Nogoa Mackenzie Water Supply Scheme Resource Operations Licence Operations Manual

Water Plan (Fitzroy Basin) 2011

APPROVED 26 SEPTEMBER 2019

Statement of changes made to this manual

Version	Version Date	Statement of changes	Approved by
V1-0	June 2018	Initial document created and approved by Department of Natural Resource, Mines and Energy	David Wiskar – Executive Director, Water Policy. Department of Natural Resources, Mines and Energy on 29 June 2018
V2-0	July 2019	Amended by the Department of Natural Resource, Mines and Energy under section 723 of the *Water Act 2000*.	David Wiskar – Executive Director, Water Policy. Department of Natural Resources, Mines and Energy on 21 May 2019

V3-0	September 2019	Amendment to:
		• include new section 8A, critical water sharing rules for Zones Mackenzie B to D – allows for announced allocations for water allocations located in Zones Mackenzie B to D to be calculated independently of the whole scheme (up to 30%) using the useable volume from Tartrus Weir; and
		• section 11, seasonal water assignment rules –
		    o when new section 8A is triggered, no seasonal water assignments will be allowed to transfer into Zones Mackenzie B to D; and
		    o the minimum allowable volume for seasonal water assignments in Zones Mackenzie B to D decreased from 5,182 megalitres to 4,500 megalitres.
		• correct referencing due to inclusion of section 6
			Ian Gordon – Director, Water, Divisional Support. Department of Natural Resources, Mines and Energy on 26 September 2019

Contents

Chapter 1　Preliminary

1　Short title

    (1)　This operations manual may be cited as the Nogoa Mackenzie Water Supply Scheme Operations Manual.

    (2)　Reference in this document to 'this manual' means the Nogoa Mackenzie 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 Nogoa Mackenzie Water Supply Scheme is defined in the Water Plan (Fitzroy Basin) 2011.

Chapter 2   Operating rules

4   Operating levels of storages

(1)   The minimum operating levels and nominal operating levels for Fairbairn Dam, Selma Weir, Bedford Weir, Bingegang Weir and Tartrus Weir are specified in table 1.

(2)   The licence holder may only release water from a storage if the release is necessary to—

(a)   supply water to a water allocation holder;

(b)   maintain a downstream storage at or above its minimum operating level;

(c)   meet the minimum waterhole level requirements in section 5; and

(d)   comply with the environmental management rules and the seasonal base flow management strategy prescribed in attachment 2 of the resource operations licence.

(3)   Despite subsection (2), the licence holder may only release or supply water from a storage when the water level in that storage is above its minimum operating level, unless authorised by the chief executive.

Table 1 – Operating levels of storages

Storage	Minimum operating level (m AHD)	Nominal operating level (m AHD)
Fairbairn Dam	EL 185.85	not applicable
Selma Weir	EL 165.52	not applicable
Bedford Weir	EL 115.08	EL 118.38
Bingegang Weir	EL 97.74	EL 99.94
Tartrus Weir	EL 76.85	EL 79.25

5   Minimum levels in waterholes

(1)   For waterholes listed in table 2, supplemented water must not be taken from a waterhole when its level is more than 1 metre below its cease to flow level, unless otherwise authorised by the chief executive.

(2)   For waterholes not listed in table 2 and within the extent of this water supply scheme—supplemented water must not be taken when the level in the waterhole is more than 0.5 metres below its cease to flow level, unless otherwise authorised by the chief executive.

Table 2 – Minimum levels in waterholes

Waterhole (AMTD) (approximate location of the waterhole)
467.2 km to 436.6 km
429.5 km (Tartrus Weir)–419.2 km
412.3 km
408.5 km
378.8 km
373.2 km (10 Mile Waterhole)
371.3 km (10 Mile Waterhole)
357.9 km

6   Emptying of channels in Emerald Channel Scheme

(1)   The licence holder may authorise the distribution operations licence holder to transfer water from the Emerald Channel Scheme to Zone Mackenzie M.

(2)   The methodology for permitting and calculating the volumes of water transferred will be agreed between the licence holder and distribution operations licence holder, including consideration of the use of the water within Zone Mackenzie M.

