

Attachment 4.2B

Nogoa Mackenzie Water Supply Scheme

Rules for conversion to water allocations

1 Locations where existing authorisations are being converted to water allocations

Existing authorisations for supplemented water are being converted to water allocations on:

- The Nogoa River from the upstream limit of Fairbairn Dam to the Comet River junction;
- The Mackenzie River from the Comet River junction to the Springton Creek junction; and
- Sections of tributaries of these rivers that contain water ponded from natural waterholes or infrastructure within the above sections of the Nogoa and Mackenzie rivers.

2 Rules for conversion of existing authorisations to water allocations

The following rules apply for the conversion of existing authorisations to water allocations to establish the details required for the registration of supplemented water allocations.

2.1 Location

The location from which water may be supplied under a water allocation is specified as a zone according to the position of the existing authorisation. Descriptions of the zones for the Nogoa and Mackenzie rivers are given in Attachment 2.2.

2.2 Purpose

The purpose for which water may be taken under a water allocation is specified as 'agriculture', 'distribution loss' or 'any'. 'Agriculture' is the nominated purpose for those existing authorisations that are primarily used for agricultural purposes. 'Distribution loss' is the nominated purpose for water allocations for distribution losses associated with the Selma and Weemah channel systems and Blackwater pipeline. 'Any' is the nominated purpose for all other uses of water.

2.3 Volume

The nominal volume for a water allocation will be the volume stated on existing authorisations subject to the following arrangements for entitlements associated with watering stock normally depastured on the land and domestic purposes.

Under the Water Act, an owner of land adjoining a watercourse, lake or spring may take water for domestic purposes and watering stock that would be normally depastured on the land without a water entitlement. Therefore any existing authorisation that provides for the taking of water for stock and domestic purposes on land adjoining a watercourse will not be converted to a water allocation.

2.3.1 Arrangements for authorisations for irrigation and stock and domestic purposes

- a) For an authorisation for irrigation, stock and domestic purposes, where all the land supplied adjoins a watercourse:
- If the authorisation states an irrigation volume and a stock and domestic volume, the irrigation volume is the volume for the water allocation; or
 - If the authorisation states an irrigation volume but not a stock and domestic volume, the irrigation volume is the volume for the water allocation.
- b) For an authorisation for irrigation, stock and domestic purposes, where all the land supplied does not adjoin a watercourse:
- If the authorisation states an irrigation volume and a stock and domestic volume, the combined irrigation volume and stock and domestic volume is the total volume for the water allocation; or
 - If the authorisation states an irrigation volume but not a stock and domestic volume, the irrigation volume is the volume for the water allocation.
- c) For an authorisation for irrigation, stock and domestic purposes, where part of the land supplied is not contiguous with the land that adjoins a watercourse:
- If the authorisation states an irrigation volume and a stock and domestic volume, the combined irrigation volume and the calculated volume for stock and domestic purposes on the non-adjointing land is the volume for the water allocation; or
 - If the authorisation states an irrigation volume but not a stock and domestic volume, the irrigation volume is the volume for the water allocation.
- d) For an authorisation for stock and domestic purposes only, where all the land supplied does not adjoin a watercourse:
- If the authorisation states a stock and domestic volume, the stock and domestic volume is the volume for the water allocation; or
 - If the authorisation does not state a stock and domestic volume, the annual volume calculated for stock and domestic purposes is the volume for the water allocation.
- e) For Section 2.3.1c) and Section 2.3.1d), the annual volume calculated for domestic purposes is:
- i) 1 ML; or
 - ii) An alternative volume determined by the chief executive based on consideration of a submission received on this matter on the draft Resource Operations Plan (ROP).
- f) For Section 2.3.1c) and Section 2.3.1d), the annual volume calculated for stock watering is:
- i) A volume equivalent to 1 ML per 250 ha of land; or
 - ii) An alternative volume determined by the chief executive based on consideration of a submission received on this matter on the draft ROP.

Where an existing authorisation does not state a stock and domestic volume, the annual volume specified for the water allocation is the combined volume calculated using Section 2.3.1e)i) and Section 2.3.1f)i).

2.4 Priority group

The priority group for a water allocation converted from an existing authorisation to take supplemented water is medium priority, except where a product specification or other undertaking associated with the authorisation identifies the authorisation's water supply as being high priority water allocation.

Attachment 4.2C

Nogoa Mackenzie Water Supply Scheme

Total volume of supplemented water allocations

Table 1: Total volume of supplemented water allocations at Resource Operations Plan approval

Zone	Medium priority water allocation (ML)	High priority water allocation (ML)
Mackenzie N	125,239 (note 1)	8,589 (note 2)
Mackenzie M	17,534	10,066
Mackenzie L	20,350	1,000
Mackenzie K	11,241	0
Mackenzie J	1,100	0
Mackenzie I	3,173	13,286
Mackenzie H	1,128	290
Mackenzie G	488	11,167
Mackenzie F	838	0
Mackenzie E	1,652	0
Mackenzie D	2,330	0
Mackenzie C	4,592	0
Mackenzie B	1,260	0
Total	190,925	44,398

Note 1: Includes 155 ML to be granted to SunWater under Section 6.2.7 of Chapter 6.

Note 2: Includes 45 ML to be granted to SunWater under Section 6.2.7 of Chapter 6.

Attachment 4.2D

Nogoa Mackenzie Water Supply Scheme Infrastructure details

Storage: Fairbairn Dam – Nogoa River AMTD 685.6 km

Description of water infrastructure	
Main embankment	Earth fill dam
Full supply level	EL 204.23 m AHD
Fixed crest level	EL 204.23 m AHD
Saddle dam(s)	Six saddle dams. Saddle dam 3 has a concrete chute spillway
Fabridams	Nil
Gates	Nil
Storage volume and surface area	
Full supply volume	1,301,000 ML
Dead storage volume	12,300 ML
Surface area/elevation and storage volume/elevation relationship	Natural Resources Drawing No. A3-203831 & A3-203832 (19/09/96)
Spillway arrangement	
Description of works	Curved approach channel to a mass concrete ogee crest. Concrete lined chute with energy dissipaters.
Spillway level	EL 204.23 m AHD
Spillway width	167.64 metres
Discharge characteristics	Irrigation and Water Supply Commission spillway discharge curve No. L42944 1054-D1189 (Aug 1974)
River inlet/outlet works	
Description of works	An intake tower, equipped with two 1200 mm by 1800 mm regulating gates, diverting under gravity via a 6.1 metre diameter tunnel to headworks controlled by 1 vertical lift gate for releases to the Nogoa River Methods may be employed to enable a maximum discharge capacity of up to 400 ML/day when the level of water stored in Fairbairn Dam is between EL190.21 m AHD and EL185.85 m AHD.
Multi-level inlet	Works do not accommodate selective withdrawal.
Cease to flow level	EL 190.21 m AHD (river outlet)
Discharge characteristics	Right bank outlet (River & Weemah Channel) L42946 1054-D1191 (Aug 1974) The existing maximum discharge capacity of the river outlet is approximately 600 ML/day. <i>Note: Chapter 8 provides for the river outlet to be modified to accommodate an increased discharge capacity to up to 1,600 ML/day.</i>
Fish transfer system	
Description of works	Nil

Storage: Selma Weir – Nogoia River AMTD 668.7 km

Description of water infrastructure	
Main embankment	Mass concrete weir
Full supply level	EL 170.39 m AHD
Fixed crest level	EL 170.39 m AHD
Saddle dam(s)	Nil
Fabridams	Nil
Gates	Nil
Storage volume and surface area	
Full supply volume	1180 ML
Dead storage volume	25 ML
Surface area/elevation and storage volume/elevation relationship	Drawing No. F35379 (27/6/73)
Spillway arrangement	
Description of works	Mass concrete ogee crest
Spillway level	EL 170.39 m AHD
Spillway width	From left to right along structure: EL 170.39 m AHD (der) – Length 23.77 metres EL 171.92 m AHD (der) – Length 54.86 metres EL 171.31 m AHD (der) – Length 34.75 metres EL 171.00 m AHD (der) – Length 34.75 metres
Discharge characteristics	Irrigation and Water Supply Commission Drawing No. F-12400 (5/3/54)
River inlet/outlet works	
Description of works	Outlet works: 300 mm RC pipe with a gate valve at the concrete outlet box
Multi-level inlet	Single-level offtake only
Cease to flow level	Outlet works: Invert EL 165.52 m AHD
Discharge characteristics	Maximum discharge capacity of approximately 35 ML/day
Fish transfer system	
Description of works	Nil

