, Sunday</p> <p>8:00-10:00am</p> <p>3:00-5:00pm</p> <p>5 hours per day preferably at night, but no watering between 10:00am-5:00pm</p>	<p>No restriction for internal use</p> <p>Gardens</p> <p>No Watering on Mondays unless specifically stated below</p> <p>Odd Numbers – Tuesday, Thursday, Saturday</p> <p>Even Numbers – Wednesday, Friday, Sunday</p> <p>8:00-9:00am</p> <p>3:00-4:00pm</p> <p>5 hours per day preferably at night, but no watering between 10:00am-5:00pm</p>	<p>No restriction for internal use</p> <p>Gardens</p> <p>No Watering on Mondays unless specifically stated below</p> <p>Odd Numbers – Tuesday, Thursday, Saturday</p> <p>Even Numbers – Wednesday, Friday, Sunday</p> <p>3:00-4:00pm</p> <p>Buckets Only</p> <p>15 hours per week maximum preferably at night, but no watering between 10:00am-5:00pm</p>	<p>No restriction for internal use</p> <p>Gardens</p> <p>Banned</p> <p>Banned</p>

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<p>7. Showgrounds (public areas & gardens)</p>	<p>No restriction for internal use</p> <p>Gardens</p> <p>Any Day</p> <p>8:00-11:00am</p> <p>3:00-6:00pm</p> <p>6 hours per day preferably at night, but no watering between 10:00am-5:00pm</p>	<p>No restriction for internal use</p> <p>Gardens</p> <p>No Watering on Mondays unless specifically stated below</p> <p>Odd Numbers – Tuesday, Thursday, Saturday</p> <p>Even Numbers – Wednesday, Friday, Sunday</p> <p>8:00-10:00am</p> <p>3:00-5:00pm</p> <p>5 hours per day preferably at night, but no watering between 10:00am-5:00pm</p>	<p>No restriction for internal use</p> <p>Gardens</p> <p>No Watering on Mondays unless specifically stated below</p> <p>Odd Numbers – Tuesday, Thursday, Saturday</p> <p>Even Numbers – Wednesday, Friday, Sunday</p> <p>8:00-9:00am</p> <p>3:00-4:00pm</p> <p>5 hours per day preferably at night, but no watering between 10:00am-5:00pm</p>	<p>No restriction for internal use</p> <p>Gardens</p> <p>No Watering on Mondays unless specifically stated below</p> <p>Odd Numbers – Tuesday, Thursday, Saturday</p> <p>Even Numbers – Wednesday, Friday, Sunday</p> <p>3:00-4:00pm</p> <p>Buckets Only</p> <p>15 hours per week maximum preferably at night, but no watering between 10:00am-5:00pm</p>	<p>No restriction for internal use</p> <p>Gardens</p> <p>Banned</p> <p>Banned</p>
<p>8. Stables</p> <ul style="list-style-type: none"> • Stables • Watering of stock • Garden beds & lawns • arenas 	<p>Cleaning of stables trigger nozzle or high pressure 6:00pm-8:00pm</p> <p>Gardens</p> <p>Any Day</p> <p>6:00-9:00am</p> <p>4:00-7:00pm</p>	<p>Cleaning of stables trigger nozzle or high pressure cleaner during specified hours</p> <p>Gardens</p> <p>Sprinklers or Soaker Hoses</p> <p>Any Day</p> <p>6:00-8:00am</p> <p>6:00-8:00pm</p>	<p>Cleaning of stables trigger nozzle or high pressure cleaner during specified hours</p> <p>Gardens</p> <p>One Sprinkler or Soaker Hose Only</p> <p>6:00-8:00pm</p> <p>Odd Numbers – Monday, Wednesday, Friday</p> <p>Even Numbers – Tuesday, Thursday, Saturday</p>	<p>Cleaning of stables trigger nozzle or high pressure cleaner during specified hours</p> <p>Gardens</p> <p>Banned</p>	<p>Cleaning of stables trigger nozzle or high pressure cleaner – 15 min per day</p> <p>Gardens</p> <p>Banned</p>
<p>9. Other Requests</p>	<p>To be considered by Council on an individual basis after written application. Council shall use the Queensland Water Commission guidelines to provide guidance where individual circumstances are not covered by the above requirements.</p>				

Appendix G

Exemption Application Form



Application for Exemption or Amendment Form

All Sections Must Be Completed

APPLICANT DETAILS:			
<i>(Applicant should have the consent of the owner of the property or authorised agent prior to submitting this application)</i>			
SURNAME:		GIVEN NAME(S):	
BUSINESS NAME:			
ADDRESS:			
TELEPHONE (B/h):		TELEPHONE (a/h):	
FAX:		MOBILE:	
EMAIL ADDRESS:			

PROPERTY OWNER DETAILS:			
<i>(If owner is Applicant, write "As Above")</i>			
SURNAME:		GIVEN NAME(S):	
BUSINESS NAME:			
ADDRESS:			
TELEPHONE (B/h):		TELEPHONE (a/h):	
FAX:		MOBILE:	
EMAIL ADDRESS:			

PROPERTY OR SITE DETAILS FOR WHICH EXEMPTION IS BEING REQUESTED:			
<i>(If property location is same as owners address, write "As above")</i>			
<i>(If no street number, provide Lot & Registered Plan No.)</i>			
ADDRESS:			
TOWN/SUBURB:		POSTCODE:	
LOT No:		PLAN No:	
OTHER:			

CATEGORY FOR EXEMPTION REQUEST <i>(please circle)</i>		
Private Garden/Lawn	Public Swimming Pool/Spa	Public Park or Garden
Ponds/fountains/water Ornaments	House and Window Cleaning	Sports Ground Recreation Area
Commercial Business	Market Garden/Nursery	Private Swimming Pool/Spa
Mobile Water Tankers		
Other: <i>(Please Specify)</i>		

PRIVACY DISCLAIMER

Longreach Regional Council is collecting your personal information in order to process your application. This information will only be disclosed to any other third party with your written authorisation or as we are required to by law.

APPLICATION CONSIDERATION AND CONDITIONS

An Application Fee is to accompany each application for exemption. The fee is set out in the Longreach Regional Council Fees and Charges Schedule.

Exemptions will be assessed taking into consideration: -

- Prevailing weather conditions;
- Water allocation available to Longreach Regional Council;
- Water demand and progressive annual consumption;
- The realistic needs of the customer applying for the exemption;
- Any special requirements of the customer applying for the exemption;
- Supporting evidence tendered in justification of the application; and
- That the exemption is in the public interest.

Longreach Regional Council reserves the right to withdraw or further modify any approved exemption at any time.

An application will not be considered unless the applicant is able to demonstrate and satisfy at least one of the below criteria: -

1. The exemption is essential to avoid an unduly adverse impact upon the livelihood of the customer should the designated level of water conservation be imposed and no reasonable alternative is available.
2. Exemption is necessary due to the special needs of the customer provided:
 - The proposal merely alters the hours permitted under the declared level of water conservation
 - The proposal merely alters the days permitted under the declared level of water conservation
 - The proposal would not increase the number of hours or days permitted under the declared level of water conservation
3. The exemption would avoid or minimise permanent physical damage to a building or structure owned by the customer.
4. The exemption is necessary to avoid any adverse effect on public health, wellbeing or safety.
5. The exemption is necessary to avoid serious health or safety consequences for an individual applicant.
6. The exemption is essential to avoid or minimise adverse effects resulting in permanent or irreversible damage to a public or private asset of historical, botanic or ecological significance.

The applicant must demonstrate and provide evidence that possible alternatives have been explored and no reasonable alternative is available, to the satisfaction of Longreach Regional Council.

An exemption, if approved, is not transferable to any other person or entity or location.

An exemption, if approved, is applicable only to the level of water conservation under which the approval was granted. Upon declaration of a revised level of water conservation, exemptions may be withdrawn, modified, or subject to additional conditions being imposed.

REASON FOR EXEMPTION	
Please indicate the grounds for which you believe an exemption or modification should be granted. <i>(tick appropriate box)</i>	
	Clause 1 - Adverse financial impact
	Clause 2 - Special needs of the customer (altering hours or days)
	Clause 3 - Avoid or minimise permanent physical damage to a building or structure
	Clause 4 - Public health, wellbeing or safety
	Clause 5 - Serious health or safety consequences for an individual applicant Clause 6 - Historical, botanic or ecological significant

Appendix G

REASONS:

Please explain the circumstance or specify the reasons for making the application.

EVIDENCE:

Please attach evidence supporting other options have been explored and no reasonable alternative exists.

APPLICANT DECLARATION:

If this exemption is granted, I hereby:

Authorise Longreach Regional Council to publicly disclose any relevant details of the exemption (excludes private personal details);

Agree to adhere to all the specified conditions of any such exemption and the requirements under which the Exemption is granted;

Permit appropriate and reasonable access to the property / site to enable Longreach Regional Council to assess adherence to any exemption conditions;

Acknowledge that any violation of the terms of the exemption will result in immediate voiding of the exemption and no further application will be considered;

Acknowledge that this exemption is only applicable to the level of water conservation measures current as at the date of the exemption approval, and Longreach Regional Council may withdraw, modify or additional conditions upon declaration of a revised level.

.....
Signature of Applicant

.....
Date

Appendix H

DNR&M Proposed Operation Plan of Longreach Town Weirs

Appendix H

The operational plan presented in this Appendix was compiled by the Department of Natural Resources and Mines to assist the Longreach Regional Council in the management of the Town Weirs situated along the Thomson River. The concept of the operational plan has been adopted from this report; however the trigger levels and capacities used in the Drought Management Plan are different.

