

Burdekin Basin

Bowen Broken Water Supply Scheme Operations Manual

May 2017

This publication has been compiled by Water Policy, Department of Natural Resources and Mines.

© State of Queensland, 2017

The Queensland Government supports and encourages the dissemination and exchange of its information. The copyright in this publication is licensed under a Creative Commons Attribution 4.0 International (CC BY 4.0) licence.

Under this licence you are free, without having to seek our permission, to use this publication in accordance with the licence terms.



You must keep intact the copyright notice and attribute the State of Queensland as the source of the publication.

Note: Some content in this publication may have different licence terms as indicated.

For more information on this licence, visit <https://creativecommons.org/licenses/by/4.0/>.

The information contained herein is subject to change without notice. The Queensland Government shall not be liable for technical or other errors or omissions contained herein. The reader/user accepts all risks and responsibility for losses, damages, costs and other consequences resulting directly or indirectly from using this information.

Contents

Chapter 1	Preliminary	4
1	Short title	4
2	Interpretation of words used in this manual	4
3	Water supply scheme.....	4
Chapter 2	Operating rules	5
4	Operating levels of storages	5
5	Supplying medium and high A1 priority group water allocations	5
6	Diverting water to Gattonvale Offstream Storage	6
7	Releasing water from Gattonvale Offstream Storage	6
Chapter 3	Water sharing rules	7
8	Definition for chapter 3	7
9	Announced allocations	7
10	Calculation of announced allocation for high A1 priority group.....	8
11	Calculation of announced allocation for high A2 priority group.....	8
12	Calculation of announced allocation for medium priority group	8
13	Announced allocation formulae.....	8
14	Stream flow period	11
15	Taking water under a water allocation	12
Chapter 3	Seasonal water assignment rules	13
16	Seasonal water assignment rules—Regulation, s. 61	13
Attachment 1	Dictionary	14

Chapter 1 Preliminary

1 Short title

This operations manual may be cited as the Bowen Broken Water Supply Scheme Operations Manual.

2 Interpretation of words used in this manual

The dictionary in attachment 1 defines particular words used in this manual.

3 Water supply scheme

The extent of the Bowen Broken Water Supply Scheme is within the Burdekin Basin and shown on the map in schedule 1 of the Water Plan (Burdekin Basin) 2007.

Chapter 2 Operating rules

4 Operating levels of storages

- (1) The minimum operating levels and nominal operating levels for Eungella Dam, Bowen River Weir, and Gattonvale Offstream Storage are specified in table 1.
- (2) The resource operations licence holder must not release water from a storage unless the release is necessary to achieve one or more of the following—
 - (a) meet minimum stream flow requirements in attachment 2 section 3 of the resource operations licence;
 - (b) supply water to a water allocation holder; or
 - (c) maintain a downstream storage at its nominal operating level.
- (3) Despite subsection (2), the resource operations licence holder must not release or supply water—
 - (a) from a storage mentioned in subsection (1) when the water level in that storage is at or below its minimum operating level;
 - (b) from Eungella Dam to supply high A1 or medium priority group water allocations when the water level in the dam is at or below 539.5 m AHD.
- (4) In this section—

minimum operating level means the operating level below which water cannot be used to supply water users, either because there is insufficient hydraulic gradient or because of poor water quality for environmental reasons.

nominal operating level means the level that the weir was designed to operate at.

Table 1 – Operating levels of storages

Storage	Minimum operating level (m AHD)	Nominal operating level (m AHD)
Eungella Dam	EL 532.95	Not applicable
Bowen River Weir	EL 121.00	EL 123.61
Gattonvale Offstream Storage	EL 152.40	EL 153.50

5 Supplying medium and high A1 priority group water allocations

- (1) In supplying medium and high A1 priority group water allocations outside of any stream flow period notified under section 14 of this manual, the resource operations licence holder must to the extent practicable draw water from—
 - (a) firstly—Bowen River Weir;
 - (b) secondly—Gattonvale Offstream Storage; and
 - (c) thirdly—Eungella Dam.
- (2) When supplying water from Eungella Dam, the resource operations licence holder must manage releases in a way that minimises losses associated with the transmission of water along the Broken and Bowen rivers.
- (3) The resource operations licence holder must prepare and maintain operating procedures that demonstrate arrangements are in place to achieve the requirements of this section.

