

Memo

Date	29 August 2017
To	OTOP Zone Committee
CC	
From	Craig Davison

Current Environmental Flow and Allocation Regime in the Opihi and Temuka Catchments for Surface Water and Groundwater

INTRODUCTION:

The purpose of this paper is to inform the Orari, Temuka, Opihi, Pareora (OTOP) Zone Committee (ZC) on the current environmental flow and allocation regime that manages surface and groundwater resources in the Opihi and Temuka Catchments. This paper is intended to provide context around accompanying papers the ZC will receive on options for refining this current regime in the Opihi and Temuka Catchments, where it is needed.

BACKGROUND:

The Opihi River Regional Plan (ORRP) regulates the taking of surface water and stream depleting groundwater in the Opihi and Temuka Catchments (Figure 1), and their tributaries¹. The ORRP classifies abstractions through A and B Permits. B Permits are designed to be less reliable than A Permits and are generally subject to a more restrictive minimum flow regime. The Land and Water Regional Plan (LWRP) manages the taking of groundwater from this area through defined Groundwater Allocation Zones² (GWAZs) (Figure 2)

In the Opihi Catchment, the ORRP restricts abstractions for irrigation, domestic and stockwater water, and community drinking water supply depending on when water permits were granted, and whether the consent holder is a shareholder of Opuha Water Limited (OWL). Consents are classified into four categories:

- a. Non-Affiliated A Permits (AN): Granted prior to 30 July 1994³, and do not hold shares in Opuha Water Limited.
- b. Non-Affiliated B Permits (BN): Granted post 30 July 1994 and do not hold shares in Opuha Water Limited.
- c. Affiliated A Permits (AA): Granted prior to 30 July 1994 and are holders of shares in Opuha Water Limited.

¹ Including but not limited to the North and South Opuha Rivers, Te Ana Wai River, Hae Hae Te Moana River, Kakahu River, and the Waihi River.

² Fairlie, Levels Plains, and Orari Opihi GWAZs.

³ Notification date of the ORRP

- d. Affiliated B Permits (BA): Granted post 30 July 1994 and are holders of shares in Opuha Water Limited

In the Temuka Catchment, the ORRP also restricts abstractions for irrigation, domestic and stockwater supply, and community drinking water supply depending on when water permits were granted. Water permits are grouped into two categories:

- a. A Permits (A): Granted prior to 1 January 1999.
- b. B Permits (B): Granted post 1 January 1999.

