

**IN THE MATTER OF** the Resource Management Act 1991

**IN THE MATTER OF** applications by Central Plains Water Trust to:

Canterbury Regional Council for resource consents to take and use water from the Waimakariri and Rakaia Rivers for the Central Plains Water Enhancement Scheme and for associated consents required for the construction and operation of the Central Plains Water Enhancement Scheme; and to

**IN THE MATTER OF** applications by Central Plains Water Trust to:

Selwyn District Council for resource consents to construct and operate the Central Plains Water Enhancement Scheme

**AND**

**IN THE MATTER OF** a Notice of Requirement by Central Plains Water Limited to:

Selwyn District Council for the designation of land for works associated with the construction and operation of the Central Plains Water Enhancement Scheme

**Minute 12 of Commissioners relating to application to take water from the  
Waimakariri River (interim decision)**

**20 November 2009**

## TABLE OF CONTENTS

<b>1. INTRODUCTION</b> .....	<b>1</b>
Scope and purpose of the Minute .....	1
Summary of our key conclusions .....	1
<b>2. SETTING THE SCENE</b> .....	<b>5</b>
CPW's proposed take regime for the Waimakariri River .....	5
The alternative take regimes .....	8
The Waimakariri River Regional Plan and Proposed Plan Change 1 .....	9
<b>3. OUR APPROACH TO SETTING A TAKE REGIME FOR CPW</b> .....	<b>10</b>
Our approach to Proposed Plan Change 1 .....	10
Our overall approach to setting the take regime .....	12
Existing Environment and Cumulative Effects .....	15
<b>4. INSTREAM VALUES</b> .....	<b>15</b>
<b>5. THE EXISTING FLOW AND TAKE ENVIRONMENT</b> .....	<b>17</b>
<b>6. POTENTIAL HYDROLOGICAL IMPACTS</b> .....	<b>20</b>
Evidence for resumed hearing .....	21
<b>7. POTENTIAL EFFECTS ON NATURAL VALUES</b> .....	<b>29</b>
Salmon and Trout Habitat.....	29
Salmon Passage.....	29
Flow Requirements for River Birdlife.....	30
Nuisance Periphyton and Macroinvertebrates .....	31
Native Fish.....	32
Effects on Sediment Transport and River Morphology .....	32
Effects on Water Quality including Assimilative Capacity of Pollutants .....	33
<b>8. RECREATIONAL FLOW REQUIREMENTS</b> .....	<b>33</b>
Flows for Kayaking .....	33
Flows for Jet Boating .....	35
Flows and turbidity for salmon angling.....	36
Flow Requirements for Whitebaiting .....	38
Flow Requirements for other forms of Recreation .....	38
Effects on Aquifer Recharge .....	39
Effects on Existing Water Users.....	40
Effects on Māori Cultural Values .....	40
<b>9. COMPARISON OF THE CPW AND PPC1 TAKE REGIME</b> .....	<b>40</b>
Mitigation of instream effects.....	40
Effects of the PPC1 proposed on CPW .....	41
<b>10. EFFICIENCY AND NECESSITY</b> .....	<b>43</b>
Taking of winter water .....	44
Lapse period and term of consent.....	45
<b>11. CPW ACCESS TO UNALLOCATED A AND B1 WATER AND TO ALLOCATED BUT UNUTILISED WATER</b> .....	<b>46</b>
<b>12. ASSESSMENT AGAINST PLAN PROVISIONS</b> .....	<b>47</b>
Proposed Plan Change 1 .....	50
<b>13. PART 2 ASSESSMENT</b> .....	<b>52</b>
<b>14. CONCLUSION</b> .....	<b>52</b>
<b>15. FURTHER STEPS</b> .....	<b>52</b>

