BEFORE THE COMMISSIONERS APPOINTED BY THE CANTERBURY REGIONAL COUNCIL

IN THE MATTER OF

The Resource Management Act 1991

AND

IN THE MATTER OF the proposed Waipara Catchment Environmental Flow and Water Allocation Plan 2010.

EVIDENCE OF **Paul Donaldson**

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1. BACKGROUND

My name is Paul Ivan Donaldson. I am the Business Manager at Pegasus Bay Vineyards and Winery and I am a family member of this family owned and operated business. I have a Masters Degree in Business Administration and a Batchelor of Science Honours **Degree in Zoology** with a focus on **aquatic zoology**.

I am presenting this submission on behalf of Pegasus Bay Winery and Vineyards and on behalf of the Waipara River Users Group. My presentation also has the support of the Waipara Valley Wine Growers, of which I am Vice-President.

2. THE PURPOSE OF THIS SUBMISSION

The purpose of this submission is to discuss both the effects of abstraction on surface flow in the Waipara River, the effects of flow on fish species in the river, and any perceivable gains from a minimum flow increase

THE SUBMISSION

3. The **Donaldsons** are long established in both the wine industry and the Waipara area. Our vineyard was the **first** in Canterbury to be assessed and **registered** as a **Sustainable Vineyard** by New Zealand Winegrowers. Waipara is a naturally dry area but we believe, like other dry areas, such as Central Otago, it is a very special place. Native plants, trees and fauna were once abundant but the area has been changed by man with a **sad loss of indigenous biodiversity** and **invasion by introduced exotic species.**

4. We have been **working** with **Lincoln University**, through Steve Wratten, Professor of Ecology, on a project to **reintroduce** and foster the return of **indigenous flora and fauna**, with a view to enhancing native biodiversity throughout the region. This "Greening of Waipara" project has been supported by Waipara Valley Winegrowers. Trial **areas** have been **established at Pegasus Bay Vineyards and Winery** on the lower Waipara and we would like to extend this to the property on the Upper Waipara River. Both our current and new properties abut onto the Waipara River.

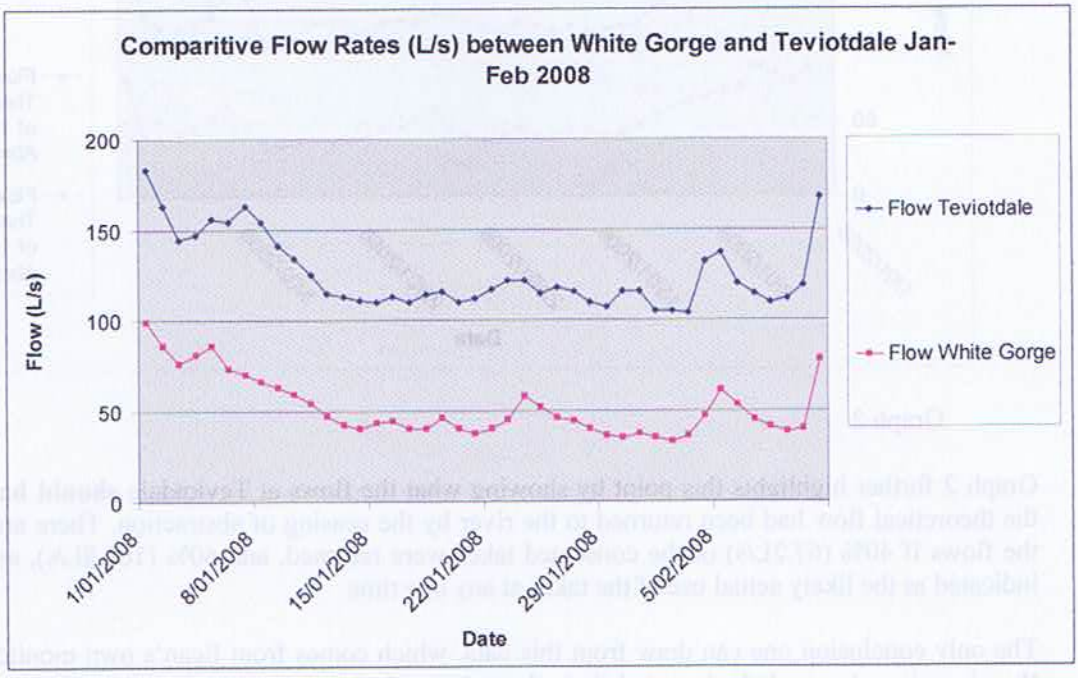
5. The Waipara River, being fed from the eastern foothills, is different from most other hill fed rivers in Canterbury (Hayward et al 2003) and is **naturally subject to long periods of low flow**, particularly in summer and autumn,. At other times it is subject to wild floods and freshes. It is thus quite unlike rivers which arise in the mountains, such as the Waimakariri and Rakaia. Over the centuries, if not millennia, an **indigenous fish population** has established itself in the Waipara River. A population which not only tolerates, but **thrives in such conditions**. As we heard Mr Jowett say, there is an abundance and diversity of fish in the Waipara, and they seem well suited and resilient to the current regime. **Exotic species**, such as trout, have **not thrived** in the Waipara River.

