

From: [Richard English](#)
To: [Plan Hearings](#)
Subject: Proposed Plan Change 7 to the Canterbury Land and Water Regional Plan - Evidence
Date: Tuesday, 7 July 2020 10:33:17 AM
Attachments: [PC 7 Evidence - Aquifer Nitrate Levels.pdf](#)

Submitter ID: PC7 - 506

Please find my Evidence attached

Richard English

Before the Independent Hearings Panel

In the matter of the Resource Management Act 1991

And

In the matter Of Plan Change 7 to the Land & Water Regional Plan,
Canterbury Regional Council.

(Schedule 8 Region-wide Water Quality Limits.)

EVIDENCE OF RICHARD SPENCER ENGLISH

(SUBMITTER ID: PC7- 506)

DATED: 7TH JULY, 2020

Introduction

1. My full name is Richard Spencer English.
2. I hold a Bachelor of Science (Hons, Civil Engineering) degree from Birmingham University, England. I am a Member of the Institution of Civil Engineers (London).and a past Member of the Institution of Professional Engineers New Zealand.
3. Of relevance to this evidence, I have had both a direct and indirect involvement with the local aquifers for over thirty five years and have approximately ten years of direct local water supply experience including responsibility for the development and maintenance of local water supply well fields, water quality and related aquifer management issues.
4. I have been involved with the operation of cleanfills for over twenty five years with respect, in particular relevance, to their contamination potential of underlying aquifers.
5. Over the last 10 years I have conducted a personal investigation into the hydrology of the Christchurch - West Melton aquifer. I was a part instigator of and have been party to an on-going CCC project on gaining an improved understanding of local aquifers.

Stygofauna and the Aquifers.

6. The presence of stygofauna has been acknowledged both internationally and locally for almost 140 years. (e.g. Charles Chilton identified numerous stygofauna in the Canterbury Plain's aquifers as early as 1882)
7. Their critical importance in maintaining aquifer health is also well documented⁽¹⁾.

(1) For example: <https://www.envirolink.govt.nz/assets/Envirolink/Reports/1838-HZLC143-Groundwater-Ecosystems-Functions-values-impacts-and-management.pdf> (pages 40 - 43)

9. To quote from a recent Australian research report ⁽²⁾ *"[A]s in any ecosystem, pollution threatens the health of the groundwater biota, with flow-on effects to other elements of the ecosystem. For groundwater ecosystems, disruption to one element of the ecosystem is likely to have significant effects on the microbial communities and subsequently impact the ability of the ecosystem to self-purify and provide clean groundwater.... The risk to groundwater ecosystems is that the fauna has evolved classic k-strategist traits of longevity, low metabolic and reproductive rates, meaning that recovery from disturbance is, at best, slow....."*
10. *"In groundwaters where contamination is typically long-term and difficult to remediate, these impacts will be persistent, and likely lead to a decrease in population viability. The broader consequences of declining invertebrate populations in aquifers is the loss of ecosystem services, including changes to aquifer hydraulic properties....."*
11. Unfortunately, particularly given their known importance, there remains a significant lack of experimentally derived data on local stygofauna susceptibility to various contaminants.
12. The New Zealand science community has called repeatedly, over a long period of time, for the relevant toxicity research to be conducted ⁽³⁾. It is regrettable that this work has not been undertaken. As a consequence decision makers have little, appropriate, reliable information to hand on which to base their deliberations.

Plan Change 7

13. Plan Change 7, nor the associated S42A reports, appear to directly address the issue of stygofauna. This is a **major failing** of those documents.
14. Setting this failing aside, the question arises as to the appropriateness of the level of contaminants in general, and concentration of nitrates in particular, which will be permitted in the aquifers by the rules embodied in PC7.

(2) *"The Toxicity and Uptake of As, Cr and Zn in a Stygobitic Syncarid"*, Hose.G. et al : Water – Nov 2019
<https://www.mdpi.com/2073-4441/11/12/2508/htm>

(3) For example: *"Life in New Zealand's Underworld"* L.Sinton; Soil & Water Issue 2: 1985

15. The current version of PC7 indicates that the maximum permissible concentration of nitrate nitrogen in groundwater will be 11.3 mg/l, with an average annual concentration permissible less than 5.65 mg/l ⁽⁴⁾. The former is the Maximum Allowable Value stipulated in the New Zealand Drinking Water Standard to protect human health.

Maximum Permissible Nitrate Nitrogen Levels.

16. The question arises as to whether a value which is designated to protect human health is relevant to the protection of aquifer health.
17. I can find no evidence, in relation to local aquifer health, that supports the figures in the current version of PC7.
18. The topic of allowable nitrate nitrogen levels in aquifers in relation to aquifer health was recently traversed in depth at the hearing for the Water Conservation Order in relation to Te Waikoropupū Springs in Golden Bay.
19. Joint Expert Witness caucusing for this latter hearing determined that a maximum concentration of 0.55mg/l of nitrate nitrogen was an appropriately precautionary level at which to provide protection to the sytgo fauna and hence the health of the Spring's aquifer⁽⁵⁾
20. The hearing panel has subsequently set the limit in the WCO at 0.44 mg/l ⁽⁶⁾
21. Both these figures are completely at odds with the concentrations set by the PC7 rules for the Canterbury aquifers. (i.e. The maximum PC7 allowable level is **twenty five times greater** than the level set by the Te Waikoropupu Water Conservation Order.)

(4) Schedule 8 – Region wide Water Quality Limits – Groundwater .

(5)<https://www.epa.govt.nz/assets/FileAPI/proposal/NSP000042/External-advice-and-reports-External-reports/8032667ff9/Waikoropupu-Expert-Conferencing-Statements.pdf> (Annexure D)

(6)https://www.epa.govt.nz/assets/FileAPI/proposal/NSP000042/Boards-decision/WCO_Te_Waikoropupu_Springs_Recommendation_report_Final_ERRATUM_20_March_2020.pdf (pages 49 - 53) The full decision is currently under appeal to the Environment Court.

22. Although I have anecdotal evidence that suggests that stygofauna in the Christchurch aquifers may not be unduly impacted at nitrate levels of the order of 1.5mg/l, the disparity between the various figures illustrates our lack of knowledge on this topic.
23. Setting the limit unnecessarily low could have very significant negative impacts on farm productivity without any commensurate increase in the protection of aquifer health. Conversely setting the figure too high could severely impact, if not effectively irreversibly destroy the aquifer's health to the detriment of all those who rely on them.
24. Given the significant environmental and financial implications of the decision relating to maximum allowable nitrate nitrogen concentrations in local aquifers I believe that the relevant sections of PC7 should be placed on hold until definitive information becomes available.
25. In the alternative Maximum and Annual Average limits should be reduced to 0.55mg/l of nitrate nitrogen.

R English

Richard English

7th July, 2020