Storage: Bedford Weir – Mackenzie River AMTD 548.8 km

Description of water infrastructure	
Main embankment	Mass concrete weir with fabridam
Full supply level	EL 124.0 m AHD
Fixed crest level	EL 122.80 m AHD
Saddle dam(s)	Nil
Fabridams	1.2 m fabridam
Gates	Nil
Storage volume and surface area	
Full supply volume	22,900 ML
Dead storage volume	3,290 ML
Surface area/elevation and storage volume/elevation relationship	Department of Primary Industries (Water Resources) Storage Curve No. A3-110858A (22/3/96)
Spillway arrangement	
Description of works	Reinforced concrete crest (with deflated dam)
Spillway level	EL 122.80 m AHD
Spillway width	185.90 metres
Discharge characteristics	Ref: SWP ES, Bedford Weir Stage 2 Weir Operation, July 97
River inlet/outlet works	
Description of works	Original outlet works: Concrete outlet recess. 750 mm diameter RC pipe reducing to 450 mm diameter RC pipe controlled by a gate valve on the downstream end. New outlet works: 1200 mm by 1200 mm square unlined conduit cut from the original mass concrete monolith, controlled by 1200 mm by 1200 mm roller gate.
Multi-level inlet	New inlet works have selective withdrawal capabilities.
Cease to flow level	Original outlet works: EL 112.88 m AHD New outlet works: EL 116.08 m AHD
Discharge characteristics	Maximum design discharge capacity of original outlet 160 ML/day Maximum design discharge capacity of new outlet 890 ML/day Ref: SWP ES, Bedford Weir Stage 2 Weir Operation, July 97
Fish transfer system	
Description of works	Nil

Storage: Bingegang Weir – Mackenzie River AMTD 489.2 km

Description of water infrastructure	
Main embankment	Mass concrete weir
Full supply level	EL 102.90 m AHD
Fixed crest level	EL 102.90 m AHD
Saddle dam(s)	Nil
Fabridams	Nil
Gates	Nil
Storage volume and surface area	
Full supply volume	8,060 ML
Dead storage volume	1,400 ML
Surface area/elevation and storage volume/elevation relationship	Natural Resources Storage Curve No. A3-110940 (22/5/96)
Spillway arrangement	
Description of works	Reinforced concrete crest
Spillway level	EL 102.90 m AHD
Spillway width	107.30 metres
Discharge characteristics	Ref: SWP ES, Bingegang Weir Stage 2 Weir Operation, June 97
River inlet/outlet works	
Description of works	Original outlet works: 600 mm diameter pipe controlled by a 450 mm diameter gate valve with a 150 mm diameter scour around gate valve. New outlet works: 1200 mm by 1200 mm square unlined conduit cut from the original mass concrete monolith, controlled by 1200 mm by 1200 mm roller gate.
Multi level inlet	Single level offtake only
Cease to flow level	Original outlet works: EL 94.81 m AHD Invert level of scour: EL 94.97 m AHD New outlet works: EL 98.74 m AHD
Discharge characteristics	Maximum design discharge capacity of original outlet 92 ML/day Maximum design discharge capacity of new outlet 690 ML/day Ref: SWP ES, Bingegang Weir Stage 2 Weir Operation, June 97
Fish transfer system	
Description of works	Nil

Storage: Tartus Weir – Mackenzie River AMTD 429.5 km

Description of water infrastructure	
Main embankment	Mass concrete weir
Full supply level	EL 81.75 m AHD
Fixed crest level	EL 81.75 m AHD
Saddle dam(s)	Nil
Fabridams	Nil
Gates	Nil
Storage volume and surface area	
Full supply volume	12,000 ML
Dead storage volume	2,530 ML
Surface area/elevation and storage volume/elevation relationship	Queensland Water Resources Commission storage Curve No. A3-72973 (27/1/87)
Spillway arrangement	
Description of works	Central reinforced concrete ogee crest
Spillway level	EL 81.75 m AHD
Spillway width	170.0 metres
Discharge characteristics	Drawing No. 158999 E-A4-1989 (18/12/89) as submitted to NR&M on 30/3/01
River inlet/outlet works	
Description of works	Outlet works: 1200 mm diameter RC pipe controlled by a circular opening penstock.
Multi level inlet	Single level offtake
Cease to flow level	Outlet works: EL 76.85 m AHD Nib: EL76.9 m AHD (cease to flow level)
Discharge characteristics	Queensland Water Resources Commission outlet rating Curve No. CQ-A2-4903
Fish transfer system	
Description of works	Nil

Attachment 4.2E

Nogoa Mackenzie Water Supply Scheme

Rules for infrastructure operation and environmental management

1 Operating levels of storages and waterholes

1.1 Nominal operating levels of storages

The nominal operating level for each storage in the scheme is given in Table 1.

Releases must be made from the relevant upstream storage given in Table 1 to maintain the water level in a storage at its nominal operating level, unless the water level in Fairbairn Dam is below EL 191.0 m AHD (92,900 ML).

Storage levels may vary above and below the nominal operating level due to practical limitations of estimating and making releases and for unforeseen circumstances.

Table 1: Nominal operating levels of storages

Storage	Upstream storage	Nominal operating level
Fairbairn Dam	Not Applicable	Not Applicable
Selma Weir	Fairbairn Dam	EL 169.89 m AHD (900 ML)
Bedford Weir	Fairbairn Dam	EL 118.38 m AHD (6,500 ML)
Bingegang Weir	Bedford Weir	EL 99.94 m AHD (3,100 ML)
Tartrus Weir	Bingegang Weir	EL 79.25 m AHD (6,160 ML)

1.2 Minimum operating level of storages

The minimum operating level for each storage in the scheme are given in Table 2.

Table 2: Local supply areas and minimum operating levels of storages

Storage	Local supply area	Minimum Operating Levels
Fairbairn Dam	Fairbairn Dam pond and downstream to, but excluding, Bedford Weir pond	EL 185.85 m AHD
Selma Weir	Not applicable	EL 165.52 m AHD
Bedford Weir	Bedford Weir pond and downstream to, but excluding, Bingegang Weir pond	EL 115.08 m AHD
Bingegang Weir	Bingegang Weir pond and downstream to, but excluding, Tartrus Weir pond	EL 97.74 m AHD
Tartrus Weir	Tartrus Weir pond and downstream to Springton Creek junction	EL 76.85 m AHD

Water must not be released or supplied from a storage if the water level in that storage is below its minimum operating level, unless otherwise authorised by the chief executive.

Bedford Weir may be drawn down to its minimum operating level only if Fairbairn Dam is below EL 191.0 m AHD (92,900 ML).

Bingegang Weir may be drawn down to its minimum operating level only if Bedford Weir is below its nominal operating level.

Tartus Weir may be drawn down to its minimum operating level only if Bingegang Weir is below its nominal operating level.

1.3 Minimum levels in waterholes

For the waterholes listed in Table 3:

- Supplemented water must not be taken from a waterhole that is below the level stated in Table 3, unless otherwise authorised by the chief executive.

Table 3: Drawdown levels for specific waterholes within the area of the Nogoia Mackenzie Water Supply Scheme

Waterhole AMTD and local name (see note re AMTD)	Allowable drawdown below cease to flow level of waterhole (m)
436.6 to 467.2 km (downstream of Bingegang Weir)	0.9
Tartus Weir - 419.2 km (downstream of Tartus Weir)	1.0
412.3 km	1.0
408.5 km	1.0
378.8 km	1.0
373.2 km (10 Mile Waterhole)	1.0
371.3 km (10 Mile Waterhole)	1.0
357.9 km (at end of scheme)	1.0

The waterhole referred to is that waterhole for which the stated AMTD is inclusive

For a waterhole within the extent of the Nogoia Mackenzie Water Supply Scheme other than a waterhole listed in Table 3:

- Supplemented water should not be taken from a waterhole that is more than 0.5 metres below its cease to flow level; and
- The chief executive may authorise supplemented water to be supplied from a waterhole when the level is more than 0.5 metres below its cease to flow level.

2 Releases of water from storages

2.1 General rules

When determining releases from a storage, the ROL holder must have regard to the following:

- Total volume of water ordered, and its distribution;
- The rules for the supply of water orders in zone Mackenzie I, H, G, F and E, when the total volume of medium and high priority water allocations in those zones exceeds 33,000 ML;
- The likely contribution of inflows from tributaries that could assist the supply of orders;
- The likely transmission and operating losses;

- The travel time for water delivery;
- The volume of releases required to maintain nominal operating levels in downstream storages, and to maintain levels in waterholes;
- The first post-winter flow management strategy;
- The seasonal base flow management strategy; and
- The quality of water released from storages.

The ROL holder may incorporate provisions in supply contracts for circumstances when the release capacity of a storage is insufficient to meet downstream demand.

2.2 Release rate rules

Water may be released from a storage at a rate up to the maximum discharge capacity of its outlet works.

The maximum discharge capacity of the outlet works is to be used for meeting downstream demand or passing environmental flows as required.

A change to the rate of a release through the outlet works of a storage must have regard to the limits described in Table 4.