6. There has been a lot of talk from ECan staff and witnesses in both their reports and in this hearing about the potential for abstractors to "suck the river dry" if 100% of the consented takes were used. Mr Jowett said exactly that during questioning several days ago stating "the upper Waipara would be totally dry if the full consented amount was being taken" or words to that effect, and states in his evidence that (in section 6.15) "abstraction of water extends the duration of low flows as well as reducing the flow", and (in section 6.20) "without partial restrictions and full abstraction the river could be dry at some places downstream before minimum flow is reached" without providing evidence specific to the Waipara to support this. He states that he has suggested an increase of 10L/s to the minimum flow at both recorder sites because he is looking to reduce the intensity and frequency of dry events created by abstraction. Mathew McCallum-Clark stated in his section 42a officers report that "it is logical that at some point down stream of White Gorge, the river will be drawn down to zero due to abstractions".

The **flaw in all of these arguments** is the assumption that every litre/second of abstraction comes 100% from surface flows with no acknowledgement that there is any **replacement of the surface flow** from the large area of underflow in the river gravels. The basis of all the theories presented to date seems to be that the river's surface flows are a **sealed pipe** and that abstraction from it has a 100% depleting effect of that flow. This is also seen in Mr Leftley's evidence where he talks about the amount of flow that could be "put back in the river" if abstraction was ceased. I **do not believe this is the case** at all, and I believe that ECan's own monitoring sites are able to **demonstrate an alternative situation** to that being purported by this theory.

While I am not a hydrologist, it seems ECan have developed a **very simple theory** of 100% return of flow, and based their recommendations on this. Mt Leftley confirmed this in questioning when he stated that **he believed that for every 1L/s of water abstracted there would be an effect seen downstream on the Teviotdale recorder of a drop on 1L/s (i.e. a 100% effect).** Therefore it should also be very simple to see this flow return to the river in real situations when abstraction ceases. However as seen below, **this simply is not the case.**

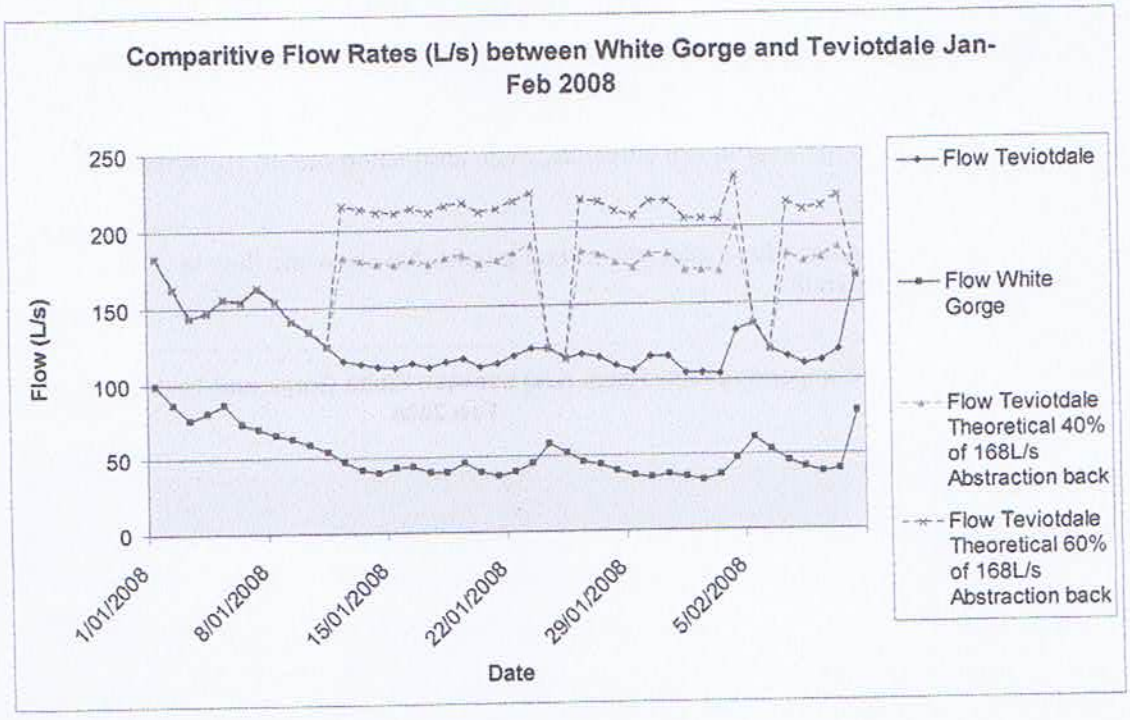
To highlight my point I have attached several graphs that show the flow at 2 points of the river, during a very dry period in 2008.