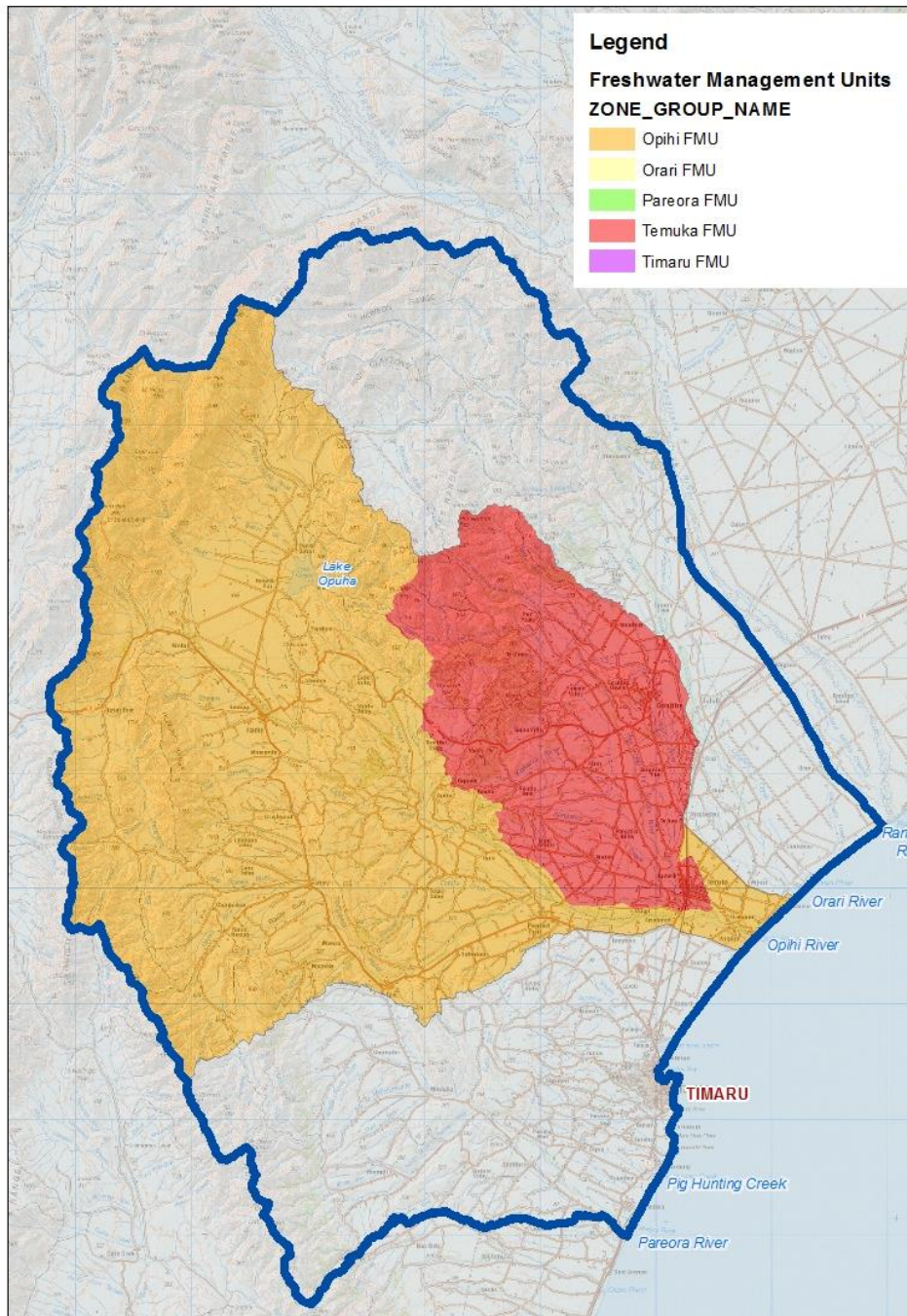


Figure 1 Freshwater Management Units in the Opihi Catchment



Figure 2 Groundwater Allocation zones in the Opihi Catchment

CURRENT ENVIRONMENTAL FLOW REGIME IN THE OPIHI CATCHMENT:

Non-Shareholders (AN and BN Permits)

Flows for the restriction regime in the Opihi Catchment for non-shareholders are measured on the Opihi River at State Highway One. Table 1 provides an overview of the current restriction regime that applies to non-shareholders of OWL for irrigation, domestic and stockwater, and community water supply takes. In summary:

- a. AN irrigation restrictions do not apply until the unmodified flow (UF)⁴ at State Highway One falls below 8.1 cumecs. At this flow, abstractions must reduce pro rata until the flow reduces to 2.5 cumecs, at which point abstraction must cease.
- b. BN irrigation restrictions do not apply while the UF is above 15 cumecs. At 15 cumecs and below, BN abstractions for irrigation must cease.
- c. AN domestic and stockwater and community drinking water restrictions do not apply until the UF falls below 8.1 cumecs. At this flow, abstractions must reduce pro rata until the flow reduces to 2.5 cumecs, at which point 50% of the abstraction must cease.
- d. BN domestic and stockwater and community drinking water restrictions do not apply while the UF is above 15 cumecs. At 15 cumecs and below, abstraction must cease.

Table 1: Environmental Flow Regime for Non-Shareholders of Opuha Water Limited

Restriction trigger	Non-affiliated irrigation consent restrictions		Non-affiliated domestic and stock water supply consent restrictions	
	AN	BN	AN	BN
When UF > 15m ³ /s	No restriction	No restriction	No restriction	No restriction
When UF is in range 8.1–15m ³ /s	No restriction	100%	No restriction	100%
When UF is in range 2.5–8.1m ³ /s	Pro rata restriction	100%	Pro rata restriction	100%
When UF < 2.5m ³ /s	100%	100%	50%	100%

In addition to the restriction regime on the Opihi Mainstem, the ORRP also requires abstractions on tributaries to be subject to a tributary specific minimum flow to protect the specific values of that waterbody. The ORRP does not specify what these minimum flows should be, but stipulates the location of where they are to be restricted. As resource consents to abstract water from tributaries

⁴ Unmodified flow' in the Opihi River at State Highway One is an estimate of what the flow would be in the Opihi River at State Highway One if the Dam were not there.

have been granted, minimum flow restrictions were determined on a case by case basis, and evolved into a common minimum flow regime (Table 2).