Table 4: Limits on changes to rate of release through the outlet works of storages

Storage	Limits on changes to rate of release through outlet works
Fairbairn Dam, Selma Weir, Bedford Weir, Bingeang Weir, and Tartrus Weir	<ul style="list-style-type: none"> • Reductions of release rate must occur incrementally, such that the risk of fish stranding and bank slumping is minimised. • Maximum rates of increase in release rate are not specified.

2.3 Bedford Weir fabridam deflation/inflation rules

Inflation and deflation of the Bedford Weir fabridam must occur incrementally, such that the risk of fish stranding and bank slumping is minimised.

2.4 Rules for the supply of water orders in zone Mackenzie I, H, G, F and E

2.4.1 Fairbairn Dam

This section only applies if:

- The total volume of medium and high priority water allocations in zone Mackenzie I, H, G, F and E exceeds 33,000 ML at the start of the water year;
- The level in Bedford Weir is between nominal operating level (EL 118.38 m AHD) and EL 123.5 m AHD;
- The level in Bingeang Weir is between nominal operating level (99.94 m AHD) and EL 102.4 m AHD; and
- The level in Fairbairn Dam is above EL 195.1 m AHD (300,000 ML).

If the total volume of medium and high priority water allocation in zone Mackenzie I, H, G, F and E exceeds 33,000 ML:

- Releases must be made from Fairbairn Dam to meet a portion of the volume of water ordered in zones Mackenzie I, H, G, F and E; and
- The volume of water ordered in zones Mackenzie I, H, G, F and E to be met by releases from Fairbairn Dam must be determined from the following relationship:

$$\text{FDO(Fairbairn)} = (X - 31,000) * \text{TD1}/X$$

Where:

FDO(Fairbairn) is the volume of water ordered in zones Mackenzie I, H, G, F and E that must be met by releases from Fairbairn Dam.

X is the total nominal volume for all medium and high priority water allocations in zones Mackenzie I, H, G, F and E at the start of the water year, adjusted by the net volume of medium and high priority water seasonally assigned into or out of this zone grouping to date since the start of the water year.

TD1 is the total volume of water ordered in zones Mackenzie I, H, G, F and E.

For the purpose of this rule:

- Volumes of water to be released under this rule may be accumulated up to 200 ML to improve the efficiency and effectiveness of the release.

2.4.2 Bedford Weir

This section only applies if:

- The total volume of medium and high priority water allocations in zone Mackenzie I, H, G, F and E exceeds 33,000 ML at the start of the water year;
- The level in Bedford Weir is between nominal operating level (EL 118.38 m AHD) and EL 123.5 m AHD;
- The level in Bingegang Weir is between nominal operating level (99.94 m AHD) and EL 102.4 m AHD; and
- The level in Fairbairn Dam is above EL 195.1 m AHD (300,000 ML).

If the total volume of medium and high priority water allocation in zones Mackenzie I, H, G, F and E exceeds 33,000 ML:

- Releases must be made from Bedford Weir to meet a portion of the volume of water ordered in zones Mackenzie G, F and E; and
- The volume of water ordered in zones Mackenzie G, F and E to be met by releases from Bedford Weir must be determined from the following relationship:

$$\text{FDO(Bedford)} = \text{FDO(Fairbairn)} * \text{TD2}/\text{TD1}$$

Where:

FDO(Bedford) is the volume of water ordered in zones Mackenzie G, F and E that must be met by releases from Bedford Weir.

FDO(Fairbairn) is the volume of water ordered in zones Mackenzie I, H, G, F and E that must be met by releases from Fairbairn Dam determined under Section 2.4.1.

TD2 is the total volume of water ordered in zones Mackenzie G, F and E.

TD1 is the total volume of water ordered in zones Mackenzie I, H, G, F and E.

For the purpose of this rule:

- Volumes of water to be released under this rule may be accumulated up to 200 ML to improve the efficiency and effectiveness of the release.

3 First post-winter flow management strategy

3.1 Node 11 (Carnangarra) first post-winter flow management strategy

3.1.1 Notification of activation of strategy

The Node 11 (Carnangarra) first post-winter flow management strategy is activated when the chief executive notifies the Nogoia Mackenzie Water Supply Scheme ROL holder that the strategy is activated.

The chief executive will activate the first post-winter flow management strategy for the first flow event with the following attributes:

- General stream flow level rises of at least 1.5 metres in the Mackenzie River between the Comet River junction and the effective upstream limit of Bedford Weir between 1 October and 10 April, to indicate circumstances that would potentially trigger ecological processes associated with the first post-winter flow; or
- General stream flow level rises of at least 1.5 metres in the Mackenzie River between the Comet River junction and the effective upstream limit of Bedford Weir after 14 September, to indicate circumstances that would potentially trigger ecological processes associated with the first post-winter flow, provided that the water temperature is expected to be above the critical level for these processes; and
- Flow characteristics that would typically indicate an event resulting in flows between the Comet River junction and the effective upstream limit of Bedford Weir with a duration greater than the base flow of at least 15 days, to support ecological processes associated with the intent of the first post-winter flow.

The following guidelines will apply to evaluation of these flow attributes and in making a decision to activate the first post-winter flow management strategy:

- The ecological processes trigger will generally be identified by a rise in stream flow of at least 2,500 ML/day in the Mackenzie River immediately downstream of the Comet River junction.
- For an event with the ecological processes trigger occurring in September, the water temperature should be at least 23°C; and
- The characteristics of the flow event will be evaluated to decide whether the event would typically result in extended periods of flow immediately downstream of the Comet River junction above the base flow (the Water Resource Plan (WRP) specifies a base flow of 156 ML/day at the Comet River junction). This evaluation will be based on stream flow as well as Bureau of Meteorology weather and rainfall information.

The decision to activate the first post-winter flow management strategy will typically be made

within 3 days of the occurrence of the ecological process trigger flow. However the decision may occur later if subsequent weather, rainfall and runoff conditions indicate that the flow duration attributes could be achieved.

The department will prepare work practices that further guide evaluations associated with the activation of the first post-winter flow management strategies. These guidelines will be regularly reviewed to adapt to technological advances and operational experience.

3.1.2 Strategy details

Releases to pass flows under the Node 11 (Carnangarra) first post-winter flow management strategy are in addition to any releases required for water supply or for maintaining operating levels in downstream weirs.

(a) Fairbairn Dam

The ROL holder must implement the node 11 (Carnangarra) first post-winter flow management strategy at Fairbairn Dam within 1 day of the activation of the strategy by the chief executive.

For 19 days from the date that implementation of the strategy begins at Fairbairn Dam, inflows to Fairbairn Dam must be passed as they occur, except:

- Releases must not be made if the water level in Fairbairn Dam is below EL 195.1 m AHD (300,000 ML);
- Releases are not required when Fairbairn Dam overflow is more than 220 ML/day; and
- Releases are not required when Fairbairn Dam inflow is less than 20 ML/day.

For the purpose of implementing the strategy:

- The passing flow may vary above and below that required under this strategy due to practical limitations of estimating and making releases, the maximum discharge capacity of the outlet works, and for unforeseen circumstances;
- The shape of the passing flow hydrograph should follow as far as practicable the shape of the inflow hydrograph; and
- At those times when the maximum discharge capacity of the outlet works limits the ability to pass inflows, the excess inflow volume will be retained in storage.

3.2 Node 10 (Bingegang) first post-winter flow management strategy

3.2.1 Notification of activation of strategy

The Node 10 (Bingegang) first post-winter flow management strategy is activated when the chief executive notifies the Nogoia Mackenzie Water Supply Scheme ROL holder that the strategy is activated.

The chief executive will activate the first post-winter flow management strategy for the first flow event with the following attributes:

- General stream flow level rises of at least 1.5 metres in the Mackenzie River between Bedford Weir and the effective upstream limit of Tartrus Weir between 1 October and 10 April, to indicate circumstances that would potentially trigger ecological processes associated with the first post-winter flow; or

- General stream flow level rises of at least 1.5 metres in the Mackenzie River between the Bedford Weir and the effective upstream limit of Tartrus Weir after 14 September, to indicate circumstances that would potentially trigger ecological processes associated with the first post-winter flow, provided that the water temperature is expected to be above the critical level for these processes; and
- Flow characteristics that would typically indicate an event resulting in flows between Bedford Weir and the effective upstream limit of Tartrus Weir with a duration greater than the base flow of at least 15 days, to support ecological processes associated with the intent of the first post-winter flow.

The following guidelines will apply to evaluation of these flow attributes and in making a decision to activate the first post-winter flow management strategy:

- The ecological processes trigger will generally be identified by a rise in stream flow of at least 2,500 ML/day in the Mackenzie River immediately downstream of the Bingegang Weir.
- For an event with the ecological processes trigger occurring in September, the water temperature should be at least 23°C; and
- The characteristics of the flow event will be evaluated to decide whether the event would typically result in extended periods of flow immediately downstream of the Bingegang Weir above the base flow (the WRP specifies a base flow of 163 ML/day at the Bingegang Weir). This evaluation will be based on stream flow as well as Bureau of Meteorology weather and rainfall information.