6 Diverting water to Gattonvale Offstream Storage

- (1) The resource operation licence holder may divert water from Bowen River Weir to Gattonvale Offstream Storage.
- (2) If the water level in Gattonvale Offstream Storage is less than the nominal operating level—the resource operations licence holder may commence diverting to Gattonvale Offstream Storage water which has been released from Eungella Dam under section 4(2)(c) of this manual.
- (3) If the water level in Gattonvale Offstream Storage is less than full supply level—the resource operations licence holder—
 - (a) may commence diverting water into Gattonvale Offstream Storage using the pump station on Bowen River Weir but only if a flow greater than 1037 ML/day is recorded at Myuna Gauging Station; and
 - (b) must cease diverting water into Gattonvale Offstream Storage using the pump station when the combined flow over Bowen River Weir and through the outlet works is less than 750 ML/day.
- (4) For this section, the maximum rate at which the resource operations licence holder may divert water to Gattonvale Offstream Storage using the pump station on Bowen River Weir is 300 ML/day.

7 Releasing water from Gattonvale Offstream Storage

- (1) The resource operations licence holder may release water from Gattonvale Offstream Storage to Bowen River Weir only when the level in the weir is at or below the nominal operating level for the weir.
- (2) The maximum rate at which the resource operations licence holder may release water from Gattonvale Offstream Storage into Bowen River Weir is 180 ML/day.

Chapter 3 Water sharing rules

8 Definition for chapter 3

In this chapter—

announced allocation means a number, expressed as a percentage, which is used to determine the maximum volume of water that may be taken in a water year under the authority of a water allocation.

stream flow period, for a zone, means a period of time that starts and ends at such time that the resource operations licence holder notifies under section 14 of this manual.

9 Announced allocations

(1) The resource operations licence holder must—

- (a) determine an announced allocation for each priority group for use in defining the share of water available to be taken under water allocations in that priority group;
- (b) use the water sharing rules specified in this part, to calculate announced allocations throughout the water year;
- (c) calculate and set the announced allocation for each priority group to take effect on the first day of each water year;
- (d) following the commencement of a water year—
 - (i) if the announced allocation percentage is less than 100 per cent—recalculate the announced allocation within five business days of the first calendar day of every month; and
 - (ii) reset the announced allocation—if a recalculation indicates that the announced allocation would—
 - (A) increase by five or more percentage points; or
 - (B) increase to 100 per cent; and
- (e) within five business days of—
 - (i) setting an announced allocation under subsection (1)(c); and
 - (ii) the first calendar day of the month when resetting an announced allocation under subsection (1)(d);
 - (A) publish the announced allocation; and
 - (B) publish details of the announced allocation, including parameters used in determining the announced allocation, on the resource operations licence holder's website for the Bowen Broken Water Supply Scheme.

(2) The announced allocation must—

- (a) not be less than zero or greater than 100 per cent;
- (b) be rounded to the nearest per cent; and
- (c) not be reduced during a water year.

- 10 Calculation of announced allocation for high A1 priority group**
- (1) The resource operations licence holder must calculate the announced allocation for water allocations belonging to the high A1 priority group using—the greater of formula 1 and formula 3 as set out in table 2
 - (2) Despite subsection (1), when the storage level of Eungella Dam is at or below 539.5 m AHD, the resource operations licence holder must calculate the announced allocation for the high A1 priority group using—formula 1 as set out in table 2.
- 11 Calculation of announced allocation for high A2 priority group**
- (1) The resource operations licence holder must calculate the announced allocation for water allocations belonging to the high A2 priority group using the formulae set out in table 2.
 - (2) The calculation of announced allocation is the percentage calculated using—
 - (a) where formula 2 results in a number less than or equal to formula 1—formula 2; or
 - (b) where formula 2 results in a number greater than formula 1—formula 3.
- 12 Calculation of announced allocation for medium priority group**
- (1) The resource operations licence holder must calculate the announced allocation for water allocations belonging to the medium priority group using the formulae set out in section 13 of this manual.
 - (2) The calculation of announced allocation is—
 - (a) where the announced allocation for either the high A1 or high A2 priority groups is less than 100 per cent—zero; and
 - (b) where the announced allocation for high A1 and high A2 priority groups is 100 per cent—formula 4.
- 13 Announced allocation formulae**
- (1) The formulae for calculating the announced allocations in sections 23, 24 and 25 of this manual are detailed in table 2.
 - (2) The parameter used in the formulae in table 2 are defined in table 3.

