

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.

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

Addendum

- References referred to in Clause 10 of principal evidence (Meredith, para 69; Robinson, para 4.17)
- Typical examples of frequency and magnitude of present river fresh events
 - short term, April 2000
 - longer term, March – August 2008
 - current, July/August 2008
- Effect of different extraction options on frequency and magnitude of river fresh events (Burrell, Supplementary Evidence, July 2008)
- Maximum nitrate-N concentrations in monitoring wells (Ecan webpage)



G M Keeley
14/8/08

68. The assessment of the effects of point source discharges (particularly PPCS (Belfast meatworks)) was likewise relatively simplistic, and failed to acknowledge that the receiving environment is tidal and not of the habitat types normally characterised by ANZECC 2000 trigger values. CPW therefore concluded somewhat simplistically, that there would be no more than minor effects on water quality downstream of PPCS. I disagree with this analysis. The analysis was based upon consideration of individual chemical determinands against inappropriate guidelines, rather than consideration of their overall effects. It is notable that there have been localised and widespread visible evidence of enrichment effects along shallow river margins and on tidal islands downstream of SH1 at times of stable and low river flow. These growths and discolorations generate widespread complaints from various river users such as whitebaiters, fishermen and other recreational users. These 'effects' are inevitably driven by a combination of, concentrations of contaminants discharged, and river (low) flow stability.
69. The PPCS discharge was authorised in 2000 on the basis of effects being unlikely due to high river flow variability preventing adverse effects of nutrient and contaminant additions. However, the significant increases in periods of summer minimum flows and increased accrual periods now predicted, will in particular, increase the potential for nuisance growths effects as a result of the considerable concentrations of contaminants (particularly nutrients) discharged by PPCS into the lower Waimakariri River.
70. Overall, the assessments of flows, habitat and water quality by the applicant tend to understate or omit issues that are likely to have adverse effects on in-stream values. Most relate to the effects of greatly increased durations of low flow periods as a result of the proposed abstractions, and lack of controls on flow regimes (a minimum flow alone). This lack of controls can potentially allow a doubling or more of periods when flows will be held at or near to minimum flows (41 m3/sec). During these extended periods:
- habitat areas for most biotic communities will be greatly reduced in area
 - water temperatures will be well above optimal or preferential temperature ranges
 - water clarity regimes will be changed with increasing periods of 'infishable' water