The Department has advised Council staff that a review of the operational plan will be completed in 2016.

January 2006

OPERATION PLAN – LONGREACH TOWN WEIRS

SCOPE

This operation plan has been developed to aid in the management of the collection of weirs located on the Thomson River at Longreach collectively known as the Longreach Town Weirs. The structures are the Longreach Weirs, the Fairmount Weirs, the Bimbah and the Goodberry Hills weirs.

These structures are authorised under the Order in Council dated 22nd December 1983 and Licence Number 43976.

The weir system is currently used as a water supply for the town of Longreach, provides group domestic, domestic, stock watering and irrigation supplies.

This document defines when water restrictions will take effect, the severity and the projected impacts. This allows all parties to plan fair and equitable extractions to maximise their use of a finite resource.

A management committee of interested parties will manage the weir system, and will review water levels and the need for water restrictions three times a year at a minimum.

RESPONSIBILITIES

NR&M is responsible under the Water Act 2000 for the management of the State's non-tidal waters and the regulation of water storage operators.

Local governments are responsible under the Integrated Planning Act for the planning and regulation of development activities to maintain local social, economic and environmental values. Also LG's have the responsibility for local management of water quality issues as part of the Environmental Protection Act.

DPI is responsible under the Primary Industries Act for the sustainable management of the states agriculture, aquaculture and grazing industries. The DPI is also responsible under the Fisheries Act for the management and protection of the states fisheries resources

WATER USERS

The current water users range from single point domestic and stock water users to commercial irrigators and town water supplies.

The weir also provides commercial tourism opportunities, and is an important recreational and social focal point for the town of Longreach.

There are currently 14 licences or permits issued which give entitlements to extract water from the weir. Many of these licences have area-based allocations. If converted to volumetric allocations the estimated current entitlements would be approximately 3000 ML.

Longreach Shire Council	2200 ML/yr	Order in Council
Longreach Pastoral College	900 ML/yr	Licences
Various (Inclusive)	50 ML/yr	Licences

The total stored volume for the system is in the vicinity of 8,000ML giving a potential 2 years supply, which with evaporation loss, reduces the supply to around 18 months no flow.

While the longest recorded no flow situation has been 14 months and is usually from 10 to 13 months, there is a strong need to define restrictions, and their application

INTERESTED PARTIES

All parties, which have a vested interest in the management of the weir, should provide input into the timing and severity of restrictions. This would include tourist operators, recreational fisheries groups and others.

The group includes but is not limited to representatives from

- Longreach Shire Council (3)
- Dept of Natural Resources and Mines (2)
- Dept of Primary Industries (2)
- Commercial Tourist Operators (2)
- Irrigators (3)
- Recreational Users (2)
- Commercial town water users (2)

The timing of meetings are in July, November and January of each year, or as required in exceptional circumstances.

This group provides input to the Dept of Natural Resources and Mines and the Longreach Shire Council regarding the need for and level of water restrictions

All meetings are minuted and these documents publicly available if requested.

BACKGROUND

There is a need to provide water managers with confidence with regards the timing and severity of proposed water restrictions. This allows the planning of activities promotes the efficiency of water use and provides a long-term supply of domestic water for the town of Longreach.

Prolonged no flow period, while unusual, replicates the experience of 2002-3, 1982 and 1995. Given an environment of climactic extremes it is expected that there will be future threats to water supplies in Longreach. This group meets during each year so that collective experience gained is passed onto new members and, those management techniques and options developed are implemented. The documentation of outcomes

is a vital part in this process. This documentation is included in the Longreach Shire Council Total Management Plan for future reference.

TRIGGER POINTS

To ensure maximum use of the available water and minimise evaporation and transmission loss, the upstream weirs are released after top water level, at a time commensurate with the usage of the town and irrigators while the bed of the river is still damp thus minimising transmission and evaporation losses. The Fairmont Weir is in the first instant syphoned into the Town Weir then pumped.

Provision must be made in conjunction with Department Primary Industries Fisheries to allow for fish survival in the Fairmont Weir.

This process would keep the lower Town Weir at an artificially high level for many months and may encourage the growth of native vegetation. This however is seen as a bonus as a fish habitat and by minimising evaporation loss as the surface area will be reduced.

To promote water efficiency, commercial irrigators and non-commercial residents are allowed to use river water between the hours 5.00 pm to 8.00 am

Cessation of available water from Fairmount, Goodberry Hills and Bimbah weirs.

Domestic and commercial water use restricted by times, and days per week of operation
Reduction in the area of public gardens watered

0.0 M Mark on NR&M gauge (approx 1500 ML Remaining)
Domestic and commercial town water users restricted by times, days of week and number of sprinklers (Odds & Evens)
Irrigators cease operations
Reduction in the area of public gardens watered

-1.0 M Mark on the NR&M gauge (approx 750 ML Remaining)
Commercial town water users cease operations
Cessation of irrigating public gardens except for high value areas
Domestic town water users cease sprinkler usage (hand held hoses only)

-2.0 M Mark on NR&M Gauge (approx 300 ML Remaining)
Reduction in the fish density within the weir
Cessation of boating
Domestic town water users hand held hoses only

-3.0 M Mark on NR&M (approx 200 ML Remaining)
Reduction in fish density within the weir
Supplemental addition of Bore water (domestic supply only)

Review of Document

At each meeting results from any relevant monitoring, data, or information are to be assessed to indicate validity of trigger points and recommendations to constantly update this document.

Appendix I

AACC Water Efficiency Management Plan

QATC LONGREACH CAMPUS**WATER EFFICIENCY PLAN “WEP”****LONGREACH SHIRE COUNCIL MEETING****October 2015**

The WEP for QATC Longreach Campus is a review and update to the original WEP dated 15 March 2007.

They are:

- The Thompson River irrigation farm and stock water.
- Livestock water supply and reticulation.
- Town water supply and use on campus.
- Recycled and rain water use for the campus.

Please note: The WEP for the QATC Longreach Campus is a living document and changes as needs are identified, improvements are made and projects are completed. The details presented in this document do not include Manningham Station. Manningham is destocked and in the hands of DAF advised by Corporate. Today’s presentation will focus on the Longreach Campus and its surrounding land.

The original Longreach Campus aggregation comprised of 12199 ha (30143 ac).

This was reduced to **xxxx** area as a result of the Longreach Regional Council purchase of area on the date **xxxx**

An additional area, “Rosebank” (6907 ha) has been transferred DAF to LPC. LPC holds a DRNM irrigation licence on Rosebank/

Safe carrying capacity (SCC) for the Longreach Campus aggregation and ‘Rosebank’ is estimated at 10 000 DSE.

The Longreach Campus aggregation management is currently operating its drought management plan. The country is destocked. – Sheep and cattle retained for training purposes are being hand fed.

1. THE THOMPSON RIVER IRRIGATION FARM.

The conditions surrounding the irrigation entitlements has been reviewed.

- Comprises two blocks consisting of the Old Farm 35 ha and the New Farm 28.8 ha of cultivation.
- Holds three entitlements to extract water for irrigation. One entitlement for the Old Farm and two entitlements for the New Farm.
- The farms produce - summer & winter cereal crops to support livestock production on campus.
- The farms are required for student training over a range of competencies including irrigation systems, tractor operation, WH&S, and fodder crop production.

Appendix I

Longreach Campus has complied with their conditions of its irrigation licences administered by NRM&W and include:

- The area of land that can be irrigated at any time.
- Recommendation for hours of irrigation (5.00 pm to 8.00 am).
- Longreach Campus has adhered to the trigger points for the cessation of available water for their commercial and irrigation.

Irrigation water use and systems/programs used by Longreach Campus are specifically allocated to the Old Farm and the New Farm:

Table 1. Farm irrigation

From	To	Old Farm MI	New Farm MI	Both Farms MI
1/07/05	30/06/06	159.560	233.631	393.191
1/07/06	30/06/07	155.402	220.859	376.261
1/07/07	30/06/08	148.451	188.084	336.535
1/07/08	30/06/09	134.152	186.701	320.853
1/07/09	30/06/10	107.705	164.159	271.864
1/07/10	30/06/11	95.489	76.677	172.166
1/7/11	30/6/12	75.891	96,511	172,402
1/7/12	30/6/13	88.099	81.900	169.999
1/7/13	30/6/14	107.827	153.211	261.038
1/7/14	30/6/15	126.843	174.210	301.053

Old

Farm

Licence 609660 - Expiry Date 30 June 2111 – taking of watercourse water from Thompson River with the point of take on or adjacent to Lot 1 on PER207962.

Authorised Purpose: Irrigation

Nominal Entitlement: 160 Megalitres

Maximum Rate: 78 Litres per second

- Pivot irrigator commissioned July 2015 –Max 16 ha.
- Hand lines – approx. 5 ha

Appendix I**New Farm**

Licence 13596J - Expiry Date 30 June 2111 – taking of watercourse water from Thompson River with the point of take on or adjacent to Lot 1 on PD839910.

Authorised Purpose: Irrigation
 Nominal Entitlement: 128 Megalitres
 Maximum Rate: 31 Litres per second

And,

Licence 14115WJ - Expiry Date 30 June 2111 – taking of watercourse water from Thompson River with the point of take on or adjacent to Lot 1 on Per207962.

Authorised Purpose: Irrigation
 Nominal Entitlement: 224 Megalitres
 Maximum Rate: 78 Litres per second

- Travelling irrigation – approx. 20 ha (New Farm)
- Hand lines – approx. 12 ha (New Farm)

The irrigation program is regulated through timing devices under controlled water pressure systems. The program continues to be operated under strict supervision.

