

**IN THE MATTER OF**

the Resource Management Act  
1991

**AND IN THE MATTER OF**

applications for resource  
consents by the Central Plains  
Water Trust and a notice of  
requirement for the designation  
of land by Central Plains Water  
limited associated with the  
construction and operation of  
the Central plains Water  
Scheme.

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**STATEMENT OF EVIDENCE OF GRAEME MONTAGUE KEELEY ON  
BEHALF OF SILVER FERN FARMS LIMITED (FORMERLY PPCS LIMITED)**

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**Introduction**

1. My full name is Graeme Montague Keeley. I hold the degree of Bachelor of Science in Chemistry. I am a Fellow of the NZ Institute of Chemistry and NZ Institute of Food Science and Technology and a Member of the NZ Water and Wastes Association.
2. I have been employed by Silver Fern Farms since 1962 and my current position is Technical Manager (South Island). I am responsible for overseeing the technical aspects for the company including environmental matters, R&D and the provision of laboratory services. I have been involved in the company's waste treatment systems and consenting issues for water and waste for over 20 years.
3. This submission relates to two aspects on potential effects arising from the Central Plains Water Trust (CPWT) application to extract water from the Waimakariri River and irrigate land.
4. The first is on the likely effects of modifying the river flow in the Waimakariri River and in particular the reduction in freshes naturally occurring in the river and the consequent extended low flow periods.

5. The second is the potential for increased nitrates reaching the groundwater under the irrigated zone and adding to the nitrate burden in the aquifer.

### **Waimakiriri River**

6. Silver Fern Farms holds a resource consent (CRC 950747) to discharge treated mixed meatworks, woolscour and fellmongery wastes to the Waimakariri River. This discharge occurs at the Old Highway Bridge.
7. One of the features of this river system is the occurrence of freshes that occur naturally in the river. This cycle of high and low flows is typically associated with rainfall events and snow melt in the upper catchment.
8. The ecology in the river has adapted to these events but from the Old Highway Bridge to the sea, tidal effects modify the typical braided river system upstream of this point.
9. The conditions in the Silver Fern Farms consent have been developed based on these existing river flow patterns and any changes brought about by the CPWT proposal may result in significant adverse effects downstream of the Old Highway Bridge if the frequency of freshes is reduced and longer periods of low flows occurs.
10. Other submitters (Meredith, para 69 and Robinson, para 4.17) have canvassed this issue from the point of view of increased nuisance growths and affects on the fishery.
11. We would ask that this aspect be given careful consideration as it impacts adversely on an important export meat operation that only recently has had to curtail some of its operations due to reductions in live animal supply and environmental considerations.
12. We would request that a consent condition be included in any consent granted to CPWT that effectively maintains high flow events at a frequency sufficient to prevent the development of nuisance biological growths within the total river system to the extent they affect downstream users.

### **Groundwater**

13. The CPWT proposal increases the potential for groundwater nitrate concentrations to rise if large areas of land are irrigated and more intensively farmed.

14. Silver Fern Farms is a large user of potable water extracted directly from the Belfast/Christchurch aquifers. The meat export plants at Belfast are critically dependent on potable water meeting both the NZDWS and EU potable water criteria. Any possibility of the current supply not meeting these criteria places the export licences of these plants in jeopardy.
15. Earlier evidence has indicated the likely affected groundwater zone will lie further South of the Christchurch/Belfast aquifer but not-with-standing this, there is some potential risk to the overall aquifer of an increased nitrate burden. With large scale developments of this type, if a potential risk is identified a conservative approach needs to be taken. The lag in establishing a cause and effect relationship by physical measurement can mean any problem is identified too late for corrective measures to be undertaken.
16. It is requested that a condition be included in any consent granted that requires monitoring wells to be established to provide early warning of increased nitrate concentrations in the drainage from the scheme to the immediate groundwater and in the down gradient aquifer from the irrigated zones.
17. Further, it is requested that consideration be given to the establishment of 'nitrate control zones' between the irrigation scheme and the East Coast covering the potentially affected area. A schematic diagram is presented in the Attachment depicting this concept. The numbers are nominal only and serve to illustrate the approach. This approach seems reasonable when nitrogen application is diffuse over large land areas with no existing point source application.
18. In this way, surety and greater clarity is given for planners, administrators and other potential users of the groundwater resource.



G M Keeley  
28/7/08

Attachment – 'Nitrate Control Zones'