Chapter 3   Water sharing rules

7   **Announced allocations**

(1)   The licence holder must—

   (a)   set an announced allocation for water allocations belonging to the high and medium priority groups to take effect on the first day of each water year;

   (b)   following the commencement of a water year—

      (i)   if the announced allocation percentage is less than 100 per cent— recalculate the announced allocation—

         (A)   within two weeks after a major inflow occurs; and

         (B)   within five business days of the first calendar day of every quarter, unless a major inflow has occurred within the previous two weeks; or

      (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

   (c)   make public details of the announced allocation, including parameters used in determining the announced allocations, within five business days of setting or resetting an announced allocation.

(2)   The announced allocation that is set by the licence holder must be—

   (a)   for the medium priority group—the lesser of—

      (i)   the announced allocation calculated for the medium priority group under section 8 rounded to the nearest per cent; and

      (ii)   100 per cent;

   (b)   for the high priority group—

      (i)   if the announced allocation for the medium priority group is greater than zero—100 per cent; or

      (ii)   otherwise—the lesser of—

         (A)   the announced allocation calculated for the high priority group under section 8 rounded to the nearest per cent; and

         (B)   100 per cent.

(3)   Despite subsection (2), the announced allocations that are set by the licence holder must—

   (a)   not be less than zero; and

   (b)   not be reduced during the water year.

8   **Calculation of announced allocations**

(1)   The licence holder must calculate the announced allocation using the following formula—

   (a)   for water allocations belonging to the medium priority group—

$$AA_m = \frac{100 \times (UV - HPA - RE - TOL + DIV - VIWY)}{MPA}$$

(b)   for water allocations belonging to the high priority group—

$$AA_h = \frac{100 \times (UV - TOL + DIVH - VIWY)}{HPA}$$

(2)   The parameters used in the formula described under subsection (1) are defined in table 3.

Table 3 – Parameters for calculation of announced allocation

Parameter	Definition
AA_m	The announced allocation for water allocations belonging to the medium priority group.
AA_h	The announced allocation for water allocations belonging to the high priority group.
MPA	Medium priority allocations—the sum of the nominal volumes for all water allocations belonging to the medium priority group.
HPA	High priority allocations—the sum of the nominal volumes for all water allocations belonging to the high priority group.
DIV	Diversions—the sum of the diversions for all water allocations during the current water year.
DIVH	High priority diversions—the sum of the diversions for all high priority water allocations during the current water year.
UV	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— $$UV = ASV - DSV$$ where— *adjusted storage volume (ASV)* means the storage volume, in megalitres, equating to the current storage level adjusted for the projected storage loss (SL). *projected storage loss (SL)* 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. *dead storage volume (DSV)* means the volume of water, in megalitres, that cannot be released or used from the storage under normal operating conditions. For the purposes of this section— - UV is the sum of the useable volumes for Fairbairn Dam, Bedford Weir, Bingegang Weir and Tartrus Weir. - Evaporation and seepage is specified in millimetres for each month in table 4 for specific storages. To determine the projected storage loss (SL), the value next to the current month is multiplied by the current surface area of the storage. The storage loss for each storage is determined and then summed to give the total storage loss. - DSV is specified for each of the storages in attachment 1 of the resource operations licence. - Storage volumes are derived from the relevant storage volume/level curve in attachment 1 of the resource operations licence.

RE	Reserve—the volume reserved for supplying high priority allocations in future years. RE must be determined from the following relationship— $$RE = (RES \times HPA) \div 44\,398$$ where RES is the reserve volume for the current month at the time of the calculation given in table 5.
TOL	Transmission operating loss—the allowance for the expected instream losses associated with the supply of water allocations over the remainder of the water year. TOL is derived from table 6 using linear interpolation of the announced allocation for the medium priority group.
VIWY	Net Carryover volume—the sum of the available carryover volumes for the scheme determined under section 10.

Table 4 – Project storage losses (mm)

Month in which announced allocation is calculated	Fairbairn Dam (mm)	Bedford, Bingegang and Tartrus Weirs (mm)
July	1660	1770
August	1580	1680
September	1470	1570
October	1340	1420
November	1170	1240
December	990	1050
January	770	830
February	580	620
March	410	440
April	260	290
May	160	170
June	75	85

Table 5 – Reserves (ML)

Month in which announced allocation is calculated	Reserve (ML
July	54 700
August	60 200
September	65 700
October	71 200
November	76 800
December	82 300
January	87 800
February	93 300
March	98 800
April	104 300
May	109 900
June	115 400

Table 6 – Transmission and operational losses (ML)