The area under summer and winter crops are have been and continue to be managed in forecasted Thompson River Weir 1 water levels. 2015/16 summer crops have not been planted due to the current low weir levels.

2. LIVESTOCK WATER SUPPLY AND RETICULATION.

In the last 6 months a number of surface water dams have been desilted as part of the Longreach Campus ongoing drought mitigation program. Following a normal summer rainfall season the increased capacity of these dams will play a major role in reducing the impact on the reticulated and river water.

The Northern Paddocks Project noted in the 2007 WEP has been completed and provides river water all troughs (11 troughs) and tanks in the paddocks and a set of cattle yards on the northern side of the railway line.

The paddocks are currently destocked except for the sheep drought management and training programs. There is approximately 1500 hd in the NE paddocks (River Water) and 300 hd of sheep, 100 hd AE cattle and 30 horses on Campus (Reticulated water). It is estimated that the sheep consume 15l/hd/day, cattle 50l/hd/day and horses 35l/hd/day.

Table 2 Estimated stock consumption

	Northern Paddock Project l/day	Reticulated metered water l/day
Sheep	22500	4500
Cattle	0	5000
Horses	0	1050

Appendix I

The Northern Paddocks Project is on an Observants Alerts monitoring program and the stock on Campus are on the reticulated metered system.

The 2015-16 budget estimates provides for the extension of the Northern Paddocks Project line to the Longreach Campus stock holding paddocks south of the Landsborough Highway. This capital works to be completed by 30 June 2016 will result in all stock in these respective areas watered on this 11 ML stock water river licence. When complete no stock will be watered on the Longreach Regional Council reticulated water supply.

The **Southern Paddocks Project** noted in the 2007 WEP has been completed and signed off.

Stock (current numbers) on the Longreach Campus aggregate are solely dependent on the Northern Paddock Project and reticulated town water.

3. TOWN WATER SUPPLY AND USE ON CAMPUS (Excluding STOCK).

LPC has made every attempt to reduce water consumption and the Campus continues to work with the LRC in monitoring this resource.

- The lawn area has been reduced.
- Reduced watering of trees and shrubs and the result is evident.
- Automatic watering systems for grounds and gardens including some residences are in place.
- Timers are on watering systems where applicable.
- Rainwater tanks have been installed.
- The watering of the horse arena is being managed in consultation with LRC to meet WPHS requirements.
- Watering of the oval has ceased 2014 onwards.
- A new fire hydrant system containing 2 x 75 kl tanks was commissioned in August 2015.
- All pipeline are monitored for leaks and attended too.

The LPC Campus all inclusive water consumption is measured on a Bulk 5 – use meter

Table 3: Campus water consumption.

Rate Period	Amount kL	Rate Period	Amount kL
12/11 – 3/12	25 041	9/13 – 12/13	No reading*
3/12 – 6/12	22 236	12/13 – 03/14	No reading*
6/12 – 9/12	13 103	3/14 – 6/14	97 077
9/12 – 12/12	32 615	6/14 – 9/14	17 079
12/12 – 03/13	12 526	9/14 – 12/14	18 654
03/13 – 6/13	No reading*	12/14 – 03/15	20 366
6/13 – 9/13	No reading*	3/15 – 6/15	13 891

No reading* - Council advises that the meter was not read during those periods.

Appendix I

Continuous monitoring of water use has been initiated to assist with management decisions and to aid in the detection of any irregularities e.g. leaks in the lines.

It is an internal policy of the Longreach Campus to shut off the irrigation of the sports oval under drought conditions to conserve water. This action is in vogue.

The campus complies with all Longreach Campus water use restrictions with some approved variations for the sports oval and grounds. Staff residences must comply with the same restrictions without variation, as town domestic water users.

4. ROSEBANK.

Licence 43923J - Expiry Date 30 June 2111 – taking of watercourse water from Wellshot Creek with the point of take on or adjacent to Lot 218 on SP237183. Associated with the House dam.

Authorised Purpose: Irrigation
Nominal Entitlement: 70.4 Megalitres
Maximum Rate: 6.5 Litres per second

The decision to destock Rosebank is based on available dry matter and availability of surface water.

5. RECYCLED AND RAIN WATER USE FOR THE CAMPUS.

It is proposed that all residents and appropriate industrial buildings on the Campus harvest rainwater.

It is proposed that remaining evaporative be decommissioned and replaced with refrigerated units.

Conclusion

QATC Longreach Campus continues to be proactive in the monitoring and supervision of our use of river and reticulated water for irrigation, domestic and stock use. LPC has commissioned water efficient technology for irrigation and it continue to make in reducing the use of reticulated water. The Northern Paddocks Project will be extended to the southern side of the Landsborough Highway by the end of the 2015/16 financial year.

Charles JK Nolan
Program Manager (Agribusiness)
QATC Longreach Campus

Appendix J

Drought Management Plan Calculations Report

By George Bourne & Associates

November 2015

Longreach Regional Council

96A Eagle Street

LONGREACH QLD 4730



Drought Management Plan Calculations Report

Action Statement

Date	Name	Position	Action required (Review/Endorse/Approve)
11/11/2015	Aidan Pugh	Engineer	Review

Prepared by Aidan Pugh
Company/Organisation George Bourne & Associates
Title Engineer
Location 67 Elm Street, Barcaldine, Qld
Version no. 1.1
Version date 24 November 2015
Status Draft
File/M files ID 150064/192913

Document control sheet**Contact for enquiries and proposed changes**

If you have any questions regarding this document or if you have a suggestion for improvements, please contact:

Project Manager Alvin Feeney
Phone (07) 4651 2177

Version History

Version no.	Date	Changed by	Nature of amendment

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1 INTRODUCTION

This report has been prepared to accompany the 2015 Longreach Regional Council, Water Conservation & Drought Management Plan (DMP). This report covers how values have been determined and the assumptions made in the 2015 version of the DMP.

Effective capacities for each water storage have been determined. For most storages this is based on the usable volume above the lowest outlet. The effective capacity of the weirs upstream of Longreach have been back calculated by the length of time Level 0 restrictions typically last.

A brief sensitivity analysis has been used to justify the trigger levels selected for the 2015 Drought Management Plan.

Recent calculations from the Department of Natural Resources and Mines (DNRM) have been analysed. The DNRM calculations have been compared to those performed to update the DMP. This comparison validates the independently generated models.

2 EFFECTIVE CAPACITY DERIVATIONS

2.1 Longreach

The estimated combined capacity of the Goodberry Hills, Bimbah and Fairmount weirs is approximately 6,670ML. The effective capacity of these weirs cannot be easily determined due to losses from ground infiltration, evaporation and other losses.

In previous versions of the Drought Management Plan the whole of the Longreach River system was given an effective capacity of 3,300ML for simplicity. This effective capacity underestimates the volume of useable water in the upstream weirs. The effective capacity of the town weir alone is 3,184.6ML, therefore the assumption was that the upstream weirs had an effective capacity of 115.4ML.

The effective capacity has been calculated empirically for the 2015 DMP. The calculations are based on length of time historically spent on Level 0 restrictions after the town weir falls below DERM gauge 1.3m (top of the weir). Figure 1 shows when water restrictions were triggered and when the weir fell below 1.3m. **The weir height data used to create this graph is located on the Longreach network.**

The old effective capacity would only allow for 2.2 months on Level 0 restrictions with normal consumption. In reality Level 0 restrictions have lasted 4.4 to 7.1 months since 2009. The effective capacity of the upstream weirs has been adjusted based on the volume of raw water pumped to the WTP. 710ML has been adopted as the effective free flowing capacity of the upstream weirs. *Table 1* summarises the length of time on Level 0 water restrictions and water usage before each time Level 1 restrictions were triggered since 2009. Restrictions were not implemented at a consistent weir height. To adjust for this inconsistency the difference between the remaining volume when restrictions were implemented and the volume when the weir reaches 0.65m has been subtracted from the plant output.

Table 1 Time spent on Level 0 water restrictions.

Level 1 Triggered	Date Weir Fell Below 1.3m	Months Difference	Weir Height Level 1 Triggered (M)	Volume Below 0.65m	Plant Output (ML)	Effective Capacity of upstream weirs (ML)
30/11/2009	04/05/2009	6.9	0.34	245.2		
20/12/2012	09/08/2012	4.4	0.58	36.4	792.45	756.00
02/09/2013	29/03/2013	7.1	0.33	245.2	843.71	598.48
14/11/2014	15/04/2014	7	0.20	313.1	1093.59	780.49
01/09/2015	15/02/2015	6.5	0.14	380.2		
Average		6.4	0.32	244.0	909.9	711.7

