

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of an application by **TRUSTPOWER LIMITED** to
Marlborough District Council for resource
consents

STATEMENT OF REBUTTAL EVIDENCE ON DRAFT CONDITIONS BY GREGORY IAN RYDER

1. INTRODUCTION

- 1.1 My name is Gregory Ian Ryder. My qualifications and experience are as stated in my evidence in chief presented at the substantive hearing.
- 1.2 This statement of rebuttal evidence is in response to matters raised in evidence on conditions of consent and in questions asked of me by the Hearing Panel in relation to my evidence on draft conditions presented on 22 January 2008.
- 1.3 My response addresses the following issues:
- (a) sediment flushing;
 - (b) periphyton flushing;
 - (c) the risk of introducing Didymo;
 - (d) fish screening; and
 - (e) conditions associated with the Wairau River mainstem aquatic ecology.
- 1.4 I have prepared this evidence in accordance with the Code of Conduct for Expert Witnesses (31 March 2005).

2. SEDIMENT FLUSHING

- 2.1 Commissioner Barber asked me a question (transcript page 8915) on the issue of sediment flushing and in particular whether there is any limitation on the flushing of sediment during the trout spawning season. I replied that there was not a specific requirement to avoid flushing under the trout spawning season but there should be one if it is possible to do so. Mr Levy has stated in evidence that it would be desirable to have the option to flush sediment over this period of the year (Mr Levy's rebuttal, paragraphs 8.3 to 8.5).
- 2.2 Mr Levy is correct in noting that floods typically occur during the trout spawning season and consequently there are many occasions when spawning trout are subjected to sediment-laden water. Fisheries typically are able to cope with such naturally occurring
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events, however flood events are generally regarded as undesirable as they can delay or interrupt spawning and if severe enough can disturb trout redds or affect oxygen supply by depositing fine sediment within them as the flood recedes.

- 2.3 I note that Mr Levy has recommended TrustPower use its “best endeavours” to avoid flushing during the spawning season. The intent of such a condition would mean that when there are few floods, flushing could be avoided. Conversely, in years when there are significant flood flows during this period, with high natural turbidity in the river, TrustPower would be able to flush during such high flow events if necessary, to manage the sediment it had collected from the river during that same period. I consider that such an approach is an acceptable management option provided that the monitoring and trigger provisions I have recommended in the aquatic adaptive management plan with respect to sediment flushing are met. Sediment flushing conditions (the SF group) could be amended to include the additional wording:

The consent holder shall use its best endeavours to avoid sediment flushing during the brown trout spawning season (late April-end June).

- 2.4 I initially recommended monitoring associated with sediment flushing from to include continuous monitoring of river turbidity at the Wash Bridge. Mr Levy has expressed doubt over the robustness of real-time monitoring equipment being used in rivers. I agree with Mr Levy’s comments as in my own experience with such equipment a high level of maintenance is required and they can give rise to questionable data if this is not undertaken. Mr Levy has recommended alternative locations for monitoring turbidity (the inlet to the intake channel and in the flushing channel exiting the pond) and I acknowledge that, for the purposes of monitoring flushing events, this approach will provide comparable data to that provided by a recorder at the Wash Bridge.

3. FLUSHING FLOWS FOR PERIPHYTON – AE2

- 3.1 Commissioner Barber asked me a point of clarification (transcript pages 8992-8923) in relation to Dr Coffey’s comments in his evidence on where the 150 cumec periphyton flushing flow trigger should be measured. Dr Coffey had mentioned in response to questions from the Hearing Panel (during the substantive hearing) that possibly Tuamarina was appropriate but TrustPower’s draft condition AE2 states the Wash Bridge

site. I replied that it was my view that Wash Bridge is a more appropriate recorder site for that trigger flow and that it probably represents a more conservative flow. If the 150 trigger was set at Tuamarina then arguably the flows further up the river could be lower than 150 and therefore not as effective at flushing periphyton.

- 3.2 Dr Coffey's observations of nuisance periphyton flushing were correlated with a 150 cumec flow at Tuamarina, hence his link between that trigger level at Tuamarina and shutting the Scheme intake. I have since discussed this with Dr Coffey and he agrees with me that the trigger flows should relate to the flows at the Scheme intake rather than at Tuamarina, for the reason I outlined above, and that 150 cumecs at the intake would in his opinion appear to be a conservative figure to use.