## **1. INTRODUCTION**

### **Scope and purpose of the Minute**

- 1.1** In Minute 9, dated 7 July, we set out our preliminary views regarding possible take regimes for the Waimakariri River in the event that we decided to grant consent. The hearing was reconvened in October to receive the further information we had requested from Central Plains Water (**CPW**) and responses to that information from officers and submitters. In Minute 11 we indicated that we would in due course be approving the scheme once conditions were finalised. We had also advised parties at the resumed hearing that we would be issuing this Minute to outline our conclusions in relation to the Waimakariri take regime.
- 1.2** The purpose of issuing this Minute now, is to provide certainty to allow the Applicant, Regional Council officers, river user groups and those whose take consents might be affected, so that relevant parties can now focus on matters of detail concerning the wording of conditions. As will be apparent, we have taken a more comprehensive approach to this Minute than we originally envisaged. That is because the take regime for the Waimakariri is of significant interest to the Community and is critical to the Applicant. We are also conscious that to some extent our conclusion may influence the final form of Proposed Plan Change 1 (**PPC1**) to the Waimakariri River River Plan (**WRRP**). Given that we have concluded that the PPC1 regime should not apply to this application, it is appropriate that we set out our reasoning for that.
- 1.3** The views expressed in this Minute are based on our review of the evidence relating to water takes from the Waimakariri River. We concentrate in this Minute on the Waimakariri as the options are broader and more contentious than the Rakaia where the proposed take fits within the regime of the Rakaia Water Conservation Order and has been partly canvassed in our earlier decision to grant consents for the Ashburton Community Water Trust hydro scheme. We will issue a further Minute/interim decision in relation to the Rakaia regime by Christmas.
- 1.4** So far as the Waimakariri take is concerned, we have reviewed the further evidence on the merits of various take regimes for that river. Subject to matters of detail regarding the wording of conditions, our conclusions are now finalised.
- 1.5** We have drafted this Minute 12 to largely stand alone and accordingly some parts of Minute 9 are repeated with appropriate amendments. However, we note that Minute 9 does contain some additional discussion of flow requirements for instream purposes and accordingly, both Minutes set out the basis for our conclusions in relation to the take regimes for the Waimakariri River. We do not envisage repeating the content of this Minute in our final decision except for a limited summary.
- 1.6** We have done our best to understand the hydrological data supplied to us. We are grateful to Mr Duncan and Mr Tipler for assisting us with our further queries over the course of the last two weeks. The final details of the take conditions will need to be resolved with the help of relevant parties before we finalise our decision.

### **Summary of our key conclusions**

- 1.7** In Minute 9 we set out our preliminary views as to a sustainable take by CPW from the Waimakariri River. Having heard further evidence relating to the

amended take regime now proposed by CPW, we are satisfied that with some minor modifications the proposed taking of water from the Waimakariri River at the Gorge Bridge will achieve the sustainable management purpose of the Resource Management Act (**the Act**) and will accord with the principles of the Act as set out in Part 2.

- 1.8** As will be apparent from this Minute and Minute 9, the issues regarding the taking of further water from the Waimakariri are complex. These issues are important to the Applicant in terms of how much water may be available to it. They are also critically important to the Regional Council as manager (steward) of the resource, submitters and the Community as a whole. It is for that reason that we have embarked on a quite lengthy discussion of the issues. We will not be repeating this discussion in our final decision.
- 1.9** We have undertaken a balancing exercise focussed on the sustainable management of the Waimakariri River resource. We have balanced the protection of in stream values and river users alongside the out-of-stream benefits of CPW's water take, including consideration of efficiency and reliability of water use. Our starting point has necessarily been in stream needs rather than the Applicant's needs/preferences. CPW will not have access to as much water as it originally sought and indeed we will be imposing additional restrictions beyond those proposed by CPW at the resumed hearing.
- 1.10** Our role is to evaluate the potential effects of the revised CPW proposal (which is now essentially an irrigation season run-of-river water take), and in the case of this Minute, to decide what mitigation measures should be required through conditions. This is a matter of weighing the effects cumulatively in tandem with the effects of existing takes. Much of the analysis of effects which we have heard is based on the assumption of full exercising of all allocations. We note that even with increased transfers of allocations among users, this worst-case situation will occur only rarely, and that it is the river and its users which benefit from unused allocations.
- 1.11** While our decision will affect any future allocations of water from the Waimakariri in a major way, it is not our role to decide how future allocations should be made. We appreciate that this decision has consequences for the PPC1 decision process. However it is not our role to either decide the PPC1 outcome, nor to require the CPW take to mitigate the effects of other consented takes of water.
- 1.12** We have concluded on the basis of the evidence presented to this hearing, that a Waimakariri flow regime with 1:1 flow sharing for the B permit take of up to 24 cumecs beginning above an Old Highway Bridge (**OHB**) unmodified flow of around 65 cumecs (41+A+B1 allocations), with some additional mitigating conditions applied, will be sustainable.
- 1.13** Adopting an overall balancing approach, we have concluded that the take will allow people and communities to provide for their economic needs, while at the same time ensuring that ecological and other natural values are sustained and amenity values are not affected in any significant way.
- 1.14** We have concluded that the modified regime now proposed by CPW will, with some additional restrictions, adequately avoid, remedy or mitigate the potential adverse effects (including cumulative effects) of the take to the extent that it will be in accord with the purpose and principles of the Act.