The decision to activate the first post-winter flow management strategy will typically be made within 3 days of the occurrence of the ecological process trigger flow. However, the decision may occur later if subsequent weather, rainfall and runoff conditions indicate that the flow duration attributes could be achieved.

The department will prepare work practices that further guide evaluations associated with the activation of the first post-winter flow management strategies. These guidelines will be regularly reviewed to adapt to technological advances and operational experience.

3.2.2 Strategy details

The ROL holder must implement the node 10 (Bingegang) first post-winter flow management strategy at Bedford Weir within 1 day of the activation of the strategy by the chief executive.

For 21 days from the date that implementation of the strategy begins at Bedford Weir, inflows to Bedford Weir must be passed as they occur, except:

- Releases must not be made if the water level in Bedford Weir is below EL 118.86 m AHD (7,500 ML);
- Releases are not required when Bedford Weir overflow is more than 220 ML/day; and
- Releases are not required when Bedford Weir inflow is less than 50 ML/day.

For the purpose of implementing the strategy;

- The passing flow may vary above and below that required under this strategy due to practical limitations of estimating and making releases, the maximum discharge capacity of the outlet works, the operational limitations of the fabridam, and for unforeseen circumstances;

- The shape of the passing flow hydrograph should follow as far as practicable the shape of the inflow hydrograph;
- At those times when the maximum discharge capacity of the outlet works limits the ability to pass inflows, the excess inflow volume will be retained in storage;
- The ROL holder must, by 31 July 2006, submit to the chief executive for approval proposed operating arrangements for the inflation of the fabridam during implementation of this strategy. The submission must include an assessment of the impact of the inflation of the fabridam on flow; and
- During implementation of this strategy, inflation of the fabridam must be consistent with arrangements approved by the chief executive.

4 Seasonal base flow management strategy

4.1 Bedford Weir seasonal base flow management strategy

A seasonal base flow equal to the inflow to Bedford Weir must pass Bedford Weir if:

- Inflows to the weir are between 100 ML/day and 220 ML/day;
- The water level in the weir is above EL 118.86 m AHD (7,500 ML); and
- The Node 10 (Bingegang) first post-winter flow management strategy is not in effect.

A seasonal base flow of 220 ML/day must pass Bedford Weir if:

- Inflows to the weir are greater than 220 ML/day;
- The water level in the weir is above EL 118.86 m AHD (7,500 ML); and
- The Node 10 (Bingegang) first post-winter flow management strategy is not in effect.

Seasonal base flow passed through Bedford Weir is in addition to any release required for supply between Bedford Weir and the Bingegang Weir pond.

For the purpose of implementing this strategy:

- The volume passed over a 48-hour period must be within plus 20% and minus 20% of the volume required to be passed under the strategy;
- The commencement and cessation of any release required under this strategy may be delayed by up to 48 hours; and
- Inflows to the weir do not include any water which was released from Fairbairn Dam intended to maintain the level in Bedford Weir at its nominal operating level or to supply users between Fairbairn Dam and the Bedford Weir pond.

4.2 Bingegang Weir seasonal base flow management strategy

A seasonal base flow equal to the inflow to Bingegang Weir must pass Bingegang Weir if:

- Inflows to the weir are between 100 ML/day and 220 ML/day;
- The water level in the weir is above EL 100.34 m AHD (3,500 ML); and
- The Node 10 (Bingegang) first post-winter flow management strategy is not in effect.

A seasonal base flow of 220 ML/day must pass Bingegang Weir if:

- Inflows to the weir are greater than 220 ML/day;
- The water level in the weir is above EL 100.34 m AHD (3,500 ML); and
- The Node 10 (Bingegang) first post-winter flow management strategy is not in effect.

Seasonal base flow passed through Bingegang Weir is in addition to any release required for supply between Bingegang Weir and the Tartrus Weir pond.

For the purpose of implementing this strategy:

- The volume passed over a 48-hour period must be within plus 20% and minus 20% of the volume required to be passed under the strategy;
- The commencement and cessation of any release required under this strategy may be delayed by up to 48 hours; and
- Inflows to the weir do not include any water which was released from Bedford Weir intended to maintain the level in Bingegang Weir at its nominal operating level or to supply users between Bedford Weir and the Bingegang Weir pond.

4.3 Tartrus Weir seasonal base flow management strategy

A seasonal base flow equal to the inflow to Tartrus Weir must pass Tartrus Weir between 1 September and 31 December if:

- Inflows to the weir are between 150 ML/day and 240 ML/day; and
- The water level in the weir is above EL 81.36 m AHD (11,000 ML).

A seasonal base flow of 240 ML/day must pass Tartrus Weir between 1 September and 31 December if:

- Inflows to the weir are greater than 240 ML/day; and,
- The water level in the weir is above EL 81.36 m AHD (11,000 ML).

Seasonal base flow passed through Tartrus Weir is in addition to any release required for supply between Tartrus Weir and the Springton Creek.

For the purpose of implementing this strategy:

- The volume passed over a 48-hour period must be within plus 20% and minus 20% of the volume required to be passed under the strategy;
- The commencement and cessation of any release required under this strategy may be delayed by up to 48 hours; and
- Inflows to the weir do not include any water which was released from Bingegang Weir intended to maintain the level in Tartrus Weir at its nominal operating level or to supply users between Tartrus Weir and the Springton Creek junction.

5 Fishway management strategy

There are no fishways in the scheme.

6 Quality of water released from storages

Where a storage incorporates a multi-level outlet, the ROL holder must draw water from the level that optimises the quality of the water released (for example, dissolved oxygen concentration and the temperature in the release water optimised), to minimise the impact on the downstream water quality. If this level does not provide enough capacity for the required release, other levels must be used to give the required discharge.

7 Use of watercourses for distribution of water

The ROL holder may use the following watercourses for the purposes of distribution of water:

- The Nogoia River from the upstream limit of Fairbairn Dam to the Comet River junction;
- The Mackenzie River from the Comet River junction to the Springton Creek junction;
- Sections of tributaries of these rivers that contain water from natural waterholes and infrastructure within the above sections of the Nogoia and Mackenzie rivers; and
- The Comet River from AMTD 10.0 km to the Mackenzie River junction.

8 Use of unsupplemented watercourses for delivery of supplemented water

The ROL holder may use the following unsupplemented watercourses for the purpose of delivery of supplemented water under the specified conditions:

8.1 Retreat Creek

Retreat Creek from the confluence of Drain RR6 (approximately AMTD 9.5 km) to the Blair Athol Railway line crossing of Retreat Creek (approximately AMTD 3.0).

The ROL holder is responsible for metering of all supplemented water supplied from Retreat Creek.

For any day, the amount of supplemented water supplied by the ROL holder must not exceed the amount of supplemented water released to Retreat Creek by the ROL holder. For any day, the amount of water taken from Retreat Creek in excess of the amount of water released is unsupplemented water.

9 Riparian stock and domestic use

Under Section 20(3) of the Water Act, an owner of land adjoining a watercourse, lake or spring may take water for domestic purposes and watering stock that would be normally depastured on the land without a water entitlement. In this section this is referred to as 'riparian entitlement water'.

This means that riparian entitlement water might also be taken through the same metered water facilities as supplemented water and some users might desire appropriate allowances be made for their riparian entitlement use. The historical arrangements for accounting for individual riparian use taken through metered facilities will not apply following commencement of the ROP.

9.1 Rules for adjusting metered use for riparian entitlement water use

This section provides arrangements to allow adjustments for riparian entitlement water metered use.

The ROL holder must enter into an arrangement with any water user who requests metered use adjustments for riparian entitlement water use taken through a metered facility. The ROL holder must supply details of the arrangements with each individual user to the chief executive within 5 business days of an agreement.

An arrangement must comply with the departmental guidelines for this purpose.

If the ROL holder and a water user are unable to reach agreement on an arrangement, the chief executive will decide the arrangement that will apply in that particular instance.

Attachment 4.2F

Nogoa Mackenzie Water Supply Scheme

Water sharing rules

This attachment provides water sharing rules for:

- Announced allocations;
- Critical water supply;
- Transfer of water between water years; and
- Seasonal water assignments.

There are two types of water allocation proposed to be supplied to water users in the Nogoa Mackenzie Water Supply Scheme, medium and high priority water allocations. The water sharing rules specify the way the water resources of the Nogoa Mackenzie Water Supply Scheme will be shared between each of the water allocation priority groups.

1 Announced allocation

The announced allocation percentage is the percentage of the water allocation volume that may be supplied during the water year.