4. INTRODUCTION OF DIDYMO VIA CONSTRUCTION EQUIPMENT

- 4.1 The Hearing Panel asked me questions (transcript page 8919) regarding the risk of Didymo being introduced to the Wairau River through the creation of the Scheme and specifically on the issue of consent conditions relating to cleaning of machinery associated with construction. I replied that I believed the construction management plans contained such conditions. I have since checked the relevant sections of the proposed conditions and condition CM1(b) (Construction Management Plan) states:

The Construction Management Plan shall include the following details:

(b) Detailed design responsibilities and method of construction, including methods of conducting earthworks, disposal of excavation material, in river works management including cleaning requirements for plant and machinery in order to avoid the spread of pest plants, surface water and erosion management;

- 4.2 In my opinion this requirement provides sufficient scope to include provision for appropriate equipment cleaning protocols for Didymo. However, this clause could be developed to be more specific to Didymo as follows:

To avoid the spread of Didymo, no equipment shall be used in the exercise of this consent that has been used previously to undertake activities in any water body known to contain Didymo, unless that equipment has been thoroughly cleaned in accordance with the attached Biosecurity New Zealand document titled "Cleaning Methods for Freshwater Activities".

- 4.3 I have attached a copy of the relevant Biosecurity document at the back of my evidence.
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5. FISH SCREENING

- 5.1 Mr Lawson Davey expressed concern (transcript pages 9020-25) over the lack of detail for the proposed fish screening of the canal. I have since had discussions with Mr Robin Dawson about this matter. I also understand that Mr Rutledge from the Department of Conservation intends to present evidence on the fish screen conditions. At the time of writing, I have only just received this brief of evidence and have not had sufficient time to review it in detail. However, Mr Dawson has prepared a memo containing additional information requested by DOC on the arrangement and operation of the proposed fish screen for the Wairau HEPS. I have attached this memo to the back of my evidence.
- 5.2 I have recommended to TrustPower that performance objectives for fish screening be set out in two parts as follows:
- (a) The primary performance objective is to exclude all adults of eels, dwarf galaxiids and salmonids from passing through the fish screen device and to return them safely back to the Wairau River downstream of the Scheme intake.
 - (b) The secondary performance objective is to exclude the majority of elvers from passing through the fish screen device and to return them safely back to the Wairau River downstream of the Scheme intake.
- 5.3 These performance objectives recognise the fact that it is not possible to guarantee total exclusion of all fish species and their life stages. Screen performance can be influenced by a range of environmental factors, which may vary throughout the year and from year to year and 100% exclusion can not be guaranteed.
- 5.4 Another consideration in setting these performance objectives is that there are no rare fish species in this section of the river to warrant total fish exclusion. However, dwarf galaxias and longfin eel are ranked as "gradual decline" (Hitchmough & Bull 2007) and these are two species that require further comment regarding screening. Juvenile eels (elvers) have a strong tendency to move upstream and are unlikely to be attracted into a downstream flowing intake. Juvenile eels present this far from the coast are also likely to be larger relative to further down the catchment and consequently a larger screen gap is appropriate (Jamieson *et al.* 2007). Hopkins (1971) found that juvenile dwarf galaxias tend to hold station in the water column during their early life, but become more benthic
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(bottom dwelling) at between 25-35 mm. Thus while some entrainment of these juvenile species can be expected with the screen design, it will represent a relatively small proportion of the total population in the catchment and, due to their small size, there is likely to be reasonable proportion of individuals that survive through the canal and turbine system before being returned back to the river. On this issue, references by Mr Davey (transcript page 9021) to a paper by Mr Bejakovich on fish screening in Canterbury warrants clarification. That paper is acknowledged in a recently prepared NIWA document titled; “Fish screening: good practice guidelines for Canterbury” (Jamieson *et al.* 2007). That document appears to assess the need for fish screening purely in relation to irrigation takes, where there is no return flow back to the river and virtually no chance at all of fish recovery. Therefore, it is not applicable to the current circumstances although some information in that document describes good practice and many of which are reflected within the proposed Wairau fish screen concept.

5.5 I note that Fish & Game's legal submissions propose a number of very specific conditions that are modelled on the Meridian Energy conditions for the Lower Waitaki. I am involved in that case as a Commissioner on the Hearing Panel and this position precludes me from commenting on the content of the conditions. I wish to note, however the following points:

- (a) The Waitaki consent has not been granted and the conditions tabled by Ms Baker were draft conditions tabled by the applicant that were subsequently changed by the applicant;
- (b) Fish & Game have formerly accepted TrustPower's proposed condition for a 17mm spaced screen for the recently proposed Arnold River hydro power scheme intake;

6. SUGGESTED AQUATIC ECOLOGY CONDITIONS

6.1 Fish & Game submissions express a concern over a lack of objectives relating to the Aquatic Ecology AMP in condition AE 1 (paragraph 22). I believe these are inherent in the draft AMP although arguably they could be more clearly specified. However, the triggers for action identify what aspects of the aquatic environment are to be maintained. Also, under 1.3 (Purpose) of the AMP, it states:

“An objective of this Plan is to ensure that all potential adverse effects are identified at a site specific level prior to the effect occurring and that the necessary mitigation measures are determined and put in place to ensure the effective implementation of the mitigation before adverse effects become more than minor”.