- 1.15** We have concluded that the more restrictive take regime set out in PPC1 is not required in order to adequately (sustainable) mitigate the effects of the CPW take.
- 1.16** The take regime which we consider to be appropriate, will allow CPW during the irrigation season, to commence taking water when unmodified flows at the Old Highway Bridge are at approximately 65 cumecs (m<sup>3</sup>/second). CPW will be able to take 24 out of the next 48 cumecs of flow, up to approximately 103 cumecs on a one to one basis (out of every 2 cubic metres of B water 1 can be taken by CPW and 1 left in the river). We have also concluded that there should be additional provision for flushing flows to pass unimpeded after periods of 14 days or more of sustained low flow (CPW had proposed a 21 day flow trigger).
- 1.17** We have concluded that to further mitigate adverse effects on recreational amenity, there should be an additional restriction on the take during potential peak usage times in the summer, so that for some of that period, the take can not commence until an unmodified OHB flow of around 75 cumecs. The objective would be to so far as is possible, maintain a residual flow of at least 55 cumecs (when that would have occurred but for CPW). We have set out our views as to a possible condition, however, the merits and details of any such additional restriction will need to be addressed by CPW, Environment Canterbury (**ECan**) officers and relevant submitters and if included, will be detailed in our final decision.
- 1.18** We are not convinced that the PPC1 recommendation of a 30 cumec gap prior to exercising of B permits has adequately accounted for the effects on scheme reliability. Nor do we consider that it will necessarily achieve significantly better mitigation of potential adverse effects. However we do accept that in relation to recreational amenity that regime may achieve slightly better outcomes.
- 1.19** We heard from many submitters that maintaining variability of flow is important. The main hydrological benefit of the flow sharing now proposed by CPW is to maintain variability of flow when B permit takes begin. One effect of the 30 cumec gap before a B permit take could begin, as proposed under PPC1, would be to flatline flows at around 71 cumecs, in addition to the current 41 cumecs. We prefer to maintain flow variability above the current authorised flat lining.
- 1.20** We summarise here the effects of the proposed water take on uses and values of the river, and evaluate these in more detail below.
- 1.21** In evaluating the impacts of the revised CPW proposal on river ecology and water quality, we have concluded that there will be little detriment to salmon and trout habitat beyond effects caused by pre-existing takes. Salmon passage will likewise not be further hindered provided provision is made for CPW to stop taking water when a fresh occurs following a sustained period of low flows, and that measure is consistent with the PPC1 proposals.
- 1.22** The objective of protecting river birdlife during the critical September to December nesting period depends primarily on maintaining islands to discourage predation within the braided river system. With the mitigation proposed, the CPW proposal will not significantly affect that.
- 1.23** The incidence of nuisance periphyton (excessive algal growths) can be managed by allowing the bypass of freshes after prolonged low flows. (14 days or more of flows at or below 41 cumecs). We note that a condition to this effect needs to apply year-round as algal proliferation can occur any time.