Month in which announced allocation is calculated	AAm = 0%	AAm = 100%
July	9020 * F_0	25 880 * F_{100}
August	8250 * F_0	24 610 * F_{100}
September	7490 * F_0	23 340 * F_{100}
October	6750 * F_0	21 250 * F_{100}
November	5980 * F_0	17 450 * F_{100}
December	5240 * F_0	16 030 * F_{100}
January	4470 * F_0	12 400 * F_{100}

February	$3710 * F_0$	$7920 * F_{100}$
March	$3020 * F_0$	$4700 * F_{100}$
April	$2250 * F_0$	$3600 * F_{100}$
May	$1510 * F_0$	$2520 * F_{100}$
June	$740 * F_0$	$1420 * F_{100}$
Where— $$F_0 = HPA \div 44\,398$$ $$F_{100} = (HPA + MPA) \div 235\,323$$		

8A Critical water sharing rules for Zones Mackenzie B to D – Tartrus Weir

(1) This section applies when the licence holder notifies under subsection (2).

(2) The licence holder must notify the water allocation holders located in Zones Mackenzie B to D of—

    (a) the commencement or cessation of each stage of the critical water sharing rules; and

    (b) if commencing a stage, the announced allocation set for Zones Mackenzie B to D under the critical water sharing rules.

(3) The licence holder must notify the Department which administers Chapter 2 of the *Water Act 2000* within one business day—

    (a) of the commencement or cessation of each stage of the critical water sharing rules; and

    (b) if commencing a stage, the announced allocation set for Zones Mackenzie B to D under the critical water sharing rules.

(4) The triggers for commencement of the critical water sharing rules are—

    (a) Stage 1 commences when the storage level in Fairbairn Dam is estimated to be less than or equal to EL 194.11 m AHD (approximately 250,000 ML) and the announced allocation for a medium priority water allocation is less than 30 percent;

    (b) Stage 2 commences when the announced allocation for a high priority water allocation is less than the announced allocation for a medium priority water allocation located in Zones Mackenzie B to D; and

    (c) Stage 3 commences when the storage level in Fairbairn Dam is estimated to be less than or equal to EL 185.85 m AHD (approximately 12,300 ML).

(5) The triggers for the cessation of each stage of the critical water sharing rules are—

    (a) Stage 1 ceases when either—

        (i) the storage level in Fairbairn Dam is estimated to be greater than EL 194.20 m AHD (approximately 255,000 ML); and/or

        (ii) the medium priority announced allocation set under section 7 is greater than or equal to the Zones Mackenzie B to D announced allocation set under subsection (6);

    (b) Stage 2 ceases when the announced allocation for a high priority water allocation is equal to or greater than an announced allocation for a medium priority water allocation located in Zones Mackenzie B to D; and

(c) Stage 3 ceases when the storage level in Fairbairn Dam is estimated to be greater than EL 186.50 m AHD (approximately 15,965 ML).

(6) The arrangements that will be applied to Stage 1 are—

(a) despite section 7, announced allocations can be calculated and set for a medium priority water allocation located in Zones Mackenzie B to D, in accordance with subsection (9);

(b) releases will only be made from Bingegang Weir to—

(i) if necessary, supply high priority water allocations located in Zones Mackenzie B to D; and

(ii) comply with the environmental management rules prescribed in attachment 2 of the resource operations licence; and

(c) compliance with section 5–minimum levels in waterholes.

(7) The arrangements that will be applied to Stage 2 are—

(a) despite section 7, announced allocations—

(i) for medium priority water allocations located in Zones Mackenzie B to D, can be calculated and set in accordance with the arrangements stated in subsection (6); and

(ii) for a high priority water allocation located in Zones Mackenzie B to D will be equal to the announced allocation for a medium priority water allocation located in Zones Mackenzie B to D;

(b) releases will only be made from Bingegang Weir to comply with the environmental management rules prescribed in attachment 2 of the resource operations licence; and

(c) compliance with section 5–minimum levels in waterholes.

(8) The arrangements that will be applied to Stage 3 are—

(a) announced allocations may be calculated and set for all water allocations located in Zones Mackenzie B to D, in accordance with the arrangements stated in subsection (7);

(b) releases will only be made from Bingegang Weir to comply with the environmental management rules prescribed in attachment 2 of the resource operations licence;

(c) compliance with section 5–minimum levels in waterholes; and

(d) storages may be drawn down below the minimum operating levels to supply high priority water allocations.