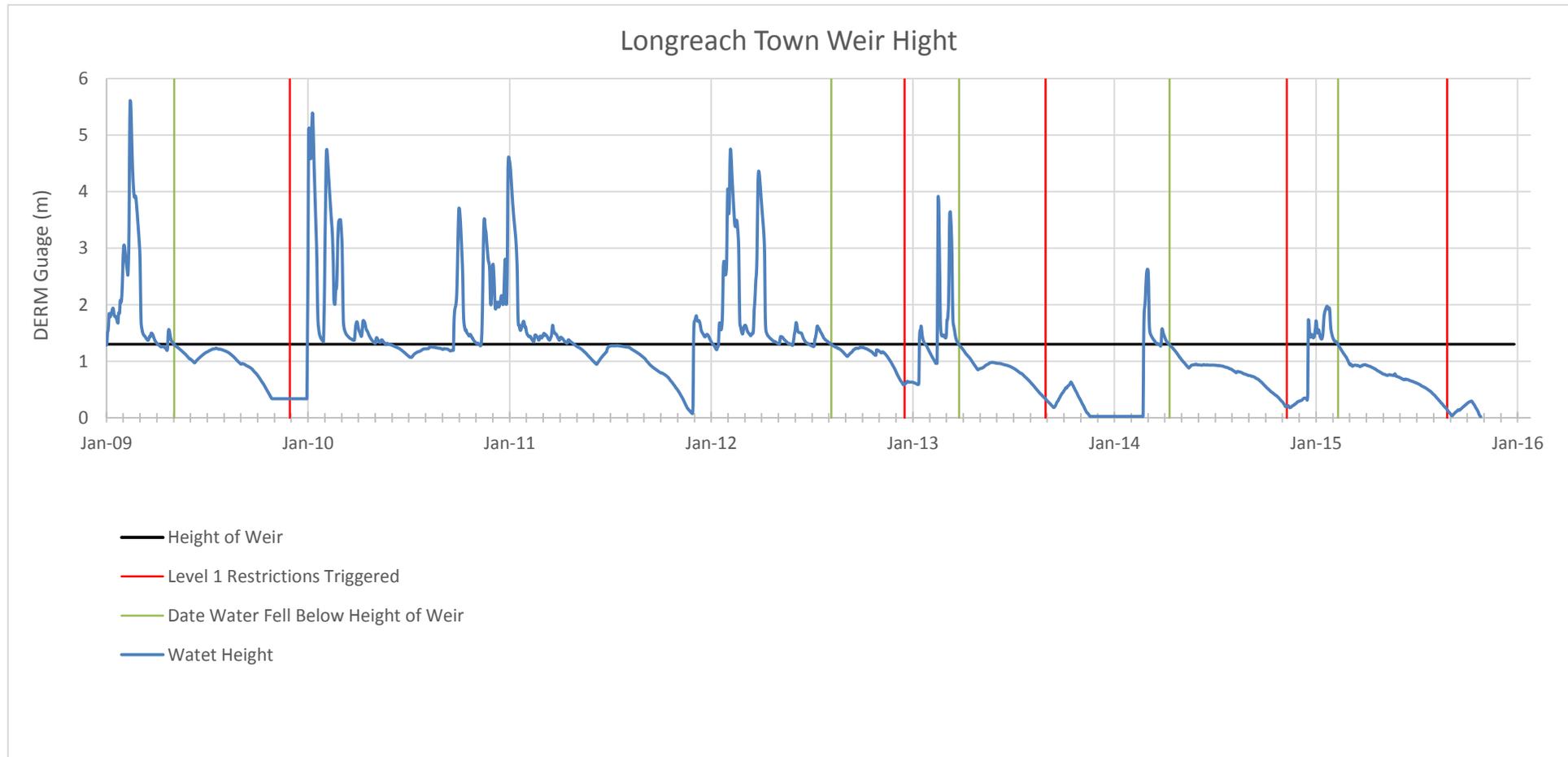


Figure 1 Change in town weir water height over time.

Once Gravity feeding stops, remaining water is pumped over the Fairmont weir. This process takes around 5 weeks of continuous pumping to complete. It is estimated that approximately 302.4ML of water is pumped in this process. Due to the considerable evaporation and infiltration losses it is estimated that only half of this 302.4ML makes it to the town weir. There is less evaporation loss and infiltration of the pumped water because this water is not held by the weirs for several months.

A recent Bathymetric survey of the town weirs calculated the volume at 3,276.7ML. The effective capacity of the town weirs has been calculated from the volume of inaccessible water below the lowest outlet which is at DERM gauge -5.5m. There is approximately 92.1ML below this point. The effective capacity of the town weirs is 3,184.6ML

When the upstream weirs stop gravity feeding the effective capacity remaining is 3,184.6ML in the town weirs plus 151.2ML from the water pumped over Fairmont weir.

Table 2 Capacity and Effective Capacity of each part of the Longreach weir system.

	Capacity (ML)	Effective Capacity (ML)
Goodberry Hills, Bimbah and Fairmount weirs (free-flowing)	6,670	710
Fairmount weir (pumped)	302.4	151.2
Town Weirs	3,276.7	3,184.6
Total	9,946.7	4,045.8

2.2 Ilfracombe

2.2.1 Shannon Dam

The capacity of Shannon dam has been calculated from a 2015 survey. The dam is considered full at the 14m gauge marker as there are known leaks above this level. Levels were taken after the survey to relate the gauge to AHD. The 14m gauge mark relates to 211.3m AHD. Calculations based on this level show the capacity of Shannon dam is 93.1ML.

The Effective capacity has been calculated based on the lowest outlet being 1.0m above the base of the dam, 0.2ML of water is below this point. 92.9ML has been adopted as the effective capacity of Shannon dam.

2.2.2 Murray Macmillan Dam

Murray Macmillan Dam was also surveyed in 2015 and the capacity was calculated to be 372ML. This is lower than values previously adopted. The lower capacity is a result of advice obtained from George Woodfield as to where the dams maximum filled height should be. The height indicated was equivalent to the 10.2m gauge marker. This level is 0.5m lower than the level previously adopted.

The effective capacity has been calculated based on the lowest outlet from the dam being at gauge level 0.0m. Below this point there is 12ML of inaccessible

water. An effective capacity of 360ML has been adopted for Murray Macmillan dam.

2.3 Isisford

2.3.1 Off Stream Dam

The off stream dam is considered full when the water level is 1.5m below the top of the bank. This relates to a level of 205m AHD. The capacity of the Off Stream Dam is 266.7. This capacity has been calculated based on a 2015 survey. There is currently no gauge at the Off Stream Dam. It is proposed in the DMP, that a gauge should be added with the 0 mark at 194.0m AHD.

The lowest outlet is 1m above the bottom of the dam. There is approximately 5.1ML below this point. The effective capacity of the off stream dam is 261.6ML.

2.3.2 Isisford Weir

The volume of the concrete weir has been calculated from GBA drawing number 1986-53. The volume shown on the drawing is 190.0ML. The lowest outlet is 0.4m above the bottom of the weir. The volume below this point is approximately 23.8ML. The effective capacity is therefore 166.2ML.

2.4 Yaraka

2.4.1 North Dam

The full level of the North Dam is at gauge level 12.5m (217.7m AHD). The North Dam has a capacity of 58.6ML, calculated from a 2015 survey. This is considerably more than the capacity calculated by Hoffmann Surveyors. They considered the dam full at 215.0 AHD. This is approximately the height of the inlet pipe. The non-return flap valves should be inspected and maintained to ensure 12.5m depth can be achieved.

The outlet is 1m above the bottom of the dam. The volume below this point is approximately 0.9ML. Therefore the effective capacity is 57.7ML.

2.4.2 South Dam

The full level of the south dam is 217.7m AHD. The South dam has a capacity of 44.7ML from the 2015 survey. The non-return flap valves should be inspected and maintained to ensure 217.7m AHD level can be achieved.

The outlet is 1m above the bottom of the dam. The volume below this point is approximately 0.4ML. Therefore the effective capacity is 44.3ML.

3 PREDICTED CONSUMPTION

Previously the DMP has used the target consumption at each level of restriction to estimate the number of months the remaining water will last. This is the simplest way to estimate the length of time the water will last. Investigating the historical consumption while restrictions have been enforced show obvious limitations of this method. The historical data shows that Level 1 to Level 3 water restrictions limits are consistently not achieved.

Target consumption before water restrictions have been triggered is based on 90% of current daily consumption. As each level of restriction is triggered the target consumption steps down evenly towards the final target of 600l/person/day.

To improve the accuracy, this version of the DMP uses predicted consumptions for the ‘remaining month’s’ calculations. The predicted consumptions have been estimated from the target consumption and historical consumption.

For the 2015 DMP restriction “Level 0” has been removed. “Level 1” is now the base level of restrictions and target consumption on Level 1 is not based on 90% of current consumption. This is likely to improve community response to “Level 2” and “Level 3” restrictions.

3.1 Longreach

Figure 2 shows how water consumption in the Longreach town system is effected by water restrictions. There is no real change from Level 0 to Level 2. There is a dramatic reduction in consumption when Level 3 restrictions are introduced. Higher restrictions have not been triggered in recent years and as a result actual consumption data is not available.

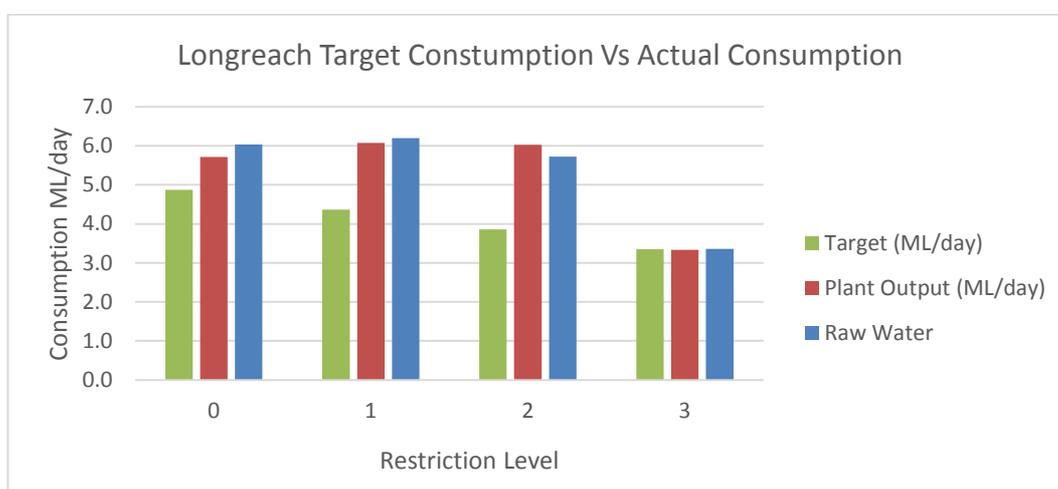


Figure 2 Actual consumption and target consumption for Longreach from Sep 2013 to Feb 2015.