- 1.24** The effects of the CPW take on the productivity of the river ecosystem (primarily macroinvertebrate production for feeding fish and birds) are likely to be minor, as are effects on native fish. Nor were we convinced that the CPW water take would affect downstream suspended sediment concentration, thereby impairing fishability. However a monitoring and review condition would allow adaptive management if this is found to be a valid concern. For the larger sediment fraction we conclude that river morphology and bedload will continue to be dominated by floods and the CPW water take will have no noticeable effect, nor will it materially affect the water quality and assimilative flow available to discharges including Silver Fern Farms (formerly PPCS).
- 1.25** Given the high recreational amenity provided by the river, we have given emphasis to adequate mitigation of the potential effects of the CPW take on recreational users of the Waimakariri. Large takes, such as by CPW, can at times benefit the river for recreation because they draw flows down into more preferred flow bands (below a residual flow of around 100 cumecs). Having said that, we are not convinced that the overall effects on recreational amenity would be an improvement on the current situation and we are of the view that some further mitigation is required.
- 1.26** For the 60-150 cumec flow range preferred by kayakers, CPW would reduce the number of suitable kayaking days between October and March by some 4 to 9%. However it would also significantly increase the number of days in the 40-60 cumec range when kayaking is more marginal. We are concerned about effects at these flows as this would likely coincide with greater usage by families and novices. The same applies to jet boating. We have proposed an additional restriction on CPW's take during low flows, at weekends and other high use periods for kayaking and jet boating.
- 1.27** Fish and Game made a strong case for protection of angling amenity and given the outstanding reputation of the Waimakariri for salmon angling, we accept the importance of this. Salmon angling success depends not only on a suitable flow regime but water clarity (similar to turbidity) within the range 0.4 – 1.0 metres. Based on a suitable flow range for angling being 70-100 cumecs the CPW take would increase the time that December to April flows are within this range.
- 1.28** We have concluded that the CPW take would not change the duration that the river is suitable for angling in terms of flow and turbidity. The potential effect is on the amount of fishable water available at the lower flows. We are not aware that the amount of fishable water in the braided reaches is currently a limiting factor for angling opportunity. Nevertheless we accept that the increase in the duration of flows where turbidity would be suitable, but angling area and flows would be reduced is a potential adverse effect. The proposed additional low flow mitigation will moderate the impact of flows being drawn below a residual flow of 55 cumecs at the Old Highway Bridge during the peak of the angling season. This will further mitigate effects on anglers beyond the mitigation already provided by the proposed one to one flow sharing. One matter which remains to be considered is which days and months that additional restriction should apply. We invite further submissions on that.
- 1.29** With 1:1 flow sharing and passing of river freshes after prolonged low flows, effects on whitebaiting and remaining identified forms of river recreation are likely to be minor.
- 1.30** With regard to effects on other users of water, we will require conditions which mean the CPW B permit take does not impair the reliability of supply of existing A

(and B1) takes. CPW has obtained 1 cumec of A permit allocation from Ngai Tahu Properties so is a member of the group of A permit water users who may choose to share their access to A block water in compliance with ECan's WRRP requirements.

- 1.31 We conclude that Christchurch City water users will not be affected by any reduction in aquifer recharge from the Waimakariri River, as the recharge is relatively insensitive to changes in flow, and we doubt that any change would be measurable. No specific concerns were expressed by iwi about effects of the water take from the Waimakariri, so we conclude that effects on Māori cultural values of the river take are also likely to be minor.
- 1.32 We are not at this stage convinced that CPW should have access to any B class water outside of the irrigation season. We have no difficulty with CPW having access to unutilised A class water during the irrigation season.
- 1.33 We have concluded that an appropriate lapse period would be 8 years as for the Ashburton Community Water Trust scheme. We are satisfied that a 35 year term of consent would be appropriate in conjunction with adequate monitoring and intervening review conditions.
- 1.34 We are satisfied that the flow regime we are proposing will be sustainable and is in accord with objectives and policies of the Waimakariri River Regional Plan. A full assessment against objectives and policies of the WRRP and the PPC1 is set out later.