Table 2: Common Minimum Flows on Tributaries of the Opihi River

Surface Waterbody	Common Consent Minimum Flow (L/s)	Minimum Flow Location ⁵
North Opuha River	850 (Summer) 1,000 (Winter)	Opuha River at Clayton Road
South Opuha River	500 (Summer) 800 (Winter)	Opuha River at Monument Bridge
Upper Opihi	790 (Summer) 1,290 (Winter)	Opihi River at Rockwood
Te Ana Wai	50% Partial Restriction @ 500 (Oct - Apr) Cease @ 400 (Oct - Apr) 600 (May – Aug) 500 (Sep)	Te Ana Wai River at Cave

Shareholders (AA and BA Permits)

Flows for the restriction regime in the Opihi Catchment for shareholders are measured in the Opihi River at Saleyards Bridge. Table 3 provides an overview of the current restriction regime that applies to abstractions for irrigation, domestic and stockwater and community drinking water supply. It is subject to OWL maintaining a certain level of flow in the Opihi River Mainstem, plus the sum of all affiliated abstraction occurring water (Table 4), and the level of Lake Opuha. If shareholders of OWL are abstracting on a tributary of the Opihi River, they are also subject to the tributary specific minimum flows outlined in Table 2. In summary:

- a. AA and BA irrigation, domestic and stockwater, and community drinking water abstractions are not subject to any restrictions when the level of Lake Opuha is greater than 375 metres above mean sea level (AMSL), and the flows in clause (a) of Table 4 are being met.
- b. When the level of Lake Opuha is between 370 and 375 metres AMSL:
 - i. AA and BA irrigation, domestic and stockwater, and community drinking water abstractions are restricted by 50%, provided the flows in clause (b) of Table 4 are being met.

⁵ These locations are specified in the ORRP

- ii. AA and BA domestic and stockwater and community drinking water abstractions are restricted by 50% and 25% respectively, and provided the flows in clause (b) of Table 4 are being met.
- c. When the level of Lake Opuha is less than 370 metres AMSL:
 - i. AA and BA irrigation takes are restricted as if they were AN and BN takes in accordance with Table 1.
 - ii. AA and BA domestic and stockwater, and community drinking water supply takes are restricted by 50%.

Table 3: Irrigation Restrictions for Shareholders of Opuha Water Limited

Restriction trigger	Affiliated irrigation consent restrictions		Affiliated domestic and stock water supply consent restrictions	
	AA	BA	AA	BA
When ODSL>375m AMSL	No restriction	No restriction	No restriction	No restriction
When ODSL is in range 370–375m AMSL	50%	50%	25%	50%
When ODSL<370m AMSL	Restrictions as per AN	Restrictions as per BN	50%	50%

Table 4: Flows OWL are required to meet at Saleyards Bridge (m³/s⁶)

Clause	Water level	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
(a)	> 375 masl	3.5	3.5	7.5	8.0	4.5	4.0	4.0	4.5	6.0	8.5	7.0	6.0
(b)	375–370 masl	3.35	3.35	5.35	3.85	3.85	3.6	3.6	3.85	4.6	5.85	5.2	4.6

CURRENT ENVIRONMENTAL FLOW REGIME IN THE TEMUKA CATCHMENT:

A Permits

Flows for the restriction regime in the Temuka Catchment are measured in the Temuka River at Manse Bridge. Table 5 provides an overview of the current A Permit restriction regime for irrigation, domestic and stockwater and community drinking water supply takes. In summary:

⁶ Opuha Water Limited must maintain these flows at Saleyards Bridge, plus the sum of all AA and BA abstraction occurring

- a. From October to March, restrictions on irrigation abstractions do not apply while the flow in the Temuka River at Manse Bridge is above 1 cumec. At or below this flow, 50% partial restrictions apply until the flow reduces to 0.7 cumecs. At this flow, abstractions must cease.
- b. From April to September, restrictions on irrigation abstractions do not apply while the flow is above 1.3 cumecs. 50% partial restrictions apply when the flow is between 1.3 and 1 cumecs. At a flow of 1 cumec or less, abstractions must cease.
- c. From October to March, restrictions on domestic and stockwater and community drinking water abstractions do not apply while the flow is above 1 cumec. Between 1 cumec and 0.7 cumecs, 25% partial restrictions apply and below 0.7 cumecs, 50% partial restrictions apply.
- d. From April to September, restrictions on domestic and stockwater and community drinking water supply do not apply while the flow is above 1.3 cumecs. Between 1.3 and 1 cumecs, 25% partial restrictions apply and below 1 cumec, 50% partial restrictions apply.