(9) If the critical water sharing rules commence as notified under subsection (2), the licence holder must calculate the announced allocation for a medium priority water allocation located in Zones Mackenzie B to D using the following formula—

(a) $$AA_{mT} = \frac{\left(UV^T - TOL^T + DIV^T - VIWY^T - HPA^T\right) \times 100}{MPA^T}$$

(b) however, if the Zones Mackenzie B to D announced allocation calculated under subsection (a) is a number that is—

(i) less than or equal to 30 percent, then the announced allocation for Zones Mackenzie B to D is the number calculated; or

(ii) greater than 30 percent, then the announced allocation for Zones Mackenzie B to D is 30 percent; and

(c) the parameters used in the announced allocation formula are defined in table 6A.

(10)   To the extent that this section is inconsistent with any other section of the Nogoa Mackenzie Water Supply Scheme Resource Operations Licence Operations Manual, this section prevails.

Table 6A – Parameters for calculation of announced allocation

Parameter	Definition
AA_{mT}	Announced allocation for medium priority water allocations located in Zones Mackenzie B to D.
UV^T	Usable volume of Tartrus Weir is the volume of stored water in Tartrus Weir that can be used to supply water allocations in Zones Mackenzie B to D through to the end of a water year and is calculated as— $$UV^T = CV^T - DSV^T - SL^T$$ Where— CV^T is the current volume of Tartrus Weir derived from the relevant storage volume/level curve as prescribed in attachment 1 of the resource operations licence. DSV^T is the dead storage volume of Tartrus Weir as prescribed in attachment 1 of the resource operations licence. SL^T is the projected storage losses from Tartrus Weir for the remainder of the water year. This is the combined evaporation and seepage losses, in megalitres, that are expected to occur from Tartrus Weir through to the end of the water year. For the purposes of this section— - If ($CV^T - DSV^T - SL^T$) is less than zero, UV^T equals zero - Evaporation and seepage is specified in millimetres for each month in table 4 for Tartrus Weir. To determine the projected storage loss (SL^T), the value next to the current month is multiplied by the current surface area of the storage. The depth for the month in question is used with the relevant storage curve as prescribed in attachment 1 of the resource operations licence.
TOL^T	Transmission operating loss for Tartrus Weir–the allowance for expected instream losses associated with the supply of water allocation from Tartrus Weir over the remainder of the water year. TOL^T is derived from table 6B using linear interpolation of the announced allocation for the Zones Mackenzie B to D medium priority water allocations.
DIV^T	Diversions in Zones Mackenzie B to D–the sum of the diversions for all water allocations located in Zones Mackenzie B to D during the current water year.
$VIWY^T$	Net carryover volume in Zones Mackenzie B to D–the sum of the available carryover volumes for Zones Mackenzie B to D.
HPA^T	High priority water allocation volume in Tartrus Weir section (Zones Mackenzie B to D).
MPA^T	Medium priority water allocation volume in Tartrus Weir section (Zones Mackenzie B to D).

Table 6B – Parameters for calculation of announced allocation

Month in which announced allocation is calculated	Transmission and operational loss allowance (ML)	
	At $AA_m = 0\%$	At $AA_m = 100\%$
July	0	1,463
August	0	1,341
September	0	1,219
October	0	1,097
November	0	975
December	0	853
January	0	732
February	0	610
March	0	488
April	0	366
May	0	244
June	0	122

9 Taking water under a water allocation

(1) The volume of water taken under a water allocation in a water year must not exceed the nominal volume of the allocation multiplied by the announced allocation.

(2) For a water allocation belonging to the high priority group that has changed its priority group from medium—the announced allocation for the high priority group must not apply until the water year following the year in which the change was registered.

(3) Subsection (1) does not include a volume of water permitted to be carried over from the previous water year as specified in section 10.

10 Carryover

(1) The licence holder may, subject to this section, allow a holder of a water allocation belonging to the high or medium priority groups, to carry over part of the water allocation holder's unused water from one water year to the next water year.

(2) The total volume of unused water for the scheme that is permitted to be carried over by the licence holder to the next water year is the lesser of—

(a) the total volume of unused water for the scheme at the end of the water year; and

(b) the maximum volume in table 7.

(3) The volume of water that may be carried over by a water user must not exceed the nominal volume of the water allocation.