## **2. SETTING THE SCENE**

### **CPW's proposed take regime for the Waimakariri River**

- 2.1 In this Minute, we will largely refer to modified and unmodified flows at the OHB since that is the way most of the evidence has been expressed. Note that flow requirements as expressed by river users relate to modified/residual flows but the WRRP restrictions are expressed as unmodified flows as if there was no abstraction.
- 2.2 As a result of the removal of the Waianiwaniwa reservoir from the scheme, CPW has amended its proposed take regime from a maximum combined total of 40 cumecs at two take points to a maximum of 25 cumecs from one take point ('the Lower Waimakariri intake') at the Gorge Bridge. It has also reached agreement with Ngai Tahu Properties Ltd which has transferred 1 cumec of its 2.72 cumecs of A permit water to CPW (NTPL retains 1.24 cumecs of B permit water). This means that the current application is now limited to 24 cumecs of B permit water.
- 2.3 The original application and evidence related to a proposal by CPW to take the first 40 cumecs above the existing A/B permit threshold of an unmodified flow of 63 cumecs. That was then modified to 5 to 5 flow sharing (5 to CPW and the next 5 to remain in the river up to the maximum take of 25 cumecs). In response to Minute 9, CPW's amended proposal is for 1:1 sharing above the flow at which the other consented B permit takes (including Ngai Tahu Properties Limited 1.24 cumecs) commence.
- 2.4 In summary, the effect of this proposal is that CPW would have access to 24 cumecs within the 48 cumec range of unmodified flows between about 65-113 cumecs. With 1:1 sharing, the other 24 cumecs would be shared pro rata with the river. There has been some debate as to what the starting point for the take would

be. If the CPW take regime is accepted, it is not entirely clear whether its take should commence at 63 cumecs (the current B permit minimum flow) or at some higher figure (about 65 cumecs) to allow for all of the existing A and B permits. We have assumed the latter for the purposes of this analysis since CPW cannot take water which has been allocated to others, except with those persons' approval.

**2.5** Although CPW seeks access to water outside of the irrigation season, under the scheme as now advanced to us, it would require little if any B permit water outside of the irrigation season. This is a significant change from the original proposal which would have required winter water to refill the Waianiwaniwa reservoir. As a result the amended take will have little if any impact on instream values outside of the irrigation season.

**2.6** In addition, CPW proposes two additional mitigation measures:

- No takes during the Coast to Coast event.
- No takes for up to 2 days after 21 days of low flow (41 cumecs or less) until after the first "flushing" fresh has come through the system.

**2.7** Mr Taylor also suggested some additional mitigation for the original proposal in relation to kayaking which we have taken into account.

**2.8** Mr Tipler summarised the revised proposal as 30-25-1:1, where the maximum rate of take from the Rakaia River is usually limited to 30 cumecs [ $\text{m}^3/\text{s}$ ], (with the ability to take up to 40 cumecs as applied for) the maximum rate of take from the Waimakariri is 25 cumecs and the 24 cumecs of Class B water in the Waimakariri River is shared between the river and abstraction on a 1:1 basis.

**2.9** Mr Tipler stated that the revised scheme would take, on average, 36% less water than the original proposal. The maximum rate of take required for the scheme would be around 44.2 cumecs, based on a peak application rate of 0.6 L/s/ha, a maximum irrigated area of 60,000 ha, canal seepage and bywash of 20%, and a 1  $\text{m}^3/\text{s}$  loss from the headrace canal. Individual peak and average rates of take for the Rakaia and Waimakariri Rivers would be 26.35 cumecs and 5.18 cumecs; and 25 and 2.40 cumecs respectively.

**2.10** The change to a run-of-rivers scheme impacts the reliability of the upper part of the scheme area (Figure 1) which is reliant on surface water for irrigation. As a consequence CPW expects less dairy expansion, and a change in land management practices, with less intensive farming over this half of the irrigated area.