Graph 1

In Graph 1, the flows are shown for Teviotdale and White Gorge. Of course, White Gorge is the natural flow, prior to any abstraction, and Teviotdale is based below all the points of abstraction on the Upper Waipara, which the total consented to is 168L/s if fully actioned. Given that the minimum flow at White Gorge is 50L/s then all consents on the Upper Waipara would have had to stop abstraction on 12 January until the 10th of February, with only two 2 day periods (24-25 Jan and 5-6 Feb) where abstraction could start for a short period, otherwise the time of no abstraction was consecutively 12, 10, and 4 days. It is assumed that other conditions on the river are constant before and after the cutoff period is reached.

If the theory that 100% of abstraction comes from surface flow, and ceasing abstraction could put flow back in the river was correct, then **surely at the times when abstraction ceased we would expect to see an increase in flow occur at the Teviotdale site** by roughly the amount of abstraction that was now no longer being taken, as the recorder recovers to its "natural flow level". I can see **no evidence of an increase** of any size, and the flow rate at teviotdale continues along **an identical trend as the natural flow** at White Gorge. It continues to drop, when the theories being used tell us there should have been at least 67L/s put back into the river and that should show up on the flow meter at Teviotdale. 67L/s is 40% of the consented take, and there seems to be some mutual agreement that real abstraction is between 40-60% of consented take.



Graph 2

Graph 2 further highlights this point by showing what the flows at Teviotdale **should have looked like** if the theoretical flow had been returned to the river by the ceasing of abstraction. There are 2 lines showing the flows if 40% (67.2L/s) of the consented takes were returned, and 60% (100.8L/s), as these have been indicated as the likely actual use of the takes at any one time.

The only conclusion one can draw from this data, which comes from Ecan's own monitoring sites, is that **the river is not a sealed pipe**, and that when abstraction occurs there is **not a 100% effect on surface flow**. In fact, it would appear that the replacement of surface flow from river gravels is so **significant** that abstraction has **little effect** on the natural flow patterns of the Waipara River.

This is a very important point, because it is crucial to understand that if Waipara River abstractors are **not having a significant effect on surface flow loss**, then the flow regimes witnessed there are the **work of nature**, and without some form of flow augmentation at the top of the catchment, then the ability to somehow protect a "minimum flow" is impossible. To put it simply, just because you determine that the minimum flow should be 60 l/s, **nature won't pay attention** and naturally the river will occasionally fall below that at certain points. Additionally, the thought of bringing in partial restrictions because it will slow the drop in river flow relies on the theory that abstractors are having a huge effect, and are responsible for flow drop in the Waipara. When the **data shows that this is not the case** at all, you would expect that even with partial restrictions in place, the flow patterns shown in graph 1 are still very likely to occur in a dry year, regardless of when abstractors stop, and so the ecological benefit will be slim, while the economic loss, as detailed in Ivan Donaldson's evidence, will be enormous.

In one point of clarification, Mr Jowett states in 6.21 of his evidence that if partial restrictions are not applied, then the minimum flow should be increased so that with full abstraction flow is maintained downstream. It is not made clear whether he is happy with the current minimum should partial restrictions come in, or if he thinks the minimum needs to come up above the suggested 60 L/s. Either way it seems that because the evidence from ECan's own recorders shows that abstraction does not significantly affect

surface flow, a recommendation like this will **only penalise abstractors** without providing the theorised benefits.