The effect of water restrictions in Longreach can also be seen in Figure 3. Which shows the target consumption, raw water usage and treatment plant output over time. In February 2014 Level 3 restrictions were met. At the same time there was a relatively large rain event. The rainfall is likely to be one of the driving factors for meeting the restrictions. It can also be seen in Figure 3 that in January 2014, before the spike in rainfall, consumption was already falling towards the target.

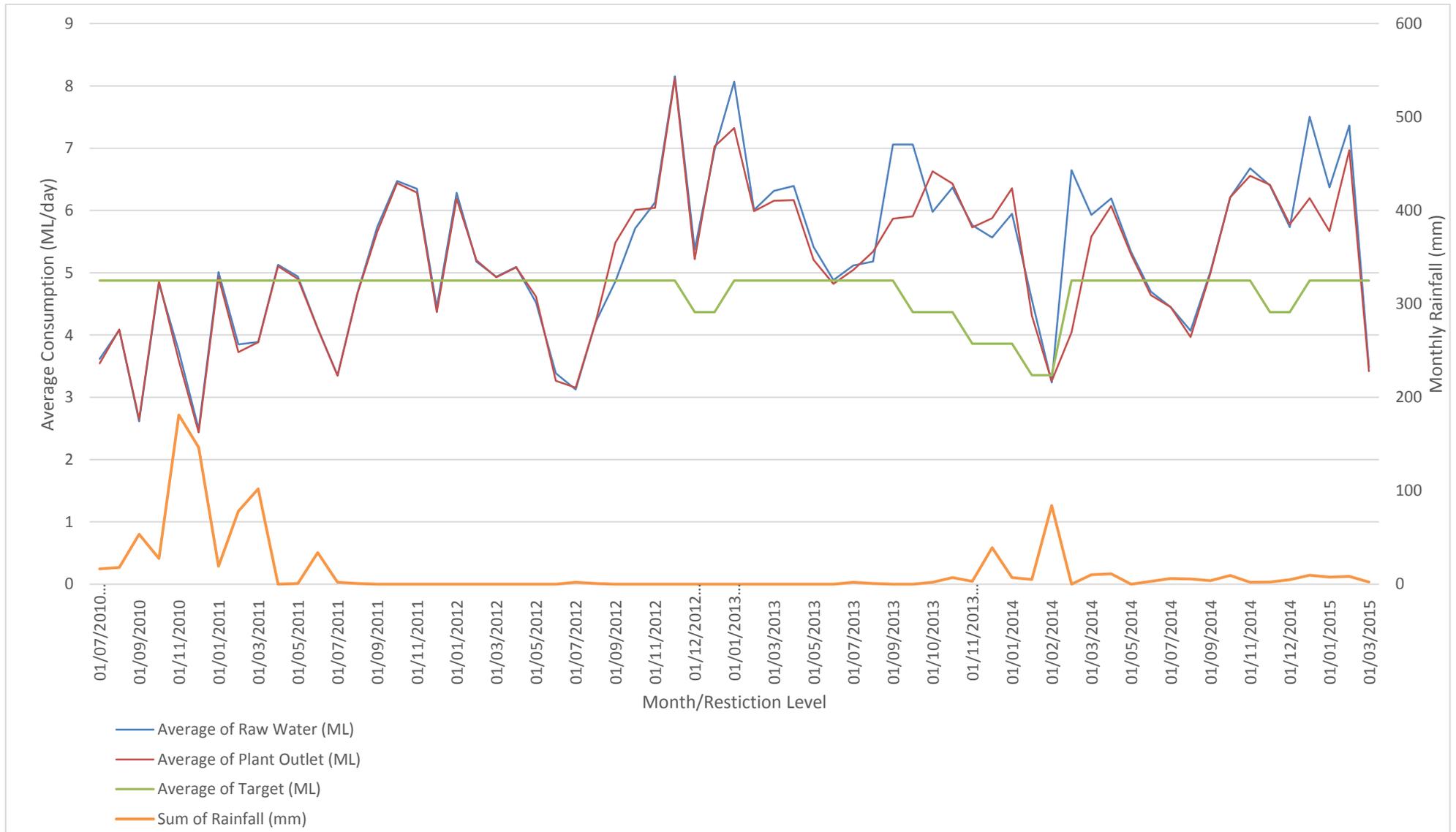


Figure 3 Water consumption in Longreach.

Figure 3 illustrates the limited effect water restrictions have on consumption in Longreach. This has a considerable effect on the length of time spent in each restriction level. Table 3 shows the number of days spent in each level of restrictions and the number of days the DMP estimates the restrictions should last. The DMP estimates are only included where subsequent restrictions were triggered.

Table 3 Time spent in each restriction level Actual vs DMP.

Level	Date Changed	number of days at Current Level	DMP Days With Restrictions
0			
1	30/11/2009	41	
0	10/01/2010	1075	
1	20/12/2012	42	
0	31/01/2013	214	
1	02/09/2013	84	77
2	25/11/2013	57	115
3	21/01/2014	38	
0	28/02/2014	259	
1	14/11/2014	40	
0	24/12/2014		

Table 3 and Figure 3 show that not meeting the consumption target can have a large effect on the time spent in each level. To improve the estimated time remaining predicted consumptions have been derived.

Table 4 shows the predicted consumption at each level of restrictions for the revised DMP. The predicted consumption values are based on the information displayed in Figure 2 and Figure 3. The Target consumption for Level 1 is based on 90% of current annual consumption. The predicted value is 100% of current annual consumption.

Table 4 Target consumption and Predicted consumption at each restriction level in Longreach.

Restriction Level	Target Consumption (ML/day)	Predicted Consumption (ML/day)	Predicted Consumption Derivation
1	7.0	7.5	Current Consumption
2	6.3	7.5	Current Consumption
3	3.6	5.0	90% Current Consumption Irrigation Stops
4	3.0	3.0	Level 4 Target
5	2.3	2.3	Level 5 Target

3.2 Ilfracombe

Figure 4 shows the actual water consumption in Ilfracombe since September 2013 compared to the target consumption. Ilfracombe’s response to water restrictions is similar to the response in Longreach. There is no reduction in consumption as restriction levels increase until Level 4 restriction are triggered.



Figure 4 Actual consumption and target consumption for Ilfracombe from Sep 2013 to June 2015.

The effect of water restrictions in Ilfracombe can also be seen in Figure 5. Which shows the target consumption, raw water usage and treatment plant output over time. The consumption in Ilfracombe dramatically reduces to below the target once Level 4 restrictions are triggered. The consumption has stayed consistent for several months well below the target.

Table 5 Time spent in each restriction level Actual vs DMP.

Level	Date Changed	Number of days at Current Level	DMP Days With Restrictions	DMP Days No Restrictions
0	15/01/2010			
1	25/11/2013	84		
0	12/12/2013	34		
1	15/01/2014	33	157	147
2	17/02/2014	11		
0	28/02/2014	87		
1	26/05/2014	81		
0	Unknown			
1	15/08/2014	70	157	147
2	24/10/2014	80		
1	17/11/2014	56		
3	12/01/2015	66	96	70
4	19/03/2015			

Table 5 shows the time spent in each restriction level in Ilfracombe since 2010. The actual time is considerable lower than the estimate in the DMP. The actual lengths of time are even lower than the DMP prediction if restrictions are not enforced. Figure 5 shows that consumption during each of the periods compared above is considerably higher than the target.

Ilfracombe's predicted consumption is shown in Table 6. The predicted consumption is based directly on the current annual consumption for Levels 1, 2 and 3.

Table 6 Target consumption and Predicted consumption at each restriction level in Ilfracombe.

Restriction Level	Target Consumption (ML/day)	Predicted Consumption (ML/day)	Predicted Consumption Derivation
1	0.31	0.34	Current Consumption
2	0.26	0.34	Current Consumption
3	0.22	0.34	Current Consumption
4	0.18	0.16	90% of level 4 Target
5	0.13	0.13	Level 5 Target

3.3 Isisford

Figure 6 shows the recent consumption under water restrictions in Isisford. It can be seen that Isisford met the target consumption for Level 0, 1 and 3.