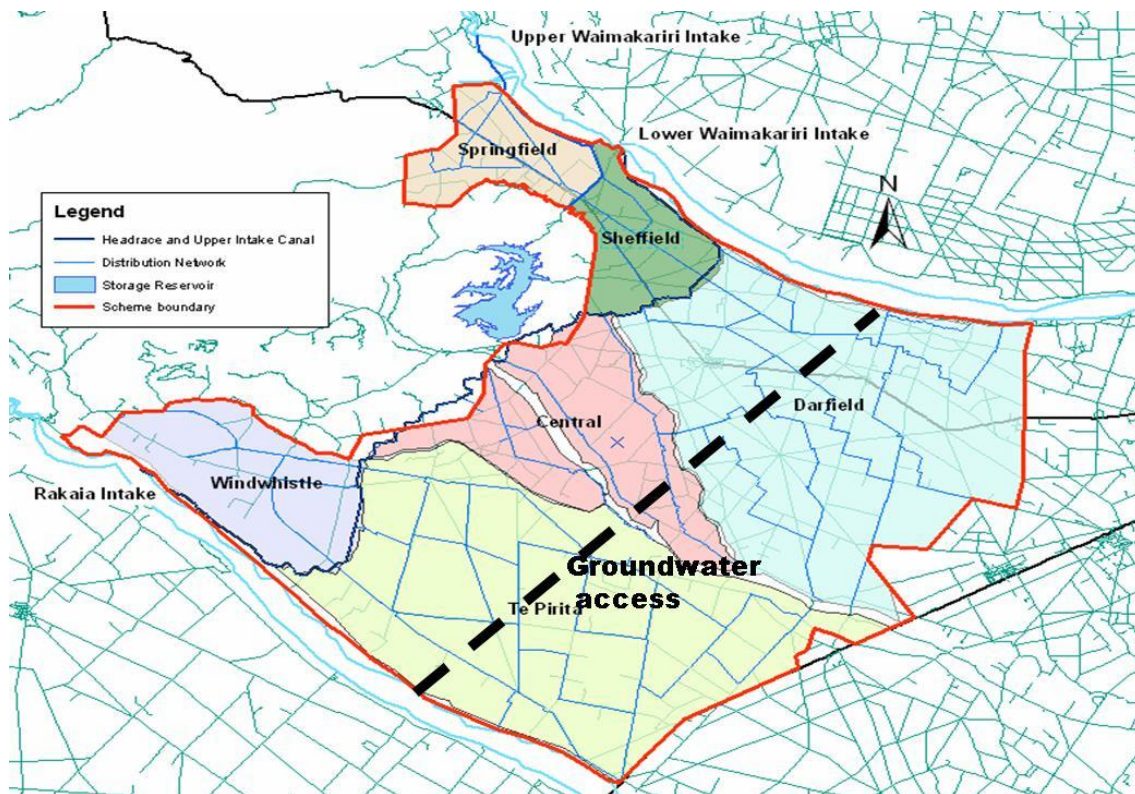


Figure 1: Revised CPW proposal (from Tipler evidence): River water supplies NW sector with poor reliability; groundwater largely supplies SE sector with good reliability. Scheme still services 60000ha.

- 2.11** Groundwater already allocated within the scheme area amounts to approximately 145 million cubic metres per year (**MCM**). It has been assumed that this water will be available for use across 30,000 ha. We were presented with calculations suggesting an average increase of about 90 MCM of groundwater recharge when the revised scheme is fully operational. While this may allow ECan to review the 'red zone' status of the Rakaia-Selwyn zone, thereby allowing further groundwater-sourced irrigation, this has not been assumed by CPW and nor is it within the scope of the consents sought.
- 2.12** In relation to the proposed water take from the Rakaia River, the only change from the original proposal is CPW's agreement with Barhill-Chertsey Irrigation Ltd (**BCIL**) to take up to 7 cumecs of their consented allocation. This agreement is for 10 years, and assuming CPW is in operation within that time, this would mean that more scheme water can be sourced from the Rakaia, resulting in less demand from the Waimakariri. However as the agreement is of limited duration and our role is in effect to identify an envelope of sustainable takes from each river, we have not put any weight on that agreement.
- 2.13** In practice CPW would not take as much water as the proposed regime implies. That is for three reasons. Firstly, outside of the irrigation season it will not need much, if any, of this water, because the scheme as currently configured will only have limited on farm storage and no off farm storage. Secondly, at some times of low irrigation demand (for example, after rain) it would not need to take from the Waimakariri and possibly the Rakaia. Thirdly, it proposes to use Rakaia water whenever available in priority to Waimakariri water and accordingly will often not need its full allocation of Waimakariri water.