It seems that the total river flow (surface and underflow) is obviously large enough that **when abstraction ceases** in the Upper Waipara the amount returned to the total flow doesn't **even register on the flow recorder** down stream, and so one really must ask how much an increase of cut-off of 10L/s at both monitoring sites will achieve in modifying the current situation on the Waipara River? The answer is that from an ecological perspective there would to be **a minimal gain** because flow will not be put back into the river by ceasing abstraction, while from an economic perspective **the loss will be great.**

7. Despite the fact that the actual flow data from ECan indicates it is very unlikely that an increase of 10L/s would result in a noticeable change to the flows in the river, it also seems pertinent to examine the fish related evidence under the assumption that it would. Mr Jowett (2006 and current evidence) points out that in some years (i.e. December 1998- May 1999, and January-February 2008) the flow at White Gorge (which is prior to any abstraction) can drop dramatically due to natural events. In the 1998-99 season flows dropped below 110L/s for 34% of the time, and it got as low as 31L/s. While these conditions do not occur every summer, they can not be viewed as a one-off event in the history of the river. This means that the ecosystem of the Waipara River is naturally adapted to such extreme summer lows (and of course winter floods), and that attempts to safeguard fauna by **raising the minimum** flow higher than the current 50L/s will have **limited or no effect, given that** under **natural (non-abstraction) conditions** the **rate will drop below** that. While Mr Jowett (2006) did discover substantial declines in some native fish populations following the very dry summer mentioned above, he also found that the following year there was a fast recovery of all native fish species. Mr Jowett, when questioned on this during his evidence, gave a figure of only $1/10^{th}$ recovery. I am not sure if this was an error, but looking at his own graphs there seems to be a rebound by the start of the next summer of far greater than 10% as seen below.

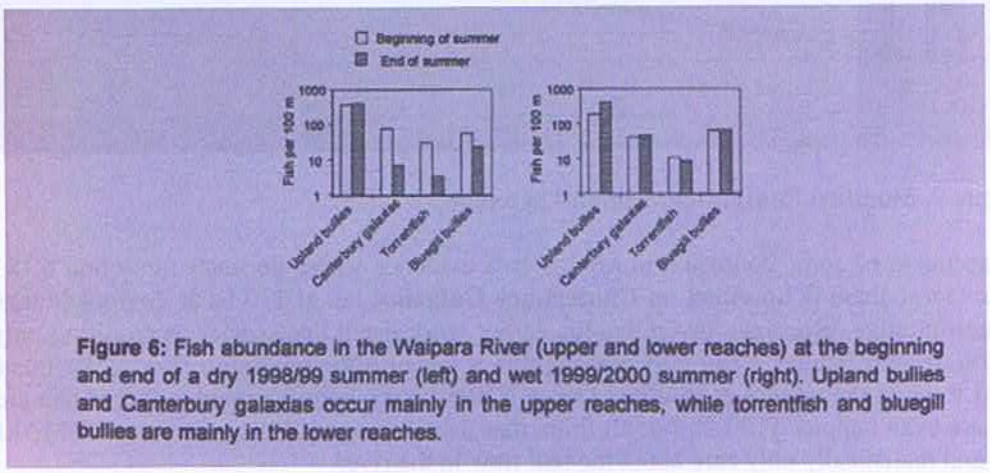


Figure 6: Fish abundance in the Waipara River (upper and lower reaches) at the beginning and end of a dry 1998/99 summer (left) and wet 1999/2000 summer (right). Upland bullies and Canterbury galaxias occur mainly in the upper reaches, while torrentfish and bluegill bullies are mainly in the lower reaches.

Figure 1 taken from Jowett's Figure 6 in current evidence.

He noted that at a **low of 62L/s there was little change in indigenous fish abundance**, and even suggested that the **minimum flow recommendations** for these species **may have been unnecessarily** high (Jowett 2006).

Looking at specific native species found in the Waipara, Mr Jowett (2006) also listed his thoughts on **flow requirements** needed to maintain 90% of available habitat for them, saying he thought these were "**adequate, but lower flows may also be adequate** in terms of maintaining fish populations". These minimum flows to sustain 90% of habitat were: **Upland bully – 40L/s, Canterbury Galaxias – 10L/s,**

Longfin Eel – 60 L/s, Bluegill Bully and Torrentfish – 900L/s. Obviously with natural flows recorded down to 31L/s **fish requiring 900L/s can never be supported year round naturally** in the areas in question **in large numbers,** and this bears out with these both being diadromous species inhabiting mainly the lower Waipara and repopulating from the sea when the lagoon mouth opens. Of the remaining species outlined, the highest is 60L/s, and as Mr Jowett said, this could even be lower. Note that **these are stated as the flows needed to maintain virtually all** (90%) **of these species habitat (i.e. areas where they live)** and **flows below** these mean the **fish are restricted or redistributed** in where they can live and **not that they necessarily die,** as shown by their **rapid repopulating** or **redistribution** in the river **after drought.**

It is worth noting that for the species in question, the **gains in habitat** from an increase in 10L/s to the minimum flow **seem very small,** as seen in the graph produced by Mr Jowett in his evidence. The gains in WUA seem particularly small from 110 to 120 L/s but also are not great from 50 to 60L/s when compared to the scale of the curves.