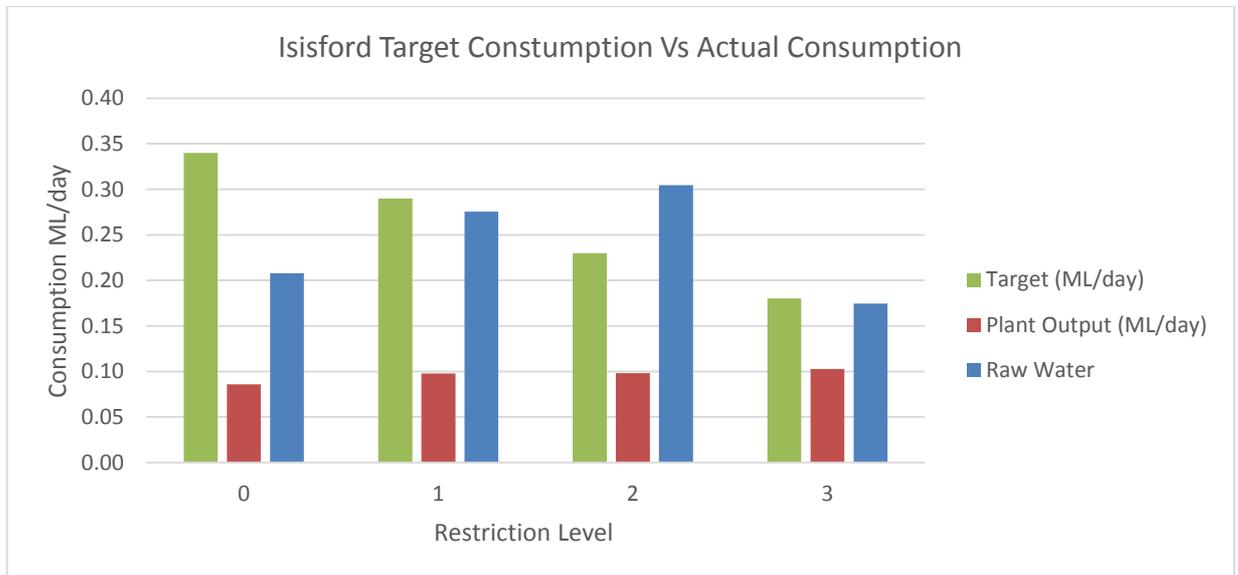


Figure 6 Actual consumption and target consumption for Isisford from July 2013 to Oct 2015.

The effect of water restrictions in Isisford can also be seen in Figure 7. Which shows the target consumption, raw water usage and treatment plant output over time.

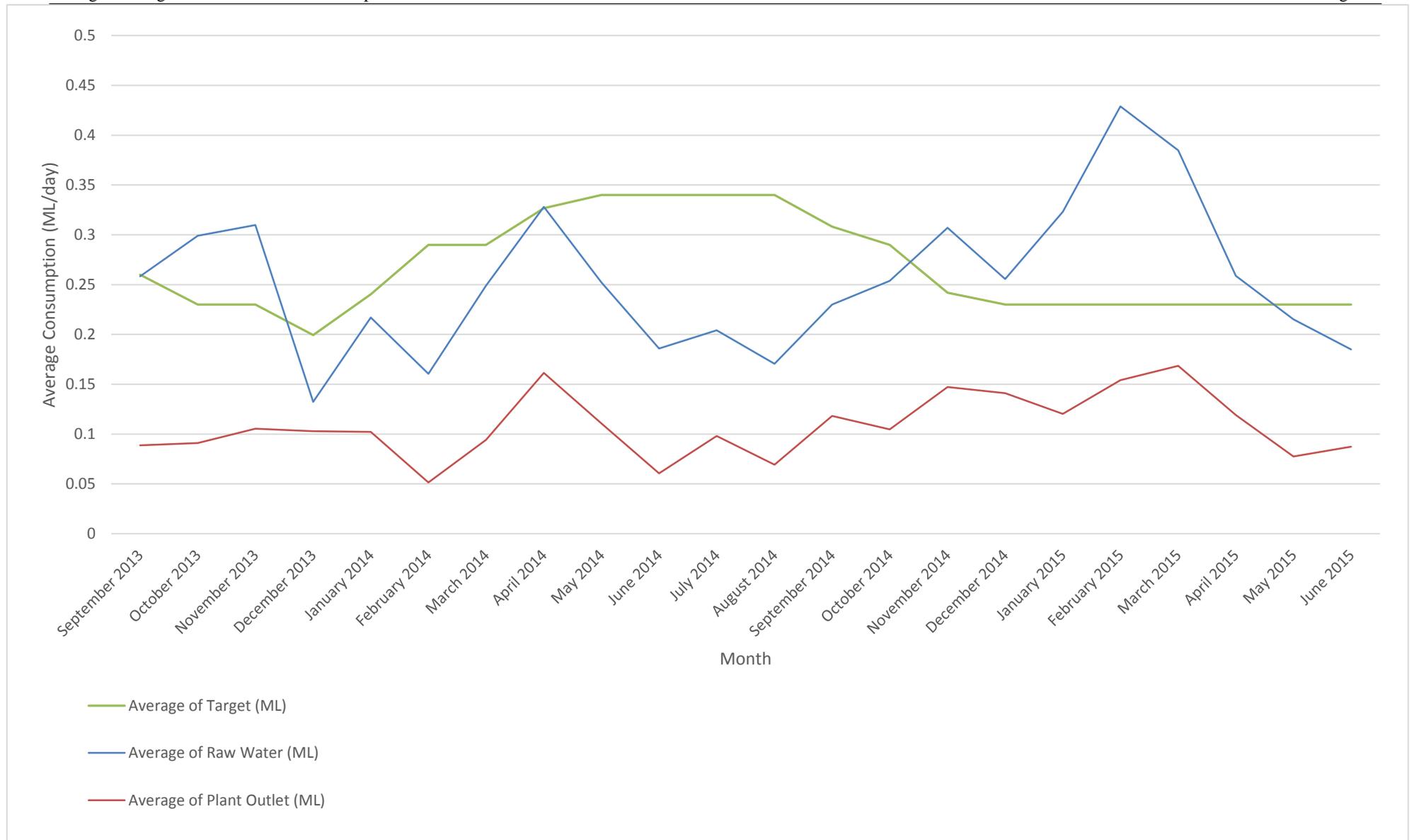


Figure 7 Water consumption in Isisford.

Table 7 Time spent in each restriction level Actual vs DMP.

Level	Date Changed	number of days at Current Level	DMP Days With Restrictions
0	15/01/2010	609	
1	16/09/2011		
2	16/09/2013	88	58
3	13/12/2013	33	
1	15/01/2014	84	
0	09/04/2014	212	
1	12/09/2014	56	54
2	07/11/2014		

Table 7 shows that the estimated times are lower than the actual time.

The predicted consumption in Isisford is based closely on the target consumption because Isisford has met the consumption targets for most restriction levels.

Table 8 Target consumption and Predicted consumption at each restriction level in Isisford.

Restriction Level	Target Consumption (ML/day)	Predicted Consumption (ML/day)	Predicted Consumption Derivation
1	0.30	0.334	Current Consumption
2	0.24	0.24	Level 2 Target
3	0.19	0.24	Level 2 Target
4	0.13	0.13	Level 4 Target
5	0.08	0.08	Level 5 Target

3.4 Yaraka

The predicted consumption in Yaraka is shown in *Table 9*. These predicted consumptions are based on how the other towns in Longreach Regional Council have performed under water restrictions.

Table 9 Target consumption and Predicted consumption at each restriction level in Yaraka.

Restriction Level	Target Consumption (ML/day)	Predicted Consumption (ML/day)	Predicted Consumption Derivation
1	0.054	0.060	Current Consumption
2	0.043	0.060	Current Consumption
3	0.032	0.032	Level 3 Target
4	0.020	0.020	Level 4 Target
5	0.009	0.009	Level 5 Target

4 SENSITIVITY ANALYSIS

A brief sensitivity analysis has been completed to establish how sensitive the number of months remaining is, to a change in the trigger levels. Three scenarios were considered for each scheme. One involved maximising the length of time the water storage would last with a target of 12 months on Level 5 restrictions. The second scenario minimises how often water restrictions are enforced. This scenario involves targeting 12 months in the first level of restrictions. The third scenario was based on spending the same amount of time in each level of restrictions.

4.1 Longreach

Table 10 shows the three scenarios for trigger levels tested for the Longreach scheme.

Table 10 Alternative trigger levels for Longreach.

Restriction Level	12 Months on Level 1	12 Months on Level 5	Equal Time on Each Level
	Trigger Level Town Weir Depth Below Full (m)		
1	0.0	0.0	0.0
2	-1.3	-0.65	-0.65
3	-3.0	-1.3	-1.3
4	-4.0	-2.0	-3.0
5	-5	-2.8	-4.5

Across all options Restriction Level 1 starts when the Town weir is full and water is gravity feeding down from the upstream weirs. For the “12 months on Level 5” and “Equal Time on Each Level” scenarios Level 2 restrictions are triggered when gravity feeding ceases from the Fairmont weir and pumping begins. These triggers have been set at a nominal -0.65m because the weir volume will fluctuate until gravity feeding ceases.

Below Figure 8 and Table 11 show the number of months spent in each trigger level under each of the proposed scenarios. The total number on months in Figure 8 is based on when gravity feeding stops. The height of the weir is not a function of time until gravity feeding stops.