Table 2 – Formulae for calculating the announced allocations

Formula	Definition
1	$100 \times (UV_{BRW+GOSS} + DIV_{HA1}) / H_{A1}$
2	$100 \times (UV_{EUNGELLA} + DIV_{HA2}) / H_{A2}$
3	$100 \times (UV - TOA_H + DIV_{HA1} + DIV_{HA2}) / (H_{A1} + H_{A2})$
4	$100 \times (UV - (H_{A1} + H_{A2}) - TOA - RE - RE_{HA2} + DIV) / M$

Table 3 – Parameters for the formulae in table 2

Parameter	Definition
H_{A1}	The sum of the nominal volumes for all water allocations belonging to the high A1 priority group.
H_{A2}	The sum of the nominal volumes for all water allocations belonging to the high A2 priority group.
M	The sum of the nominal volumes for all water allocations belonging to the medium priority group.
UV	<p>Useable volume (UV) for a storage, is the volume of stored water that can be used to supply water allocations through to the end of a water year and is calculated as—</p> $UV = ASV - MOV$ <p>where—</p> <p>adjusted storage volume (ASV) means the storage volume, in megalitres, equating to the current storage level adjusted for the projected storage loss.</p> <p>projected storage loss means the combined evaporation and seepage losses, in megalitres, that are expected to occur from the storage through to the end of the water year.</p> <p>minimum operating volume (MOV) means the volume of water, in megalitres, that cannot be released or used from the storage under normal operating conditions.</p> <p>For the purposes of this section—</p> <p>UV is the sum of the useable volumes for Eungella Dam, Bowen River Weir and Gattonvale Offstream Storage.</p> <p>UV_{EUNGELLA} is the useable volume for Eungella Dam.</p> <p>UV_{BRW+GOSS} is the sum of the useable volumes for Bowen River Weir and Gattonvale Offstream Storage.</p> <p>The projected storage loss is determined using the values for evaporation and seepage is specified in millimetres for each month in table 4. The value next to the current month is then used with the relevant storage volume/level curve and current storage volume to determine the projected storage loss.</p> <p>MOV is specified for each storage in attachment 1 to the resource operations licence.</p> <p>Storage volumes are derived from the relevant storage volume/level curve referenced in attachment 1 to the resource operations licence.</p>
RE	<p>High priority reserve—the volume reserved for supplying high priority allocations in future months.</p> <p>RE is derived from table 7 for the month the announced allocation is calculated.</p>
REH_{A2}	<p>High A2 priority reserve—the volume reserved for supplying high A2 priority allocations.</p> <p>REH_{A2} is 7226 ML which equates to the volume in Eungella Dam below 539.5 m AHD.</p>
TOAH	<p>Transmission and operational allowance for high priority water allocations—an allowance for the expected instream losses associated with the supply of high priority water allocations over the remainder of the water year.</p> <p>TOAH is derived from table 5 for the month the announced allocation is calculated.</p>
TOA	<p>Transmission and operational allowance for all water allocations—an allowance for the expected instream losses associated with the supply of both high and medium priority water allocations over the remainder of the water year.</p> <p>TOA is derived from table 6 using linear interpolation of the announced allocation.</p>
DIVH_{A1}	<p>HA1 diversions—the sum of the diversions for all water allocations belonging to the high A1 priority group during the current water year up to the time of calculating an announced allocation, less any water taken during a stream flow period.</p>

Parameter	Definition
	Refer to section 14 of this manual for more information on taking water during a stream flow period.
DIVHA₂	HA2 diversions —the sum of the diversions for all water allocations belonging to the high A2 priority group during the current water year up to the time of calculating an announced allocation, less any water taken during a stream flow period. Refer to section 14 of this manual for more information on taking water during a stream flow period.
DIV	Total diversions (ML)—the sum of the diversions for all water allocations during the current water year up to the time of calculating an announced allocation, less any water taken during a stream flow period. Refer to section 14 of this manual for more information on taking water during a stream flow period.

Table 4 – Projected storage losses for remainder of water year for the Bowen Broken Water Supply Scheme

Month in which announced allocation is calculated	Eungella Dam (mm)	Gattonvale Offstream Storage (mm)	Bowen River Weir (mm)
July	2042	2042	2042
August	1940	1940	1940
September	1809	1809	1809
October	1643	1643	1643
November	1437	1437	1437
December	1216	1216	1216
January	989	989	989
February	766	766	766
March	567	567	567
April	375	375	375
May	220	220	220
June	100	100	100

Table 5 – Transmission and operational allowance for high priority water allocations

Month	Transmission and operational allowance (ML)
July	3883
August	3572
September	3262
October	2951
November	2640
December	2330
January	2019
February	1670
March	1320
April	971

