

IN THE MATTER of the Resource Management Act
1991

AND

IN THE MATTER of submissions by **Orari Water
Society Incorporated** to the Proposed
Canterbury Land & Water Regional
Plan

HEARING THREE

ORARI SUB CHAPTER (SECTION 14)

REPLY TO A QUESTION PUT TO GREGORY IAN RYDER BY THE HEARING COMMISSIONERS

JUNE 2013

The Hearing Commissioners have asked me the following question:

Evidence of Greg Ryder: Paragraph 4.52, page 19 – why was the 50L/s minimum flow problematic - is it because Coopers Creek runs dry downstream even if the SH72 site is running at 50 L/s?

Establishing a minimum flow for Coopers Creek has proved problematic for several reasons. Some of the reasons relate to the hydrology of the Coopers Creek system, in particular no long-term flow record for the creek, no continuous flow recorder to monitor low flows, and the accumulation of gravel within the creek's channel below the Scotsburn confluence causing underflow and requiring channel works for flood protection purposes. The latter two factors have affected the long-term viability of a reliable flow recorder site. I have sought further advice from Mr de Joux on these matters as he has considerable first hand experience with hydrological issues and associated consenting issues for the Coopers Creek area. He has provided a supplementary brief of evidence which specifically addresses the Coopers Creek minimum flow issue from a hydrology perspective.

There are also several ecologically based reasons which concern me regarding the setting of 50 L/s (or any other minimum flow for that matter) for upper Coopers Creek.

Firstly, the work commissioned by Environment Canterbury (Golder Associates 2013), to assess the ecological values of upper Coopers Creek and to put forward flow requirements to sustain those values, was unable to derive a relationship between flow and habitat for aquatic biota (fish, fish food and aquatic plants). The Golder report stated: *“These factors prevented any meaningful attempt to model habitat in relation to flow.”*

The authors of the Golder report went on to state *“It is widely recognised that it may often be difficult to undertake instream habitat modelling in spring-fed streams (Alien & Hay 2011).”* and *“There is a paucity of flow information for Coopers Creek which makes recommendations of a suitable ecological minimum flow difficult.”*

Flow setting in springs for ecological management is difficult due to the stable nature of spring flows and the influence of aquatic plants (macrophytes) on flow measurements. A review of the Golder report prepared by the Cawthron Institute on behalf of Environment Canterbury noted:

“Modelling of habitat/flow relationships can be difficult and/or meaningless in spring-fed streams where there is often no relationship between water level and flow, because macrophyte abundance is often the main factor controlling water levels in these systems. The author experienced this difficulty in Coopers Creek and was unable to say whether the current minimum flow in Cooper Creek could be raised or lowered while still protecting the ecological values.”

Given the above information on minimum flow considerations in Coopers Creek, in my opinion, 50 L/s has no sound ecological basis as a minimum flow to protect the aquatic values of upper Coopers Creek. Mr de Joux has noted that the 50 L/s flow for Coopers Creek was based on an estimate of the 1:10 year low flow, which has since been shown to be incorrect.

In the absence of an accurate understanding of the relationship between instream habitat for aquatic biota and flow, defaulting to a minimum flow using hydrological records (e.g., 90% of the natural MALF) is often adopted for management purposes. However, there are no useful hydrological records for Coopers Creek and the 50 L/s value appears to have been adopted without any sound ecological or hydrological basis specific to the upper reaches of this creek.

Notwithstanding these considerations, I also refer back to the Commissioner’s original question as to whether my concern relates to the fact that Coopers Creek runs dry downstream even if the SH72 site is running at 50 L/s. This has been a matter I have taken into account, noting that the stream habitat at issue is in the order of 1.5 km in length, but the bottom line is that there is no evidence that 50 L/s approximates a mean annual low flow (and as such is a flow the aquatic biota of the creek have adapted to) or whether this flow provides suitable habitat for any valued aquatic species in upper Coopers Creek.

Secondly, the effect of gravel transport from the Scotsburn during flood events significantly influences the habitat of Coopers Creek in the section between the confluence with the springs and SH72. This gravel accumulation has resulted in channel maintenance works by Environment Canterbury including channel straightening and channel contouring, which have acted to reduce the variety of habitat available for aquatic biota and has probably affected the local relationship between habitat availability and flow.

Thirdly, it is generally agreed that flow is lost from Coopers Creek to the ground in the vicinity of SH72. The distance over which these losses occur is uncertain, but it will influence the flow measured at any flow recorder site in this section of the river and create uncertainty over actual flow (and therefore habitat availability) further upstream.

For these reasons, I remain of the view that flow setting in Coopers Creek for ecological purposes is currently problematic and speculative with respect to protecting instream values. Consequently, I support the Plan's approach to manage abstraction based on flows in the mainstem Orari (Upstream Ohapi) as an appropriate interim step until a more reliable hydrological record for Coopers Creek is established.

A handwritten signature in black ink, appearing to read 'Greg Ryder', with a stylized flourish at the end.

Greg Ryder
14th June 2013

References cited

Alien, C. and Hay J. 2011. Setting flows in spring-fed streams: issues and recommendations. Prepared for Environment Southland by the Cawthron Institute.

Golder Associates. 2013. Coopers Creek ecological values and flow requirements. Prepared for Environment Canterbury.

Young, R. 2013. Review of report on ecological values and flow requirements of Cooper Creek. Cawthron Institute letter to Tim Davie, Surface Water Resources & Ecosystems Section Manager, Environment Canterbury. Appendix 4 of the Section 42A report, Hearing 3.