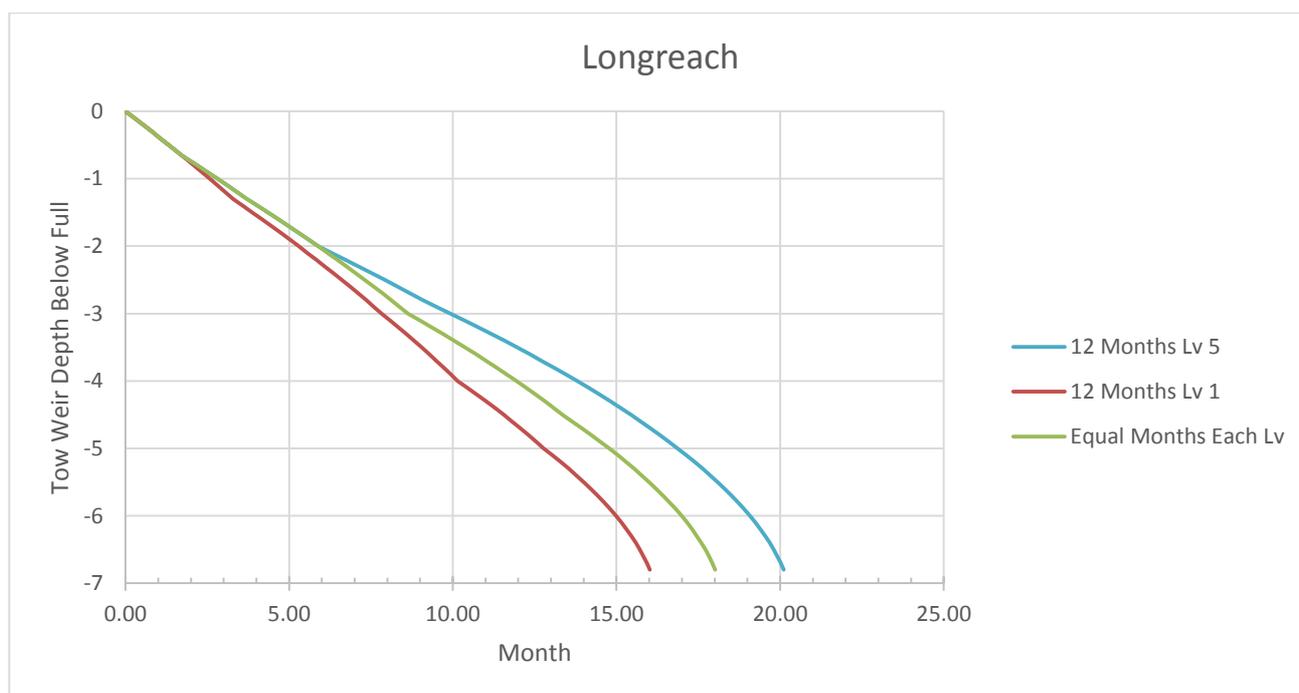


Figure 8 Months of water remaining in Longreach in each scenario.

Table 11 Months spent on each level of water restrictions in Longreach.

Longreach			
Restriction Level	12 Months on Level 1	12 Months on Level 5	Equal Time on Each Level
	Months Spent on Each Restriction Level		
1	7.1	5.5	5.5
2	4.6	2.0	2.0
3	2.3	2.2	4.9
4	2.6	3.2	4.7
5	3.2	11.0	4.7
Total	19.8	23.9	21.8

The difference in the total months is due to the time that water is gravity feeding down from the upstream weirs. This time is not illustrated in *Figure 8*. 12 months on Level 1 was not achieved in this case. This is due to triggering a restriction at DNRM gauge 0m (1.3m below full). The advantage of triggering a restriction at DERM gauge 0m is that irrigators and the community will be effected at the same time. 12 months is achieved with the combination of Level 1 and 2.

4.2 Ilfracombe

Table 12 shows the scenarios for three trigger levels tested for the Ilfracombe scheme. The trigger levels are shown for both the Murray McMillan Dam and the Shannon Dam.

Table 12 Alternative trigger levels for Ilfracombe.

Restriction Level	12 Months on Level 1		12 Months on Level 5		Equal Time on Each Level	
	Trigger Level Depth of Dams (m)		Trigger Level Depth of Dams (m)		Trigger Level Depth of Dams (m)	
	Murray/McMillan	Shannon	Murray/McMillan	Shannon	Murray/McMillan	Shannon
1	10.3	14.0	10.3	14.0	10.3	14.0
2	3.0	14.0	8.5	14.0	8.0	14.0
3	-1.7	14.0	6.0	14.0	4.6	14.0
4	-1.7	11.0	2.8	14.0	-1.7	13.5
5	-1.7	6.1	-1.7	13.9	-1.7	9.5

Figure 9 and Table 13 below show the time for which each scenario of restrictions would supply water to Ilfracombe.

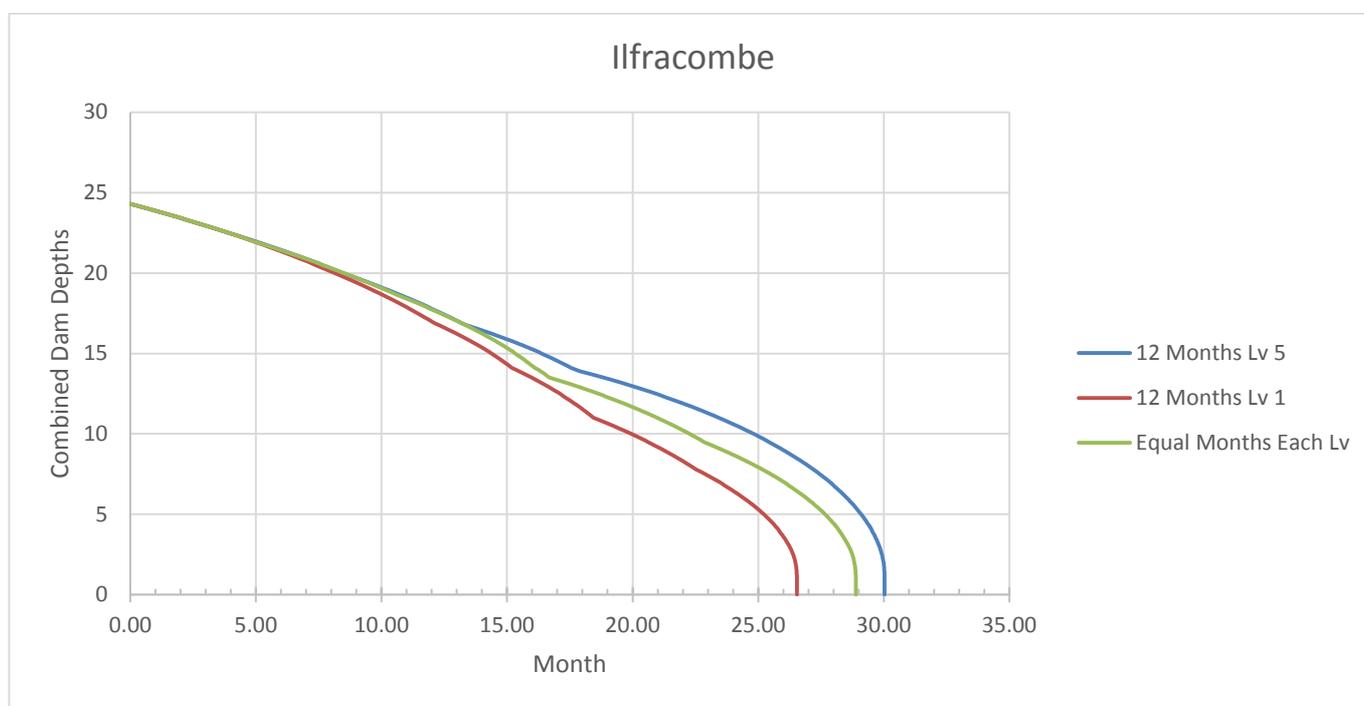


Figure 9 Months of water remaining in Ilfracombe under each scenario.

Table 13 Months spent on each level of water restrictions in Ilfracombe.

Ilfracombe			
Restriction Level	12 Months on Level 1	12 Months on Level 5	Equal Time on Each Level
	Months Spent on Each Restriction Level		
1	12.0	3.9	4.9
2	3.4	4.6	5.8
3	3.1	4.8	6.0
4	4.1	4.6	6.2
5	4.0	12.1	6.1
Total	26.6	30.0	28.9

4.3 Isisford

Isisford's mode of operation of Dams & Weirs indicates that the weir is used and pumped to the off stream dam while the weir height allows for it. After the weir drops below -1.3m the off stream dam is used to supply the town. *Table 14* **Error! Not a valid bookmark self-reference.** below shows the off stream dam heights that each restriction would be triggered.

Table 14 Alternative trigger levels for Isisford.

Restriction Level	12 Months on Level 1	12 Months on Level 5	Equal Time on Each Level
	Trigger Level Off Stream Dam (m)		
1	11.0	11.0	11.0
2	11.0	11.0	11.0
3	6.0	9.5	8.5
4	4.0	7.5	5.9
5	2.5	5.8	3.4

Level 2 restrictions are to be triggered when the weir drops below -1.2m. The weir height has not been included in this table for simplicity.

Below *Figure 10* and *Table 15* show the length of time each scenario would supply water to the Isisford Township.