(4) Any volume of water that is carried over into a water year, and that is unused by the water allocation holder as at the date of either of the following events, must be deducted from the volume of water available to the allocation holder—

(a) the end of the water year; or

(b) when the Fairbairn Dam spills.

(5) The licence holder must make public the methodology for determining the volume of water permitted to be carried over by each water user, if the volume determined under subsection (2)(b) is less than the total volume of unused water permitted to be carried over for the scheme.

(6) In this section—**unused water** means the volume of water referred to under section 8 that was not taken.

Table 7 – Maximum volume for carryover (ML)

Storage level of Fairbairn Dam at 1 July	Maximum volume for carryover (ML)
Greater than EL 197 m AHD	150 000
Between EL 197 m AHD and EL 193 m AHD	75 000
Less than EL 193 m AHD	25 000

Chapter 4   Seasonal water assignment rules

11   Seasonal water assignment rules

(1)   The holder of a water allocation may enter into an arrangement for a seasonal water assignment in relation to the allocation under section 61 of the Water Regulation 2016 only if—

    (a)   the holder of the licence consents to the arrangement; and

    (b)   the ***potential take volume*** for each zone group in table 8 is—

        (i)   less than or equal to the maximum volume for the zone group specified in table 8; and

        (ii)   greater than or equal to the minimum volume for the zone group specified in table 8.

(2)   Despite subsection (1) —

    (a)   when any stage of the critical water sharing rules are notified under section 8A, seasonal water assignments will not be permitted into Zones Mackenzie B to D.

    (b)   the consent of the distribution operations licence holder to the arrangement is also required when—

        (i)   water is being seasonally assigned from the Nogoa Mackenzie Water Supply Scheme into the Emerald Channel Scheme; and

        (ii)   water is being seasonally assigned from the Emerald Channel Scheme out to the Nogoa Mackenzie Water Supply Scheme.

(3)   Water supplied under section (1) and (2) may be used for any purpose.

(4)   In this section—

    (a)   ***potential take volume***, for a zone group, means the volume calculated using the formula—

$$NV_{zg} + SWA_{in} - SWA_{out}$$

where—

Parameter	Definition
NV_{zg}	The sum of the nominal volumes for all water allocations located within a zone group at the start of the water year.
SWA_{in}	The volume seasonally assigned into the zone group for the current water year.
SWA_{out}	The volume seasonally assigned out of the zone group for the current water year.

Table 8 – Maximum and minimum volumes for seasonal water assignment

Volume	Zone Groups			
	Mackenzie J to N	Mackenzie I & H	Mackenzie E to G	Mackenzie B to D
Maximum (ML)	—	46 000		18 882
Minimum (ML)	0	12 000	10 000	4500

Attachment 1   Dictionary

Term	Definition
AHD	Australian Height Datum, which references a level or height to a standard base level.
AMTD	Adopted Middle Thread Distance, is the distance in kilometres, measured along the middle of the watercourse, that a specific point in the watercourse is from— • the watercourse's mouth; or • if the watercourse is not a main watercourse—the watercourse's confluence with its main watercourse.
Announced allocation	For a water allocation managed under a resource operations licence, 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.
Carryover	The volume of water permitted to be carried over from the unused portion of the entitlement at the end of the previous water year.
Cease to flow level	For a waterhole, the level at which water stops flowing from a waterhole over its downstream control.
Dead storage	For a dam or weir, the specified minimum volume of water within the ponded area of the storage that cannot be released or used from the storage under normal operating conditions.
Distribution operations licence holder	Distribution operations licence holder for the Emerald Channel Scheme.
EL	Elevation level.
Full supply level	The specified maximum volume of water within the ponded area of a dam, weir or barrage, which corresponds to the full supply level.
Licence holder	The holder of the resource operations licence for the Nogoa Mackenzie Water Supple Scheme.
Megalitre (ML)	One million litres.
Minimum operating level	For a dam or weir, is the volume of water within the ponded area of a dam, weir or barrage below which water cannot be released or taken from the infrastructure under normal operating conditions.
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.
Ponded area	Area of inundation at full supply level of a storage.
Priority group	A grouping of water allocations for taking supplemented water from a water supply scheme with the same Water Allocation Security Objective (WASO).

Quarter or quarterly	Three-monthly intervals commencing at the start of the water year.
Release	Water from a dam or weir that passes downstream from the dam or weir either through the dam or weir outlet works or over the dam spillway.
Unused water	Means the volume of water not taken.
Water user	The holder of a valid water entitlement.