- 6.2 In my opinion, this statement, when read in conjunction with the triggers, provides a reasonably clear direction as to the intent or underlying objective of the plan.
- 6.3 I agree with the Fish & Game comment at paragraph 25 that the timing for finalising and approval of the AMP needs to occur prior to construction and indeed prior to pre-construction monitoring. Condition AE1 has been amended accordingly.
- 6.4 Paragraphs 27-30 of the Fish & Game submission highlight the level of detail included in the proposed Arnold River HEPS draft consent conditions relating to monitoring, and argue that this level of detail should be included in the Wairau conditions. While I do not have a strong personal objection to the approach suggested, in my experience of both drafting and interpreting consent conditions for monitoring and compliance purposes, I would prefer to see this type of detail sitting in the AMP for reasons of flexibility (for example to cater for new guidelines and new monitoring techniques) and allowing for simplicity in the consent conditions themselves. Such specificity is unwarranted when the conditions of consent provide a comprehensive procedure for preparation and approval of the aquatic management plan.
- 6.5 It is also relevant to point out that comparisons with the Arnold River HEPS are not strictly relevant for the following reasons:
- (a) The Arnold River is a stable lake outlet, single channel river with a completely different flow regime to that of the Wairau. The Arnold gradient is much steeper than the Wairau's and water velocities are much higher even under low flow conditions. The bed material of the Arnold is generally much larger than that in the Wairau and is much less prone to move under high flow conditions.
 - (b) The Arnold is a tannin-stained, low sediment carrying river. In contrast the Wairau has high water clarity outside of high flow and snow melt events, but can carry large sediment loads in flood events. The Arnold channel is very stable whereas the Wairau's braided channels are subject to frequent change associated with flooding and sediment load.
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- (c) Upstream of the Arnold HEPS the Arnold catchment is subject to increasing land intensification and the river receives municipal and industrial point source discharges, and so has a much higher nutrient status than the Wairau.
- (d) The lower Arnold River is dammed and so has a modified aquatic environment. The existing Arnold Power Station is not screened for fish and no upstream fish passage is available for salmonids and some native fish.
- (e) I understand that some draft consent monitoring conditions adopted by TrustPower for the Arnold were to satisfy stakeholders, who subsequently withdrew their opposition (e.g., Fish & Game, DoC), rather than being seen as to ensure effects were no more than minor.

6.6 These physical and biological differences mean that the Arnold river ecosystem is likely to respond in different ways to changes in environmental variables such as flow, nutrient concentrations, than the Wairau. In my view, the more physically dynamic nature of the Wairau River justifies a more flexible approach to monitoring and adaptive management.

6.7 Fish & Game seek three years of pre-scheme monitoring (as per the Arnold HEPS hearing) whereas currently the AMP states two. I understand that the difference between the number of years is due to there being more existing information available on the Wairau aquatic ecosystem than for the Arnold.

6.8 The Royal Forest & Bird Protection Society have submitted (transcript pages 8913-14) that a 30% reduction in aquatic ecology habitat would prove to be unsustainable and that there should be provision for that percentage to be increased should the need arise. The draft aquatic adaptive management plan I have helped develop for TrustPower does provide for this approach. For example, under the 'Contingency Response Plan' section of the draft AMP, one contingency action states:

In the event that the independent report shows that trigger levels for macroinvertebrates have been exceeded and the Scheme has contributed to the trigger levels being exceeded, TrustPower shall, should the Council advise that it wishes to review the minimum flow, increase the minimum flows necessary to ensure that the 90% habitat retention level for food producing and Deleatidium mayfly is achieved within the Scheme diversion reach.

6.9 Ms Martin for Forest & Bird in response to a question from Commissioner Willey (transcript page 9014) on whether a lower trigger level is necessary answered that 10% or

“something of that order” is more appropriate. In my experience, a 10% change in fish or macroinvertebrate abundance would be almost impossible to detect using the sampling methods available. Even detecting a 30% change will require substantial sampling effort.

7. REFERENCE

Hitchmough, R.; Bull, L. 2007. New Zealand threat classification systems lists 2005. Threatened Species Occasional Publication. Department of Conservation, Wellington.

Jamieson, D.; Bonnett, M.; Jellyman, D.; Unwin, M. 2007 Fish screening: good practice guidelines for Canterbury. NIWA client report CHC2007-092.

Hopkins, C.L. 1971. Life history of *Galaxias divergens* (Alamonoidea: Galaxiidae) New Zealand Journal of Marine and Freshwater Research 5:41-57.