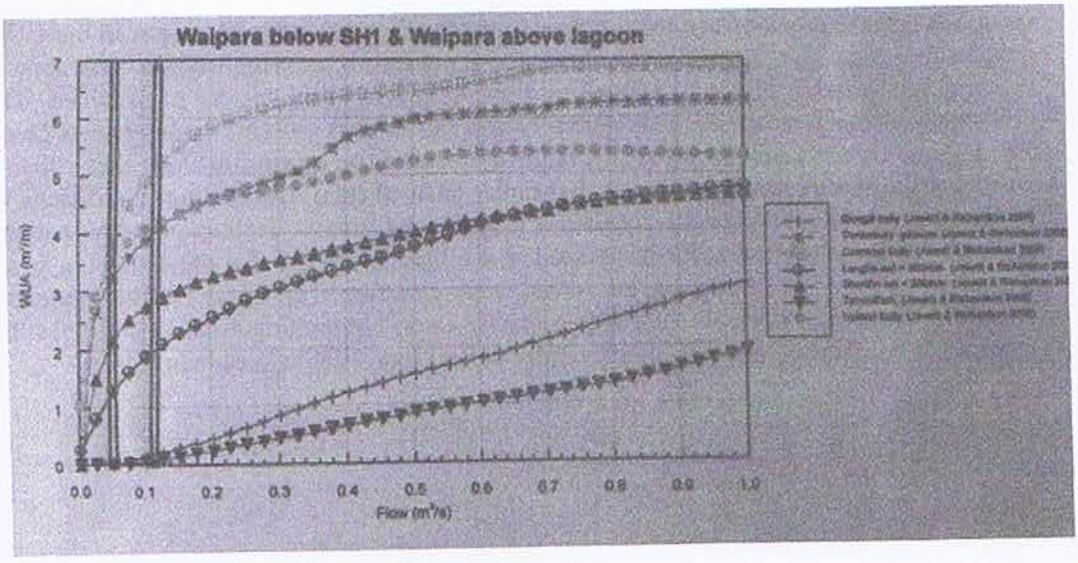


Figure 2, Modified from Jowett Section 42a report.

There also seems to be some confusion in Mr Jowett's evidence where he states in section 6.18 that at 50 L/s at White Gorge there is **no effect on Canterbury Galaxias,** but at 110 l/s at Teviotdale there is. This seems counter-intuitive, especially given that his earlier work listed this species as requiring only 10 l/s to maintain 90% of their habitat. I can only assume this is because the minimum flow at Teviotdale is only 37% of MALF while the minimum at White Gorge is 50%, but surely the point is that if fish are happy at 50 L/s they are even happier 110 L/s. I don't think that fish are aware of the percentage of MALF they are exposed to, and realistically only care about the real flow in the river.

Thus, it seems that **increasing the minimum flow** to **safeguard native fish** would seem to be of **little benefit, in contrast to the economic loss,** given that they are

- Almost unaffected at flows close to the current minimum
- Naturally subjected to even lower flows
- Populations rebound quickly from low flow events

Of course, Mr Jowett and ECan have based their recommendations for an increased minimum flow utilizing the theory that abstraction has a 100% effect on surface flow, and if this were true it could be of some small benefit to some fish species to raise the minimum flow. However you can't simply increase and maintain the natural flow to at least 60l/s at White Gorge without augmentation, because the reality is that ceasing abstraction would seem to have little effect on the flow rates, and so it seems that there will be only loosers and no real winners by increasing the minimum flow.

8. I have not discussed periphyton or trout, as there seems to be general agreement that periphyton is not caused by low flows (see Hayward 2003, Jowett 42a report) and that trout are not present in any number in the Waipara and the habitat would never be suitable (Jowett 42a). However I would be happy to answer questions on these topics if required.

9. In summary, given the evidence obtained by comparison of abstraction vs non abstraction it seems that there is a large amount of replacement of surface flow from gravels, to the extent that abstraction has little effect on surface flow and the flow patterns seen in the Waipara river are largely the natural flow. These flows have encouraged a significant population of indigenous fish, as Mr Jowett stated in his evidence. **In my opinion, raising the minimum flow** would have **little,** if any, **benefit on indigenous species,** even if such a increase of minimum flow was able to be matched by a similar increase in actual river surface flow.

Paul Donaldson 2011.

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