The Resource Operations Licence (ROL) holder is required to calculate announced allocation percentages for each priority group through the use of formulas and associated parameters. Details for each parameter used are specified in Section 5.

The amount of water that can be apportioned to each of the priority groups at any given time is determined by taking into account a number of factors, including:

- The time of year an assessment is made;
- The amount of water used by each priority group in the current water year up to the date of the assessment;
- The amount of water stored in Fairbairn Dam and the weirs;
- Allowance for evaporative and seepage losses from Fairbairn Dam and the weirs;
- Allowance for future inflows;
- Allowance for the requirements of high priority water allocation in future water years;
- Allowance for transmission and operational losses along the river; and
- The net amount of water allocation moved into the current water year from the previous water year.

The values for these factors applied in the announced allocation formula seek to maximise the availability of medium priority water allocation and secure the reliability for high priority water allocations as determined by testing in the department's hydrologic model (IQQM) over the long-term historical period. Importantly, the values given for these factors should not be taken out of the context of their purpose as part of the overall package used to determine the announced allocation.

1.1 General rules for announced allocations

The water year for the Nogoia Mackenzie Water Supply Scheme is from 1 July to 30 June in the following year.

Separate assessment of announced allocation percentages must be made for each priority group.

The initial announced allocation percentage for a water year must be announced within 2 weeks after the start of that water year.

The ROL holder may announce an interim announced allocation at any time during the water year. An interim announced allocation percentage must not be greater than the percentage that would be calculated using the formulas in Section 1.2. An interim announced allocation has effect as if it was an announced allocation calculated using the formulas in Section 1.2.

The ROL holder must announce an interim announced allocation immediately prior to the commencement of a water year. The basis/criteria for the determination of the interim announced allocation for the start of the water year must take into account water user requirements, and be made available to water users.

Announced allocation percentages must not be reduced during a water year.

Announced allocation percentages must not be greater than 100%.

Announced allocation percentages must be rounded to the nearest 1%.

Announced allocation percentages must be reviewed, and revised percentages announced within 2 weeks after a major inflow occurs. A major inflow is defined as one that would result in:

- The announced allocation percentage increasing to 100%; or
- The announced allocation percentage increasing by 5% or more.

If the announced allocation percentage is less than 100%, the announced allocation percentage should be reviewed at intervals not greater than 3 months.

The ROL holder should advise water users of forecast announced allocations, including details of the parameters used in determining the forecast values. The criteria for forecasting announced allocations, including the timing, frequency and level of accuracy must take into account water user requirements, and be made available to water users.

1.2 Calculation of announced allocation percentages

1.2.1 Medium priority water allocations

The initial announced allocation and any revised announced allocation for medium priority water allocations (AAm) must be determined from the following relationship.

$$AAm * MPA = (UV + IN - HPA - RE - TOL + USE - VIWY) * 100$$

The parameters used in this relationship are defined in Section 5.

For a medium priority water allocation that has been converted from a high priority water allocation, medium priority announced allocation must not apply to the medium priority allocation for the water year in which the change to a medium priority water allocation was registered.

1.2.2 High priority water allocations

The announced allocation percentage for high priority water allocations (AAh) must be 100% if the announced allocation determined for medium priority water allocations is greater than zero.

If the announced allocation percentage for medium priority water allocations is zero, the amount of water that may be taken by high priority water allocations may be subject to the critical water supply water sharing rules in Section 2.1.

For a high priority water allocation that has been converted from a medium priority water allocation, high priority announced allocation must not apply to the high priority allocation for the water year in which the change to a high priority water allocation was registered.

Critical water supply water sharing rules

2.1 High priority water allocations

If the announced allocation percentage for medium priority water allocations is zero, the amount of water that may be taken by high priority water allocations must be determined from the following relationship.

$$AAh * HPA = (UV + IN - TOL + USE - VIWY) * 100$$

The parameters used in this relationship are defined in Section 5.

3 Transfer of water between water years

The ROL holder may develop and apply scheme practices for carry over and forward draw of water entitlements in accordance with the principles and rules in this section.

3.1 Principles for transfer of water between water years

The ROL holder must have regard to the following principles in developing and applying scheme practices for carry over and forward draw of water entitlements.

Carry over and forward draw practices must not have an adverse impact on the objectives of the Water Resource Plan (WRP).

Entitlements must not be:

- Carried over from the current water year to any future year; other than the next water year; or
- Brought forward from a future water year to the current water year, other than from the

next water year.

The volume of an individual water entitlement carried over to the next water year must not exceed the unused portion of the entitlement at the end of the water year.

The volume of individual water allocation brought forward to the current water year must not exceed the announced allocation volume for the allocation at the start of the next water year.

The ROL holder must apply such loss factors to carry over water as necessary to avoid:

- Adverse impacts on other water entitlement holders; and
- Adverse impacts on the objectives of the WRP.

The ROL holder must consider the effects of storage overflow on the volume of carry over.

3.2 Rules for transfer of water between water years

The following rules apply for the transfer of water between water years.

The total volume permitted to be brought forward to a water year must not exceed the volume given in Table 1.

Table 1: Maximum water allocation volume that may be brought forward to a water year

Storage level of Fairbairn Dam at 1 July in next water year (m AHD)	Maximum total water allocation volume permitted to be brought forward to a water year (ML)
Greater than EL 197 m (460,000 ML)	40,000
Between EL 197 m & EL 193 m (184,000 ML)	25,000
Below EL 193 m	5,000

The total volume permitted to be carried over to a water year must not exceed the volume given in Table 2.

Table 2: Maximum water allocation volume that may be carried over to a water year

Storage level of Fairbairn Dam at 1 July (m AHD)	Maximum total water allocation volume permitted to be carried over to a water year (ML)
Greater than EL 197 m (460,000 ML)	150,000
Between EL 197 m & EL 193 m (184,000 ML)	75,000
Below EL 193 m	25,000

The ROL holder must not supply any water carried over from the previous water year that was unused at the time an overflow of Fairbairn Dam commences.

3.3 End of water year minor adjustments

As an administrative arrangement to account for the timing of the end of water year metered use reading and for the operational convenience of water users, the ROL holder may, in addition to any carry over or forward draw permitted under Section 3.1 and Section 3.2, make minor carry over and forward draw adjustments to entitlements. For an individual, the adjustments must not exceed 2% of the individual entitlement at the end of the water year for which the meter reading applies, or 10 ML whichever is the lesser.

4 Seasonal water assignment rules

Under Section 146B of the Water Act the holder of a water allocation may enter into an arrangement for a seasonal assignment in relation to the allocation. However the allocation holder may enter into the arrangement only with the consent of the ROL holder. The ROL holder may give consent only if the assignment is allowed under the seasonal water assignment rules in the ROP.

The ROL holder is required to report (refer Section 3.2.1 of Attachment 4.2G) on trends in seasonal assignment and evaluate whether seasonal assignment practices are impacting on supply for individual water users or groups of water users or impacting on the objectives of the WRP.

Chapter 8 of the ROP allows the chief executive to initiate changes to the seasonal assignment rules if considered necessary to protect the objectives of the WRP.

4.1 Principles for seasonal water assignment

The ROL holder must have regard to the following principles in developing scheme practices and for making decisions for consent of seasonal water assignment arrangements.

The effects of an individual seasonal assignment and the cumulative effects of successive or repeated seasonal assignments must not:

- Impact adversely on the WRP objectives;
- Impact adversely on the availability of water to other water users in any part of the scheme; or
- Subject waterholes to an increased potential for environmental harm.

The water under seasonal assignment may only be supplied from within the Nogoia Mackenzie Water Supply Scheme area.

4.2 Rules for seasonal water assignment

The following rules apply in developing scheme practices and for making decisions for consent of seasonal water assignment arrangements.

Water supplied under a seasonal water assignment may be used for any purpose.

Seasonal assignment of a water allocation with a specified purpose of ‘distribution loss’ is not permitted.

A seasonal water assignment must not result in the seasonal water assignment value lying outside the seasonal water assignment limits in Table 3. The seasonal water assignment value for a zone grouping in Table 3 is the total nominal volume for all medium and high priority water allocations in that zone grouping at the start of the water year, adjusted by the net volume of water seasonally assigned into or out of that zone grouping to date since the start of the water year.

Table 3: Seasonal water assignment limits

Seasonal water assignment limits (ML)	Mackenzie N, Mackenzie M, Mackenzie L, Mackenzie K & Mackenzie J	Mackenzie I & Mackenzie H	Mackenzie G, Mackenzie F & Mackenzie E	Mackenzie D, Mackenzie C & Mackenzie B
Minimum volume		12,000	10,000	5,182
Maximum volume		46,000		18,882

5 Definition of parameters

AAM = Announced allocation percentage medium priority

The percentage of the nominal volume for a medium priority water allocation that may be supplied for the current water year.