Adrian Meredith
ECR

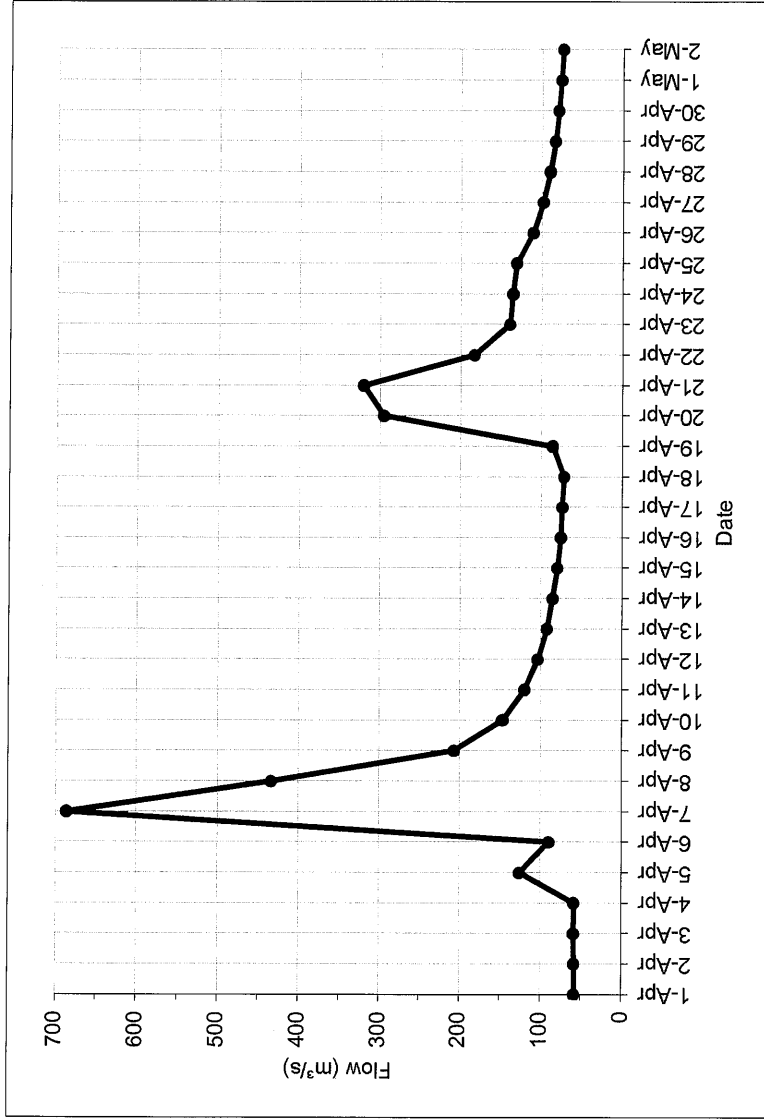
Peter Robinson. Salmon Anglers Assn

4.17 This effluent comes via an outflow located at the bridge on the Old Main North Road. PPCS have experienced difficulty in maintaining the discharge to within the conditions of their consent during low flow periods and rely on variable flows in order to maintain the conditions (Meredith para 69.). In 2007 PPCS were in breach for three months over the peak of the salmon season January to March (Ecan). During this time the tidal lower river up to 2kms downstream of the bridge, became badly polluted to the extent that silver fishing lures tarnished after a single cast. This situation will be exacerbated if river flows are kept lower for longer.

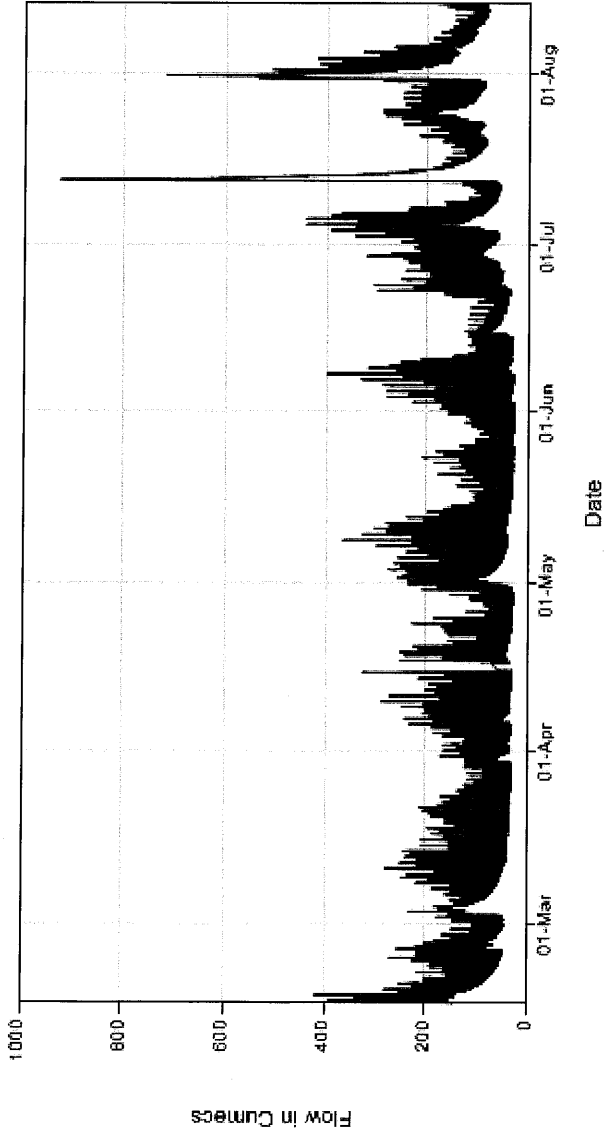
Date	Flow (m ³ /s)
1-Apr-00	58.3
2-Apr-00	58.2
3-Apr-00	59.0
4-Apr-00	58.6
5-Apr-00	125.9
6-Apr-00	89.8
7-Apr-00	686.0
8-Apr-00	433.8
9-Apr-00	206.4
10-Apr-00	146.5
11-Apr-00	120.0
12-Apr-00	103.5
13-Apr-00	92.6
14-Apr-00	85.4
15-Apr-00	79.7
16-Apr-00	75.7
17-Apr-00	73.7
18-Apr-00	72.0
19-Apr-00	86.0
20-Apr-00	295.1
21-Apr-00	320.5
22-Apr-00	182.7
23-Apr-00	138.9
24-Apr-00	135.4
25-Apr-00	131.4
26-Apr-00	110.8
27-Apr-00	98.5
28-Apr-00	90.1
29-Apr-00	83.6
30-Apr-00	79.6
1-May-00	76.3
2-May-00	74.0