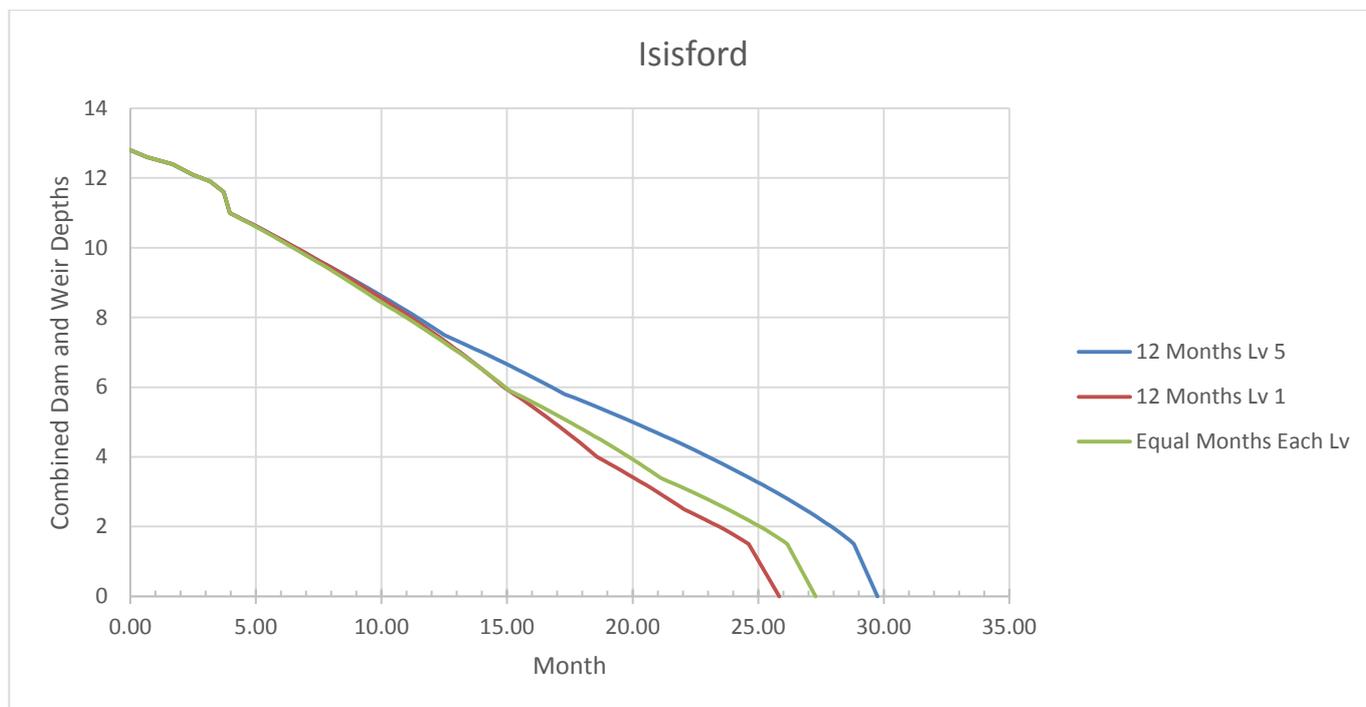


Figure 10 Months of water remaining in Isisford under each scenario.

Table 15 Months spent on each level of water restrictions in Isisford.

Isisford			
Restriction Level	12 Months on Level 1	12 Months on Level 5	Equal Time on Each Level
	Months Spent on Each Restriction Level		
1	4.0	4.0	4.0
2	10.9	3.9	5.9
3	3.7	4.7	5.3
4	3.5	4.8	6.0
5	3.8	12.4	6.2
Total	25.8	29.8	27.3

12 months on Level 1 did not last 12 months because Level 2 restrictions are still triggered when the weir is empty.

4.4 Yaraka

Table 16 shows the scenarios for three trigger levels tested for Yaraka. The trigger levels below show only the north dam for simplicity. The south dam does not have a gauge and should be kept at the same level as the north dam.

Table 16 Alternative trigger levels for Yaraka.

Restriction Level	12 Months on Level 1	12 Months on Level 5	Equal Time on Each Level
	Trigger Level North Dam (m)		
1	12.5	12.5	12.5
2	8.3	11.2	11.1
3	7.0	9.4	9.1
4	5.8	8.0	7.3
5	4.4	6.5	5.1

Below *Figure 11* and

Table 17 show the length of time each of the tested trigger level scenarios would be able to supply water to Yaraka.

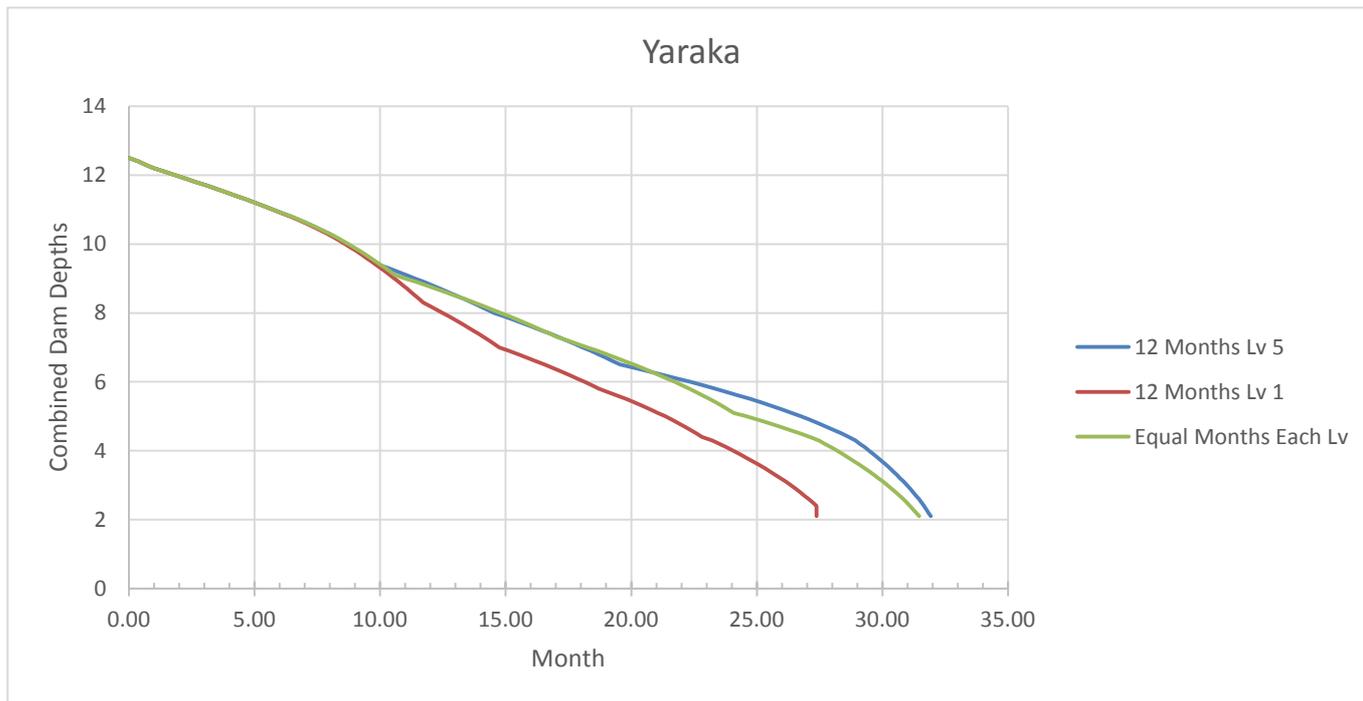


Figure 11 Months of water remaining in Yaraka under each scenario.

Table 17 Months spent on each level of water restrictions in Yaraka.

Yaraka			
Restriction Level	12 Months on Level 1	12 Months on Level 5	Equal Time on Each Level
	Months Spent on Each Restriction Level		
1	11.7	5.0	5.4
2	3.0	5.0	5.2
3	4.0	4.6	6.5
4	4.1	4.7	7.0
5	4.4	12.4	6.9
Total	27.2	31.6	31.0

4.5 Conclusion

The “12 Months on Level 5” scenario has been proposed for the 2015 DMP. Compared to the “Equal Time on Each Level” system, a few weeks less is spent in some of the earlier restrictions but several months of total supply is gained. The lower restrictions levels which would be triggered earlier are the levels that consumers are least responsive to. Reducing the time in these restriction levels would be the most effective way to extend the supply.

5 DEPARTMENT OF NATURAL RESOURCES AND MINES CALCULATIONS

The Department of Natural Resources and Mines (DNRM) have recently completed an independent analysis of the number of months the Thomson River Storage can provide water for Longreach. The analysis performed by DNRM is based on a 2015 Bathymetric survey of the town weirs. This Bathymetric survey was completed independently to the 2015 survey completed by Hoffmann Surveyors for the Longreach Regional Council. The two surveys differ by approximately 4% which is considered minimal for the calculations in the DMP.

The consumption used in the calculations by DNRM are based on Longreach Regional Council and Irrigators using all the water they are permitted to take. 2,200ML/yr used by Longreach Regional Council and 950 ML/yr by Longreach Pastoral College and others. These figures have come from the DERM Proposed Operation Plan of Longreach Town Weirs.

The actual consumption by Longreach Regional Council in 2013-2014 was 2,015ML. The total volume of all extraction licences held by Longreach Pastoral Collage and Irrigators is 560ML/yr. These figures have been used in the 2015 DMP.

DNRM created a graph on Months of Water Supply vs Town Weir Height, this is shown in Appendix A. This graph shows the consumption from irrigators, the town and combined. Irrigators consumption stops once the town weir is 1.3m below full. This does not appear to be accounted for in the DNRM calculations.

When the model created for the 2015 DMP is used with the same assumptions as the DNRM calculations the results are very similar. *Table 18* shows that there is only a 2% difference in the models when the same assumptions are applied.

Table 18 Months of supply calculated by each model.

	DNRM Model	2015 DMP Model with DNRM assumptions
Town & Irrigators (Months of Supply)	13.0	12.7
Town only (Months of Supply)	18.6	18.9

6 LONGREACH CONSUMPTION BREAKDOWN

To estimate the water required by Longreach in an emergency situation the town usage has been broken down into users. *Table 19* shows the total usage by each user group in the 2013-2014 year.

Table 19 Consumption breakdown for Longreach 2013-2014.

Category	Residential	Pastoral College	Commercial Industrial	Community & Stables	Council	Wastage	Totals
Total Consumption KL	852,228	134,439	312,941	116,575	86,297	498,014	2,000,493
Total Connections	1,298	1	223	45	45		1,612

Table 19 shows the summation of meter readings for each user group. The total is from the meter at Longreach water treatment plant output for the same period. Wastage has been calculated from the difference between the plant output and the total metered usage.

Appendix A

DNRM Months Remaining Graph

Appendix J