AAH = Announced allocation percentage high priority

The percentage of the nominal volume for a high priority water allocation that may be supplied for the current water year.

MPA = Medium priority water allocations

The volume of medium priority water allocations in the scheme.

HPA = High priority water allocations

The volume of high priority water allocations in the scheme.

USE = Volume of water taken

The volume of water taken in the current water year up to the time of the assessment of the announced allocation (excluding any water taken in the current water year that had been carried over).

UV = Useable volume

UV is determined by summing the useable volume of each of the storages included in the assessment of the announced allocation, as per the following equations:

$$UV = \text{sum}(UV_{\text{storage}})$$

$$UV_{\text{storage}} = (CV - DSV - SL)$$

$$UV_{\text{storage}} = 0 \text{ if } (CV - DSV - SL) \text{ is less than zero}$$

Where:

UV_{storage} is the useable volume of each storage.

CV is the current volume of the storage.

DSV is the dead storage volume of the storage.
SL is the storage losses.

For the purpose of the assessment of the announced allocations, the volumes of Fairbairn Dam, Bedford Weir, Bingeang Weir and Tartrus Weir are included in the calculation. The volume of Selma Weir is ignored in the calculation.

SL = Storage losses

SL is the projected storage losses from the storages for the remainder of the water year (note: storage losses include lake evaporation plus seepage, minus direct rainfall onto the storage).

The storage loss depths to be used for each storage are given in Table 4. The value for 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.

Table 4: Projected storage losses for each storage

Month in which announced allocation is calculated	Storage loss for Fairbairn Dam (mm)	Storage loss for Bedford Weir, Bingegang Weir and Tartrus Weir (mm)
July	1,660	1,770
August	1,580	1,680
September	1,470	1,570
October	1,340	1,420
November	1,170	1,240
December	990	1,050
January	770	830
February	580	620
March	410	440
April	260	290
May	160	170
June	75	85

IN = Inflow

IN is the allowance for inflows used in the resource assessment. The inflows to be used for this system are given in Table 5. The number used in the equation for inflows (IN) is the value in the table for the month in which the calculation is undertaken.

Table 5: Inflow allowances

Month in which announced allocation is calculated	Inflow (ML)
July	0
August	0
September	0
October	0
November	0
December	0
January	0
February	0
March	0
April	0
May	0
June	0

RE = Reserve

RE is the storage volume set aside for supply and associated losses in future water years. RE must be determined using the following relationship:

$$\mathbf{RE = (RES * HPA)/44,398}$$

Where RES is the reserve volume for the current month at the time of the calculation given in Table 6.

Table 6: Reserve volumes

Month in which announced allocation is calculated	Reserve (ML)
July	54,700
August	54,700
September	60,400
October	66,400
November	72,700
December	79,200
January	86,000
February	93,100
March	100,300
April	100,300
May	107,800
June	115,400

TOL = Transmission and operational losses

TOL is an allowance for river transmission and operational losses expected to occur in running the system from the date of the announced allocation assessment to the end of the current water year. TOL varies with the announced allocation for medium priority water allocations.

The transmission and operational loss allowance to be used is given in Table 7. TOL is to be linearly interpolated for intermediate values of medium priority announced allocation.

Table 7: Transmission and operational losses

Month in which announced allocation is calculated	Transmission and operational loss allowance (ML)	
	At AAm = 0%	At AAm = 100%
July	9,020 *F ₀	25,880 *F ₁₀₀
August	8,250 *F ₀	24,610 *F ₁₀₀
September	7,490 *F ₀	23,340 *F ₁₀₀
October	6,750 *F ₀	21,250 *F ₁₀₀
November	5,980 *F ₀	17,450 *F ₁₀₀
December	5,240 *F ₀	16,030 *F ₁₀₀
January	4,470 *F ₀	12,400 *F ₁₀₀
February	3,710 *F ₀	7,920 *F ₁₀₀
March	3,020 *F ₀	4,700 *F ₁₀₀
April	2,250 *F ₀	3,600 *F ₁₀₀
May	1,510 *F ₀	2,520 *F ₁₀₀
June	740 *F ₀	1,420 *F ₁₀₀

Where:

$$F_0 = \text{HPA}/44,398$$

$$F_{100} = (\text{HPA} + \text{MPA})/235,323$$

VIWY = Net total volume of unused water allocation moved into current water year

VIWY is the net total volume of unused water allocation that is moved into a water year from the previous water year, taking into account:

- The volume of water carried over to the current water year from the previous water year;
- The volume of water brought forward from the current water year to the previous water year; and
- The volume of water carried over to the current water year that had been supplied in the current water year as at the date of the assessment of the announced allocation.

Attachment 4.2G

Nogoa Mackenzie Water Supply Scheme Monitoring program

1 Water quantity

1.1 Height and stream flow

The Resource Operations Licence (ROL) holder must record height and flow data in accordance with Table 1.

Table 1: Locations in the Nogoa and Mackenzie rivers where height and flow data is required

Location	Height data	Flow data
Fairbairn Dam inflow		✓
Fairbairn Dam storage	✓	
Fairbairn Dam outflow		✓
Bedford Weir inflow		✓
Bedford Weir storage	✓	
Bedford Weir outflow		✓
Bingegang Weir inflow		✓
Bingegang Weir storage	✓	
Bingegang Weir outflow		✓
Tartrus Weir inflow		✓
Tartrus Weir storage	✓	
Tartrus Weir outflow		✓

It is preferred that continuous time series data be collected. However, the chief executive may approve the collection of data in a format and standard other than for continuous time series data.

The methodology for determining height and flow data, including data format and standard, must be approved by the chief executive.

1.1a Operating level of storages

The ROL holder must record for Fairbairn Dam, Bedford Weir, Bingegang Weir and Tartrus Weir:

- The daily storage height; and
- The daily storage outflow.

The ROL holder must record for Selma Weir:

- The daily storage height when Selma Weir is below nominal operating level.

For the purposes of this section:

- The methodology for determining the daily storage height and daily storage outflow must be approved by the chief executive; and
- The data must be real time information upon which operational decisions were based – not data that has subsequently changed for example through a verification process.

1.1b Stream flow for the purpose of first post-winter flow management strategies

The ROL holder must record for each storage where a first post-winter flow management strategy applies under Section 3 of Attachment 4.2E:

- The storage inflow;
- The storage height; and
- The storage outflow.

For the purposes of this section:

- The methodology for determining the storage inflow, storage height and storage outflow must be approved by the chief executive;
- The storage inflow, storage height and storage outflow are only required to be recorded for the duration of the implementation of the first post-winter flow management strategy; and
- The data must be real time information upon which operational decisions for the implementation of the strategy were based – not data that has subsequently changed for example through a verification process.

1.1c Stream flow for the purpose of seasonal base flow management strategies

The ROL holder must record for each storage where a seasonal base flow management strategy applies under Section 4 of Attachment 4.2E:

- The daily storage inflow volume;
- The daily storage inflow volume adopted for the purpose of determining passing flow requirements under the rules for the seasonal base flow management strategy. That is, the inflow volume after any adjustment to account for water released from an upstream storage for maintaining storage heights or to supply water users, in accordance with the seasonal base flow rules;
- The daily storage height; and
- The daily storage outflow.

For the purposes of this section:

- The methodology for determining the daily storage inflow volume, daily storage inflow volume adopted for the purpose of determining passing flow requirements, daily storage height and daily storage outflow must be approved by the chief executive; and
- The data must be real time information upon which operational decisions for the implementation of the strategy were based – not data that has subsequently changed for example through a verification process.

1.2 Releases from storages

The ROL holder must record details of the basis for each release decision for each storage under the rules for releases of water from storages given in Section 2 of Attachment 4.2E, including:

- The general rules for releases including those specified in Section 2.4 of Attachment 4.2E;
 - The release rate rules;
 - The first post-winter flow and seasonal base flow management strategies; and
-

- The quality of water released from storages.

The ROL holder must record the time, date and release rate each time a release rate is changed for each storage. In addition, for storages with a multi-level inlet, the ROL holder must record the level from which the release is made and the basis of the decision for determining that level.

The ROL holder must record the daily volume released (through the outlet/s) from each storage.

The ROL holder must record daily volumes of supplemented water released to Retreat Creek under the rules for use of unsupplemented watercourses for delivery of supplemented water given in Section 8 of Attachment 4.2E.

The ROL holder must provide a proposed methodology for accounting for the supply of water orders under Section 2.4 of Attachment 4.2E to the chief executive within 40 business days of the commencement of the plan amendment (revision 2) for approval.

1.3 Announced allocations

The ROL holder must record details of announced allocation determinations, referred to in Section 1 and Section 2 of Attachment 4.2F, including:

- The date and value for announced allocations, including the initial and any interim announced allocations; and
- The parameters applied for each announced allocation determination, including the initial and any interim announced allocations.