Table 5: Environmental Flow Regime for A Permit Holders in the Temuka Catchment

Consent Class	Season	Irrigation		Domestic and stockwater supply consents	
		Flow(m ³ /s)	Restriction	Flow(m ³ /s)	Restriction
A	1 Oct – 31 March	@ or below 1m ³ /s	50% (if no water sharing regime)	Above 0.7m ³ /s	25%
		@ or below 0.7m ³ /s	100%	@ or below 0.7m ³ /s	50%
	1 April – 30 Sept	@ or below 1.3m ³ /s	50% (if no water sharing regime)	Above 1m ³ /s	25%
		@ or below 1m ³ /s	100%	@ or below 1m ³ /s	50%

B Permits

Table 6 provides an overview of the current restriction regime that applies to B Permit holders for irrigation and community drinking water supply abstractions on the mainstem of the Temuka River at Manse Bridge. In summary:

- a. From October to March, restrictions on irrigation, domestic and stockwater, and community drinking water abstractions do not apply while the flow in the Temuka River at Manse Bridge is above 1.6 cumecs. At or below this flow, abstractions must cease.

- b. From April to September, restrictions on irrigation abstractions do not apply while the flow is above 1.9 cumecs. At or below this flow, abstractions must cease.

Table 6: Environmental Flow Regime for B Permit Holders in the Temuka Catchment

Permit Type	Season	Irrigation		Domestic and stockwater supply consents	
		Flow(m ³ /s)	Restriction	Flow(m ³ /s)	Restriction
B	1 Oct – 31 March	@ or below 1.6m ³ /s	100%	@ or below 1.6m ³ /s	100%
	1 April – 30 Sept	@ or below 1.9m ³ /s	100%	@ or below 1.9m ³ /s	100%

CURRENT ALLOCATION REGIME IN THE OPIHI AND TEMUKA CATCHMENTS

Surface Water

Opihi Catchment

The ORRP sets an allocation limit for the Opihi Catchment for AN and AA Permits of 5.6 cumecs. This value was considered to be the sum of all existing surface water abstractions from the Opihi Catchment at the time the ORRP was notified in 1994. The ORRP does not set an allocation limit for BN and BA Permits, meaning applications for B Permit water in the Opihi Catchment can continue to be lodged. The allocation limit is also set at a catchment scale rather than tributary by tributary.

Temuka Catchment

The ORRP sets an allocation limit for the Temuka Catchment for A and B Permits of 1.6 cumecs and 0.4 cumecs respectively. The limit for A Permits was considered to be the sum of all existing consented surface water abstractions from the Temuka Catchment as at 1 January 1999. The B Permit limit was set to provide for additional allocation for abstraction.

STREAM DEPLETING GROUNDWATER

The abstraction of shallow groundwater in close proximity to a surface waterbody may have a degree of hydraulic connection to that surface water body. Under the ORRP, an abstraction of shallow groundwater is deemed to be stream depleting when the calculated stream depletion effect exceeds 5 litres per second over a 30-day period. When this threshold is exceeded, the groundwater abstraction is treated as if it is a surface water abstraction, and is managed with a minimum flow restriction.

GROUNDWATER

The LWRP manages groundwater in the Opihi and Temuka Catchments through three Groundwater Allocation Zones (GWAZs) (Figure 2), with set allocation limits for abstraction:

- a. Fairlie – 37.0 Mm³/yr
- b. Levels Plain – 32.9 Mm³/yr
- c. Orari Opihi – 71.1 Mm³/yr

These limits have been set based on land surface recharge, rainfall and stream flow contributions within the zone. These limits and methodology are described in Scott (2014). Figure 2 shows the spatial area of these GWAZs. A large proportion of the OTOP zone is located outside a GWAZ. The LWRP considers that groundwater abstraction outside of a GWAZ is generally inappropriate, but provides a pathway for a resource consent application to be lodged. An option will be presented to the ZC in an accompanying paper on managing abstractions outside of a GWAZ.

References

Opihi River Regional Plan (2000)

Canterbury Land and Water Regional Plan (2017)

Scott, D. (2004) Groundwater Allocation Limits: land-based recharge estimates. Report No U04/97