Month	Transmission and operational allowance (ML)
May	621
June	311

Table 6 – Transmission and operational allowance for all water allocations

Announced allocation	Transmission operational allowance (ML)					
	0 %	20 %	40 %	60 %	80 %	100 %
July	3883	4269	4654	5040	5426	5812
August	3572	3927	4282	4637	4992	5347
September	3262	3578	3894	4211	4527	4843
October	2951	3233	3514	3796	4077	4359
November	2640	2872	3103	3335	3566	3798
December	2330	2527	2723	2920	3117	3313
January	2019	2185	2351	2517	2683	2848
February	1670	1816	1963	2109	2256	2403
March	1320	1440	1559	1679	1799	1918
April	971	1059	1148	1237	1326	1414
May	621	675	729	783	837	891
June	311	338	365	392	419	446

Table 7 – High priority reserve

Month	High priority reserve (ML)
July	0
August	2771
September	5542
October	8314
November	11 085
December	13 856
January	16 627
February	19 398
March	22 169
April	24 941
May	27 712
June	30 483

14 Stream flow period

- (1) A stream flow period is a period of time, for a zone, that starts and ends at such time that the resource operations licence holder notifies under subsection (2).
- (2) The resource operations licence holder must notify the water allocation holders for the zone of the start and end of a stream flow period for the zone.

- (3) Despite subsection (2), where the announced allocation for a priority group is 100 per cent, the resource operations licence holder is not required to notify the water allocation holders of the start and end of a stream flow period for that priority group.
- (4) The resource operations licence holder must start a stream flow period for medium priority water allocations—
 - (a) in zones Bowen Broken A and Bowen Broken B—whenever flow in the Bowen River is greater than 40 ML/day at flow monitoring Node E; and
 - (b) in zones Bowen Broken C and Bowen Broken D—whenever the storage level of Bowen River Weir is at or above full supply level and the natural inflow to the weir is greater than 40 ML/day.
- (5) The resource operations licence holder must end a stream flow period for a zone within 24 hours when the requirements in subsection (4) are not being met.

15 Taking water under a water allocation

- (1) The total volume of water taken under a water allocation in a water year must not exceed the nominal volume of the allocation.
- (2) The volume of water taken under a water allocation in a water year, other than during stream flow periods, must not exceed the nominal volume of the allocation multiplied by the announced allocation.
- (3) During a stream flow period for the zone to which a water allocation applies, water may be taken under the allocation in addition to that which may be taken under subsection (2), up to the nominal volume.

Chapter 3 Seasonal water assignment rules

16 Seasonal water assignment rules—Regulation, s. 61

- (1) The holder of a water allocation may enter into an arrangement for a seasonal water assignment of a water allocation under section 61 of the Water Regulation 2016 only if the total water use in a water year for each zone does not exceed the maximum allowable water use volumes in table 8 for each zone or zone group.
- (2) Water supplied under a seasonal water assignment may be used for any purpose.
- (3) Despite subsections (1) and (2), the resource operations licence holder must not approve the seasonal assignment of a water allocation with a purpose of distribution loss, unless the assignment—
 - (a) is to the same person; and
 - (b) does not involve a change in purpose.
- (4) In this section—

assignee means the person or entity to whom an interest or right to water is being transferred (e.g. seasonally assigned).

total water use, for a zone or zone group, means the total volume of water taken under all water allocations managed under the resource operations licence within the zone or zone group.

water use means the volume of water taken under the authority of a water allocation.

Table 8 – Maximum allowable water use volume

Zone	Maximum allowable water use volume (ML)
Bowen Broken A	3600
Bowen Broken B	5676
Bowen Broken C	24 325
Bowen Broken D	45
Bowen Broken E	21 605

Attachment 1 Dictionary

section 2

Term	Definition
Australian Height Datum (AHD)	AHD adopted by the National Mapping Council of Australia for referencing a level or height back to a standard base level.
Distribution	Water that is 'lost' when delivering water for water allocations in reticulated areas via constructed infrastructure through processes such as (but not limited to) evaporation, seepage, pipeline leakage, accidental loss through temporary pipe failure, loss through pressure relief systems, scouring and pigging.
Elevation (EL)	The elevation of a geographic location is its height above a fixed reference point, often the mean sea level.
Location	For a water allocation, location means the zone from which water under the water allocation can be taken.
Megalitre (ML)	One million litres
Nominal volume	Nominal volume means the volume of water, in megalitres, that represents the share of the water available to be taken by holders of water allocations in a priority group or a water allocation group.
Water user	Water user means the holder of a valid water entitlement.
Water year	The water year for water managed under the Water Plan (Burdekin Basin) 2007 is the 12 month period beginning 1 July and ending 30 June.
Zone	A geographic location defined by a reach of a watercourse which is used to define the location of a water allocation. Zones are defined in the Water Plan (Burdekin Basin) 2007.