Note:

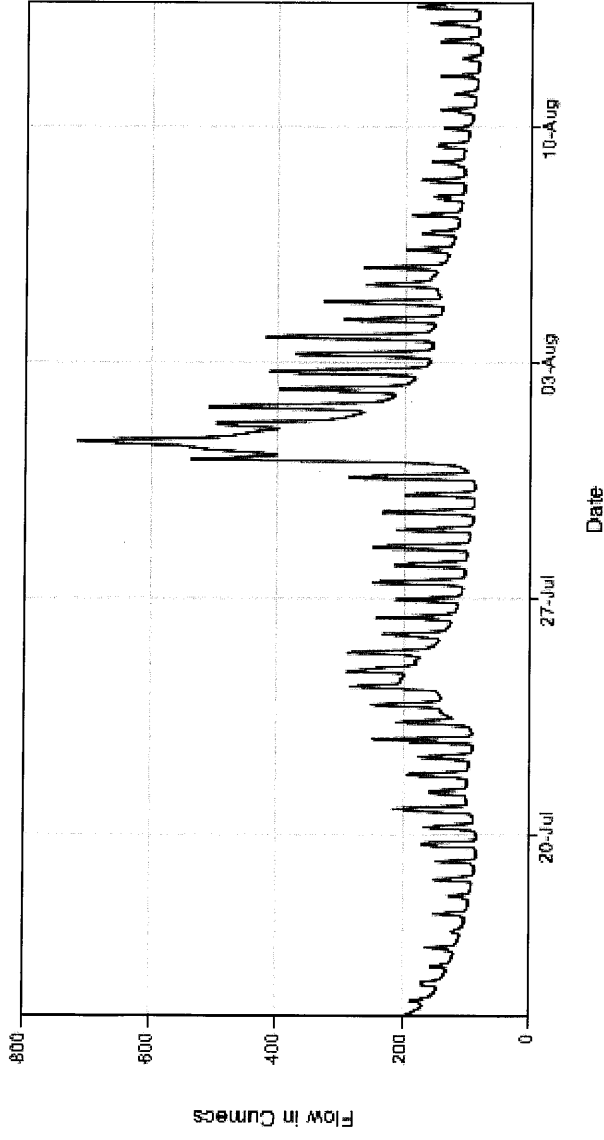
Data is from the Waimakariri River Old Highway Bridge site.
 Original data was supplied by Environment Canterbury.
 Plot created by Golder Associates (NZ) Ltd, June 2008.



River flow - Waimak Old Highway Bridge in cubic metres per second
Twice daily fluctuations are due to tidal influence.



