

16 December 2009

The Chairman
Upper Waitaki Hearings Panel
Canterbury Regional Council
PO Box 345
CHRISTCHURCH

Dear Sir,

Water Allocation and Rule 2 Table 3 (xxii)

I have had opportunity to ponder the question put to me by Mr Bowden at the Hearing yesterday and offer this by way of possible explanation.

Mr Bowden referred to Rule 2 Table 3 (xxii) relating to 'All other rivers and streams' and noted that there is no specific allocation limit provision. He then went onto ask how this might be interpreted. The Environmental Flow Regime referred to in (xxii) reads as follows:

- a) A minimum flow of a the 5 year 7 day low flow as assessed by the Canterbury Regional Council set at the downstream end of the catchment
- b) A flow sharing regime at the mean flow as assessed by the Canterbury Regional Council.

Interpretation A

Reading this as it stands, the only water that can be allocated to abstractive use is that which occurs under the flow sharing provision contained in (b) above. This would in turn reserve all flow less than mean flow to the stream and severely limit the flow available for abstractive use. Recognising that mean flow is generally exceeded for about 30% of the time, one would need to divert any water taken into storage to enjoy any reliability for subsequent irrigation use (water harvesting). I think this is what is intended through b) and is consistent with Policy 8. However this interpretation prompts the question as to why the Board saw any need for part a) of the EFR concerned.

Interpretation B

Generally, a 1:5 yr low flow (LF) ranges between 0.15 and 0.3 of the mean flow. For high country streams that ratio is assumed to be about 0.2. For spring fed high country streams the ratio is probably nearer 0.3.

Interpreting Table 3 (xxii), I could then say the equivalent 1:5 yr LF is retained instream (approximately 20 – 30% of mean flow) following which the difference between 1:5 yr LF and the mean flow could be allocated to abstractive or some other use. At mean flow a sharing regime is introduced to reserve some additional residual flow to the stream while at the same time allowing for water harvesting as described above.

Under this interpretation, someone applying to take say 200 l/s from a stream with mean flow of 400 l/s and 1:5 yr LF of 110 l/s could be granted consent subject to the minimum flow provision (110 l/s) and would be able to take the full amount when flows exceeded 310 l/s. If on the other hand, they or some other party sought to increase total take from the resource to 400 l/s then the first 290 l/s could be approved subject to compliance with the 1:5 yr LF provision while the remaining 110 l/s would be issued subject to i) the mean flow sharing rule and ii) a minimum flow equivalent to mean flow. The allocation regime would appear like this:

Flow u/str	Residual flow	Take
110	110	0
150	110	40
400	110	290
500	160	340
600	210	390
620	220	400

Interpretation C

Whether this is what the Board intended, I cannot be certain. On surface the above interpretation appears to unduly favour abstractive use. Clearly, the Board sought to protect flows in small streams from over exploitation. Policy 7 directs the Consent Authority to consider alternatives where the mean annual low flow at the proposed site of take is less than 100 l/s.

What the Board may have intended is that the sharing regime should commence at mean annual low flow (MALF) as opposed to mean flow. MALF is usually about 0.25-0.35 of mean flow. Referring again to the above example (1:5 yr LF 110 l/s, MALF 140 l/s, mean 400 l/s), the sharing regime would commence at 140 l/s as opposed to 400 l/s and the allocation regime would look like this:

Flow u/str	Residual flow	Take
110	110	0
140	110	30
200	140	60
400	240	160
600	340	260
800	440	360
880	480	400

This interpretation provides a better balance between instream retention and abstractive use. In addition the flow duration distribution would tend to mirror the natural flow duration unlike Interpretation B which tends to 'flatline' at the residual flow.

Furthermore, I am of the opinion that this interpretation is consistent with Policy 7 and the intent to protect the flows in small streams. I feel that those streams that are heavily committed for abstractive use currently have been individually identified and are catered for elsewhere within Table 3.

Final Comment

Generally, I consider that when total allocation exceeds MALF the resource is becoming over committed to 'run-of-river' abstractive use, particularly if the minimum flow provision is less then MALF. In that circumstance the flow duration is markedly impacted particularly in the median to low flow range which in turn impacts instream fisheries values.

Flow is greater than 1:5 yr LF for about 99% of the time and greater than MALF for about 95% of the time. If allocation is limited to the MALF equivalent and the minimum flow is say set at MALF, this equates to two times MALF. Flows are greater than 2 MALF about 70 % of the time generally which effectively is the reliability of supply to the consent holder. If the minimum flow is set at 1:5 yr low flow instead of MALF, the reliability of supply improves to about 75%. Most farmers would view such reliability as less than acceptable.

To retain a reliability of supply of greater than 85% then the flow duration curve limits total abstraction to about 60% MALF and for 90% reliability the limit would need to be about 0.25 MALF.

Frank Scarf