1.4 Transfer of water between water years

The ROL holder must record details of the transfer of water between water years referred to in Section 3 of Attachment 4.2F, including:

- Scheme practices applied for carry over and forward draw of water entitlements;
- The basis of each decision to adjust the amount of water an individual may be supplied in a water year and the volume of the adjustment;
- The basis of each decision to approve a carry over or forward draw for each individual water user;
- The volume of water carried over from a water year to the next water year; and
- The volume of water brought forward from the next water year to a water year by priority group.

1.5 Seasonal water assignment

The ROL holder must record details of individual seasonal water assignment arrangements.

1.6 Water taken by water users

The ROL holder must record the volume of water taken by water users as follows:

- For each individual water user specified for each zone:
 - The total volume of supplemented water taken each quarter;
 - The total volume of supplemented water entitled to be taken at any time;

-
- The basis for determining the total volume of supplemented water entitled to be taken at any time, including any adjustments for approved seasonal water assignments and transfers into or out of the water years;
 - The total volume of metered water taken as ‘riparian entitlement water’; and
 - The zone.

Note: Water taken under a water allocation with purpose ‘distribution loss’ should be recorded as an individual water user.

The ROL holder must record the daily volumes of supplemented water supplied to each water user from Retreat Creek and the associated meter readings.

1.7 Water diversions

The ROL holder must record the daily volume of water diverted to:

- Selma channel system;
- Weemah channel system; and
- Blackwater pipeline.

The methodology for determining the volume must be approved by the chief executive.

1.8 Waterholes

The ROL holder must:

- Establish a unique identifier for any waterhole from which supplemented water is taken that is drawn down more than 0.6 metres below cease to flow level; and
- Record the water level in the waterhole each day that supplemented water is taken from the waterhole and the water level is more than 0.6 metres below the cease to flow level.

2 Impact of storage operation on aquatic ecosystems

The ROL holder must undertake the following to establish any impacts on aquatic ecosystems that are potentially related to the operation of storages.

Section 2.1 Bank condition

The ROL holder must inspect banks for evidence of collapse and/or erosion within the ponded area and downstream of storages following instances of rapid water level changes or large flows through storages, or other occasions when collapse and/or erosion of banks may be likely. The distance downstream is the distance of influence of storage operations.

Any instances of bank slumping or erosion observed must be investigated to determine if the instability was associated with the nature or operation of the infrastructure.

2.2 Water Quality

The ROL holder must monitor water quality in relation to relevant infrastructure in accordance with the department's Water Monitoring Data Collection Standard.

2.3 This section not required

2.4 Fish stranding

The ROL holder must investigate instances of fish stranding downstream of storages to determine if the fish stranding is associated with operation of infrastructure. The distance downstream of storages is the distance of influence of storage operations.

3 Reporting

There are four levels of reporting for ROL holders:

- Quarterly report for the previous quarter;
- Annual report for the previous water year;
- Operational reports; and
- Emergency reports.

3.1 Quarterly report

The ROL holder must transfer the following data to the chief executive:

- Water quantity – all records referred to in Sections 1.1a and 1.1c;
- Release from storages – where applicable, the level from which releases were made referred to in Section 1.2;
- Waterholes – all records referred to in Section 1.8;
- A summary of bank condition monitoring and incidences of slumping referred to in Section 2.1;
- Water quality – all records referred to in Section 2.2; and
- Seasonal water assignments – all records referred to in section 1.5.

3.2 Annual report

The annual report must include, but not be limited to, discussion and recommendations with regard to monitoring and assessment for the previous water year as follows.

3.2.1 Water monitoring

A summary of the implementation of the rules for releases from storages, other than for first post-winter flow and seasonal base flow management and quality of water released from storages.

A summary of the implementation of the first post-winter flow and seasonal base flow management strategies for each applicable storage, including:

- Overview of strategy implementation, including the basis of decisions; and
- An evaluation of the first post-winter flow and seasonal base flow management arrangements and outcomes.

A summary of the implementation of the quality of water released from storages rules for

each applicable storage, including:

- Overview of rule implementation;
- Basis of the decisions on the level from which to make releases; and
- Periods of release from each offtake level.

A summary of waterhole management including:

- Overview of waterhole management implementation; and
- Periods when the water level in a waterhole was more than 0.6 metres below its cease to flow level for more than 2 consecutive days and supplemented water was being taken.

A summary of announced allocation determinations, including:

- An evaluation of the announced allocation procedures and outcomes; and
- The date and value for each announced allocation.

A summary of the critical water supply water sharing rules, including:

- An evaluation of the rules and outcomes.

A summary of the transfer of water between water years including:

- An evaluation of the rules and outcomes;
- The total volume of water carried over to the water year from the previous water year;
- The total volume of water carried over from the water year to the next water year;
- The total volume of water brought forward by priority group to the water year from the next water year; and
- The total volume of water brought forward by priority group from the water year to the previous water year.

A summary of the volumes of water taken by water users, specified by zone, including:

- The total volume of supplemented water taken;
- The total volume of supplemented water entitled to be taken;
- The basis for determining the total volume of supplemented water entitled to be taken, including any adjustments for approved seasonal water assignments and transfers into or out of the water years;
- The announced allocation volume at the end of the water year; and
- The total volume of metered water taken as 'riparian entitlement water'.

A summary of seasonal water assignment arrangements, including:

- An evaluation of the seasonal water assignment rules and outcomes, including:
 - An evaluation of any circumstances of supply difficulties when the supply difficulties were linked to seasonal water assignment practices; and
 - Identification of and reporting on any trends in seasonal water assignment;
- The total number of seasonal water assignment arrangements;
- The total volume of water seasonally assigned;
- The maximum seasonal water assignment value for each zone grouping in Table 3 of Attachment 4.2F; and
- The minimum seasonal water assignment value for each zone grouping in Table 3 of Attachment 4.2F.

Details of changes to storages or their operation that may have an impact on the implementation of the ROP.

Details of new monitoring devices such as equipment to measure stream flow.

3.2.2 Impact of storage operation on aquatic ecosystems

Bank condition and fish stranding

A summary of bank condition and fish stranding monitoring including:

- Results of investigations of bank slumping or erosion identified in ponded areas and downstream of storages;
- Results of any investigations of fish stranding downstream of storages; and
- Changes to operation of storages to reduce instances of bank slumping, erosion or fish stranding.

Water quality

Discussion and assessment of the following water quality issues:

- Thermal and chemical stratification in each storage;
- Water quality in each storage;
- Contribution of the storage and its management to the quality of water released;
- Cumulative effect of successive storages on water quality; and
- Cyanobacteria population changes in response to stratification in each storage.

3.3 Operational reports

The ROL holder must notify the chief executive within 1 business day of becoming aware of the following operational incidents:

- Noncompliance by the ROL holder with the rules given in the ROP;
- A decision relating to each announced allocation; and
- Instances of fish stranding downstream of a storage.

The ROL holder must provide an operational report to the chief executive for the following operational incidents:

- Noncompliance with the rules in the ROP;
- Instances where the amount of water taken by users being supplied with supplemented water from Retreat Creek in any day exceeds the amount of supplemented water released to Retreat Creek on that day; and
- Instances of fish stranding downstream of a storage.

The report must provide details of the incident, conditions under which the incident occurred and any responses or activities carried out as a result of the incident.

The ROL holder must provide an operational report to the chief executive within 5 business days after a decision relating to each announced allocation. The report should include the parameters applied referred to in Section 1.3.

The ROL holder must provide a report to the chief executive within 5 business days after

implementation of a first post-winter flow management strategy ends. The report should include:

- Storage inflow, storage height and storage outflow records referred to in Section 1.1b.

3.4 Emergency report

An emergency for the purpose of this ROP includes an occurrence, which by the nature of its severity, extent or timing might be regarded as an emergency (for example, contamination of water supply, structural damage to infrastructure or a danger to human health).

For any emergency, the ROL holder must:

- Notify the chief executive immediately; and
- Provide a report to the chief executive on the emergency including details of the emergency, conditions under which the emergency occurred, any responses or activities carried out as a result of the emergency and any impacts on the ROP.

Attachment 4.2H

Nogoa Mackenzie Water Supply Scheme

Water allocation change rules

1 Permitted changes

The permitted changes apply only to water allocations with purpose ‘agriculture’ or ‘any’.

Application for the following changes to a water allocation will be approved. On approval, a change certificate will be issued by the chief executive, which may be lodged with the registrar of water allocations.

1.1 Location

Subject to Section 1.1.1, a change to the location of a water allocation from one of the following zones to any other of those zones:

- Mackenzie B;
- Mackenzie C;
- Mackenzie D;
- Mackenzie E;
- Mackenzie F;
- Mackenzie G;
- Mackenzie H;
- Mackenzie I;
- Mackenzie J;
- Mackenzie K;
- Mackenzie L;
- Mackenzie M; or
- Mackenzie N.