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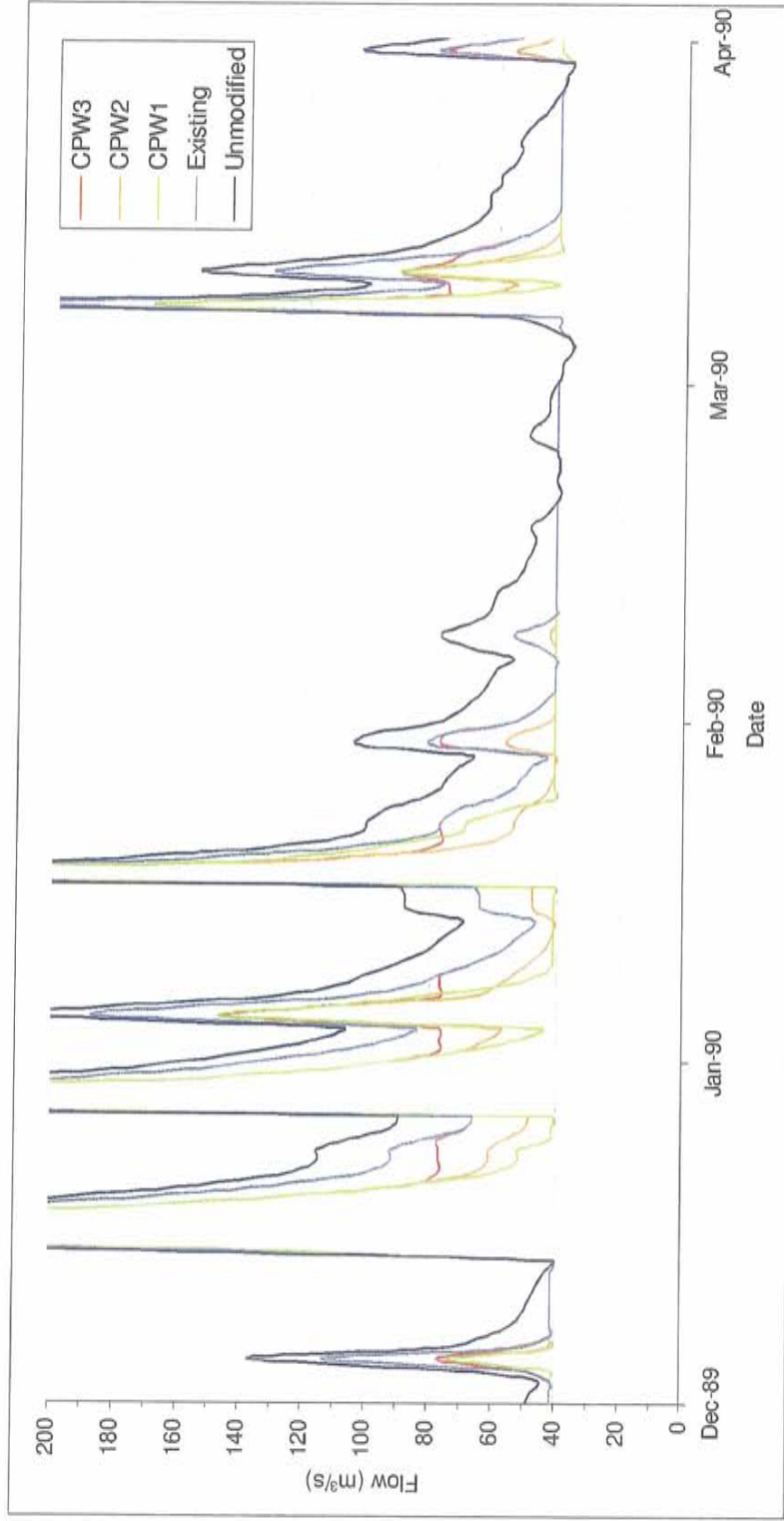
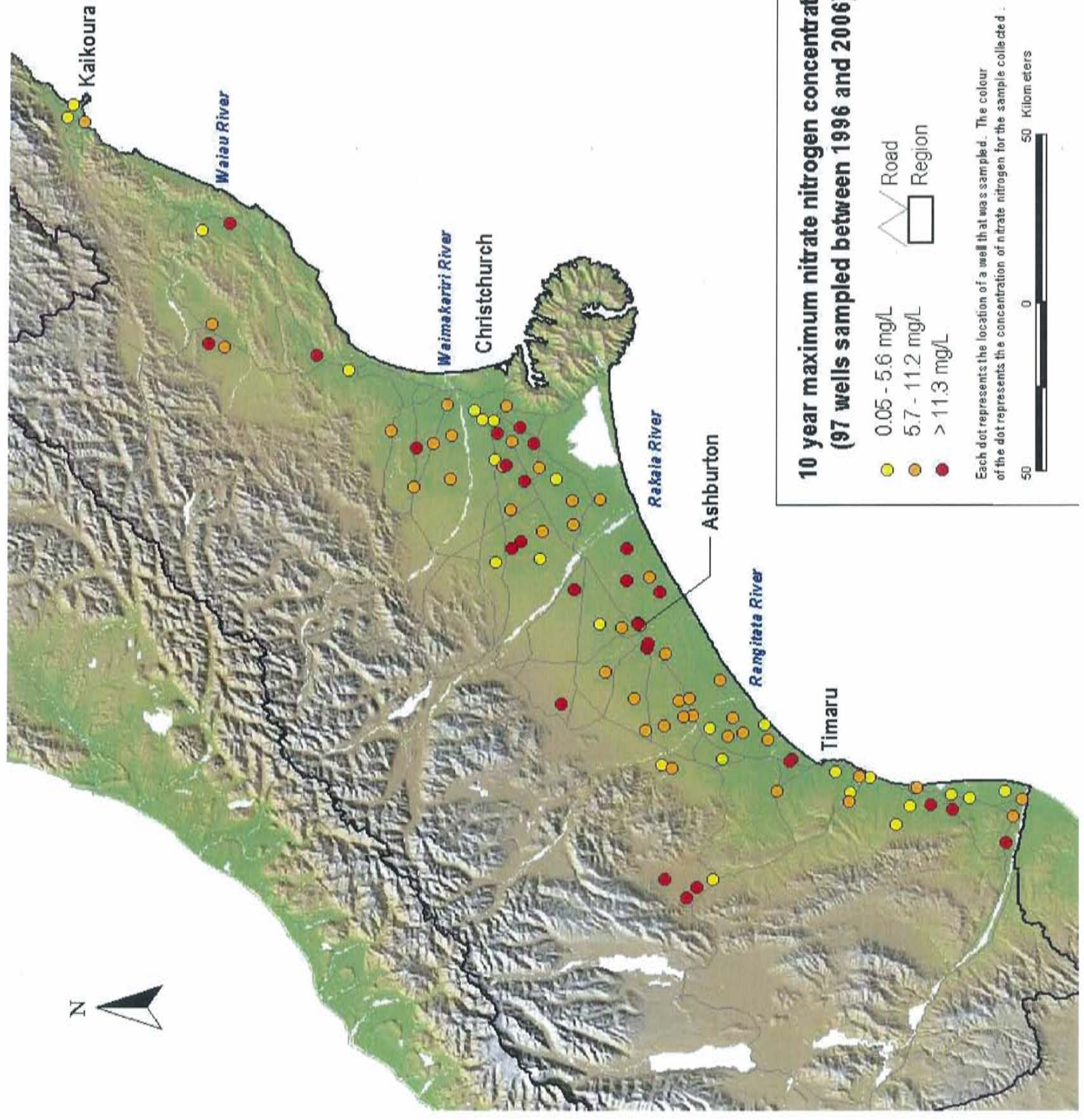


Figure 2: Hydrograph for the Waimakariri River Old Highway Bridge site for the summer period of a typical flow year (1989/1990). Data provided by URS New Zealand Ltd.



**10 year maximum nitrate nitrogen concentration
(97 wells sampled between 1996 and 2006)**

- 0.05 - 5.6 mg/L
- 5.7 - 11.2 mg/L
- > 11.3 mg/L

Each dot represents the location of a well that was sampled. The colour of the dot represents the concentration of nitrate nitrogen for the sample collected.