For the permitted changes to the location of a water allocation given in this section, conversion factors do not apply to the volume for the water allocation – that is, the volume for the water allocation will be the same before and after the change of location. However, this does not preclude consideration of conversion factors to enable changes under Section 3.

1.1.1 Limitations on change of location

A proposed change is not a permitted change if the proposed change would result in a distribution of medium and high priority water allocations not provided for in Tables 1, 2 and 3.

1.2 Purpose

A change to the purpose of a water allocation from ‘any’ to ‘agriculture’ or from ‘agriculture’ to ‘any’.

1.3 Amalgamation or subdivision

A change to subdivide a water allocation provided:

- The sum of the nominal volumes of the new water allocations is equal to the nominal volume of the water allocation that is being subdivided; and
- The location and priority group of the new water allocations is the same as that of the water allocation that is being subdivided.

A change to amalgamate water allocations provided:

- The nominal volume of the new water allocation is equal to the sum of the nominal volumes of the water allocations that are being amalgamated;
- The location and priority group of the water allocations that are being amalgamated are the same; and
- The location and priority group for the new water allocation is the same as that of the water allocations that are being amalgamated.

1.4 Priority

A change to the priority group of a water allocation from medium to high, provided:

- The conversion rate is 3.0 ML of medium-priority water allocation converts to 1 ML of high-priority water allocation; and
- The storage level in Fairbairn Dam is not less than EL 199.5 m AHD (702,000 ML) on the date the application for the change is received by the chief executive.

A change to the priority group of a water allocation from high to medium priority, provided:

- The conversion rate is 1 ML of high-priority water allocation converts to 3 ML of medium-priority water allocation.

1.4.1 Limitations on change of priority

A proposed change is not a permitted change if the proposed change would result in a distribution of medium- and high-priority water allocations not provided for in Tables 1, 2 and 3.

Table 1: Permitted distributions of high-priority water allocations in zones Mackenzie N, M, L, K, J, I, H, G, F, E, D, C and B

Volume of high priority water allocation (ML)	Mackenzie N, Mackenzie M, Mackenzie L, Mackenzie K & Mackenzie J	Mackenzie I & Mackenzie H	Mackenzie G, Mackenzie F & Mackenzie E	Mackenzie D, Mackenzie C & Mackenzie B
Minimum volume		12,000	10,000	
Maximum volume	56,000			700

Table 2: Permitted distributions of medium-priority water allocations in zones Mackenzie N, M, L, K, J, I, H, G, F, E, D, C and B

Volume of water allocation (ML)	Mackenzie N, Mackenzie M, Mackenzie L, Mackenzie K & Mackenzie J	Mackenzie I & Mackenzie H	Mackenzie G, Mackenzie F & Mackenzie E	Mackenzie D, Mackenzie C & Mackenzie B
Minimum volume				5,182
Maximum volume		18,000		18,182
		191,000		

Table 3: Permitted distributions of water allocations in zones Mackenzie N, M, L, K, J, I, H, G, F, E, D, C and B

Volume of water allocation (ML)	Mackenzie N, Mackenzie M, Mackenzie L, Mackenzie K & Mackenzie J	Mackenzie I & Mackenzie H	Mackenzie G, Mackenzie F & Mackenzie E	Mackenzie D, Mackenzie C & Mackenzie B
Minimum volume				
Maximum volume		46,000		

2 Prohibited changes

The following changes are prohibited changes:

2.1 Location

A change to a location that is not within the extent of the Dawson Valley, Nogoia Mackenzie, Lower Fitzroy or Fitzroy Barrage water supply schemes.

2.2 Priority group

A change to a priority group that is not medium or high.

2.3 Purpose

A change to a purpose that is not 'agriculture' or 'any'.

2.4 Volume

A change to the volume that is not a consequence of a change to another attribute of a water allocation.

2.5 Other

A change that requires an amendment to this ROP, other than an amendment provided for in Chapter 8.

3 Application for change under Section 130 of the Water Act

If a water allocation holder wishes to apply for a change to a water allocation that is not permitted under Section 1, and not prohibited under Section 2, an application may be made under Section 130 of the Water Act for the change.

The chief executive will deal with applications made under Section 130 of the Water Act, in accordance with the Water Act. That process is as follows:

- Notice of the application is published in local newspapers. The notice includes information about where the application can be inspected and invites submissions from the public on the application;
- The chief executive determines if the application should be approved having regard to the potential impact on a range of interests including other entitlement holders and aquatic ecosystems;
- If the chief executive approves the application, the chief executive will issue a change certificate that may be lodged with the registrar of water allocations; and
- If the chief executive refuses the application, the Water Act provides for an appeal process.

3.1 Purpose

Any application to change the purpose of a water allocation from 'distribution loss' to 'any' must be supported by information to substantiate to the satisfaction of the chief executive an efficiency gain within the associated channel system. An application may be made for efficiency gains made since the issue of the interim resource operations licence for the Nogo Mackenzie Water Supply Scheme in November 2000.

4 Registration of change

If an application to change a water allocation is approved, the chief executive will issue a change certificate. The water allocation holder may lodge the change certificate with the registrar of water allocations who will change the water allocation on the water allocation register.

However, the registrar will not register the change until a supply contract has been entered into between the water allocation holder and the Resource Operations Licence (ROL) holder for supply of the changed water allocation.

Attachment 4.2I

Nogoa Mackenzie Water Supply Scheme

Amending critical water supply management arrangements

1 Critical water supply management arrangements

1.2 Introduction

The Resource Operations Plan (ROP) rules for infrastructure operation and environmental management (refer Attachment 4.2E) and for water sharing (refer Attachment 4.2F) include arrangements for dealing with periods of low water availability. These arrangements are referred to as the critical water supply management arrangements.

The critical water supply management arrangements initially specified in the ROP are based on broad-scale basin-wide hydrologic modelling. These initial arrangements may need to be refined and further developed to ensure the arrangements appropriately deal with local issues and circumstances particular to the Nogoa Mackenzie Water Supply Scheme.

Over time the arrangements can also be amended to allow adaptation to changing circumstances and refinement through improved knowledge about the operation of the system at times of low water supply.

For example, the initial arrangements for sharing the available supplies may warrant ongoing development to secure supplies for essential water needs.

Variations to the rules associated with the minimum operating levels for storages and to the waterhole drawdown limits given in Attachment 4.2E may also be considered to accommodate local water user and environmental needs under particular circumstances.

1.2 Criteria for critical water supply management arrangements

Critical water supply management arrangements must have regard to the following:

- Provision of water for essential water needs must have first priority;
- The objectives of the Water Resource Plan;
- The effects on water allocation security performance;
- The effects on natural ecosystems and the physical integrity of the watercourse; and
- The public interest.

For the purpose of the critical water supply management arrangements, essential water needs must include that part of a town water supply required for essential services including drinking water and sanitation but excluding lawns and gardens. The Resource Operations Licence (ROL) holder in conjunction with water allocation holders may establish additional essential purposes.

1.3 Initial review of the critical water supply management arrangements

The ROL holder must undertake an initial review of the suitability of the critical water supply management arrangements. A report on the initial review must be provided to the chief executive within 12 months of the commencement of the ROP.

The initial review must include recommendations on whether amendments to the arrangements should be considered.

1.4 Proposals to amend the critical water supply management arrangements

The ROL holder may submit a proposal to amend the critical water supply management arrangements at any time.

The chief executive may require the ROL holder to prepare a proposal to amend the critical water supply management arrangements at any time.

If the initial review of the critical water supply management arrangements under Section 1.3 indicates changes to the arrangements should be considered, the chief executive may require the ROL holder to prepare a proposal to amend the critical water supply management arrangements within a timeframe set by the chief executive.

A proposal to amend the critical water supply management arrangements must include:

- Proposed changes to the rules for infrastructure operation and environmental management (refer Attachment 4.2E) and for water sharing (refer Attachment 4.2F);
- An assessment of the effects of the proposal on natural ecosystems and the physical integrity of the watercourse and the proposed environmental monitoring requirements;
- Details of consultation with stakeholders including water users, local communities and environmental interests; and
- Any other information that will assist the chief executive to decide the proposal.

1.5 Amending the critical water supply management arrangements

The chief executive may amend the rules for infrastructure operation and environmental management (refer Attachment 4.2E) and for water sharing (refer Attachment 4.2F) that apply during periods of low water availability. The chief executive will consider the following in deciding to amend the rules:

- Any proposal to amend the critical water supply management arrangements submitted by the ROL holder; and
- The criteria given in Section 1.2.

1.6 Evaluation of critical water supply management arrangements

The ROL holder must annually evaluate the critical water supply management arrangements in regard to their suitability for periods of low water availability.