- 2.14 So far as the third factor is concerned we agree that we should take into account the availability of water from the Rakaia, but in order to do so there will need to be some condition reflecting the intended priority of take and reflecting the current scheme as opposed to potential future developments of the scheme. In other words, we must assess the effects of what is proposed now, rather than what might occur if off farm storage is developed for the scheme. Similarly, in relation to winter water we must either consider the effects of taking up to the maximum in winter or impose a restriction on winter takes. We will return to that point later when we discuss the "need" for the rates and volumes sought.
- 2.15 Mr Tipler and Mr Duncan have presented evidence relating to the *predicted* and *available* water. The first is what would be taken in practice based on calculated irrigation water demands; the second is what would in theory be available based on availability in the rivers, if the take is fully exercised. It is likely that the effect of the CPW take will lie between the "predicted" results and the "available" results. There will be times when there will be sufficient water available in either river to meet the demand, however in that case only the Rakaia water would be taken. Mr Tipler indicated that the predicted take volume (assuming access to the BCIL allocation from the Rakaia) from the Waimakariri would on average be 34% of the available take volume, and that average volumetric take from the Waimakariri for the revised proposal is 27% of what was predicted for the original proposal involving storage.
- 2.16 Mr Tipler's initial estimates for the "predicted" take included allowance for the use of Barhill water allocated to Barhill-Chertsey Irrigation Ltd (**BCIL**). Given that this would be for a limited period, we asked him to also present predicted figures excluding reliance on BCIL water. His predictions did not include CPW access to unutilised A or B permit water from the Waimakariri or unutilised allocations from the Rakaia. In practice however, access to water which has not been taken up to the allocated limits would reduce the impact of the take. We also note that his "available" take figures do not appear to include the taking of B water from the Waimakariri outside of the irrigation season. In our view that is appropriate. We have focussed on the effects under his "predicted" scenario without BCIL. We note that this assumes that CPW water will not be made available for other purposes. In order for our assessment to be reliable, that outcome will need to be secured by conditions of consent since the "available" scenario would have greater adverse effects on recreational amenity than the predicted scenario.

### **The alternative take regimes**

- 2.17 In Minute 9 we outlined the various alternative take regimes which have been proposed. In essence we have evidence before us relating to two alternative take regimes to mitigate the effects of the CPW take (including cumulative effects). The primary alternative regime advocated by Fish and Game at the hearing now reflected in PPC1 (and now recommended by ECan officers) involves a 28-30 cumec flow gap between existing takes and the B permit takes, i.e. before which CPW could start taking water. That is at OHB unmodified flows between about 65 and 93 cumecs CPW could not take any water. Whenever OHB unmodified flows are 93 cumecs or higher, CPW would be able to take every cumec after that up to 24 cumecs (i.e. no 1:1 flow sharing).
- 2.18 PPC1 is expressed in terms of Otarama flows (upstream of the proposed take) rather than OHB unmodified flows. Given that PPC1 assumes an 11 cumec difference between Otarama flows and OHB flows and given that it has B takes commencing at 104 cumecs, we have translated that to 93 at OHB (104-11) for the purposes of our comparison (see Table 1). That means that the gap would in

practice be around 28.4 rather than 30 cumecs, however we will refer to it as the 30 cumec gap or PPC1 proposal.

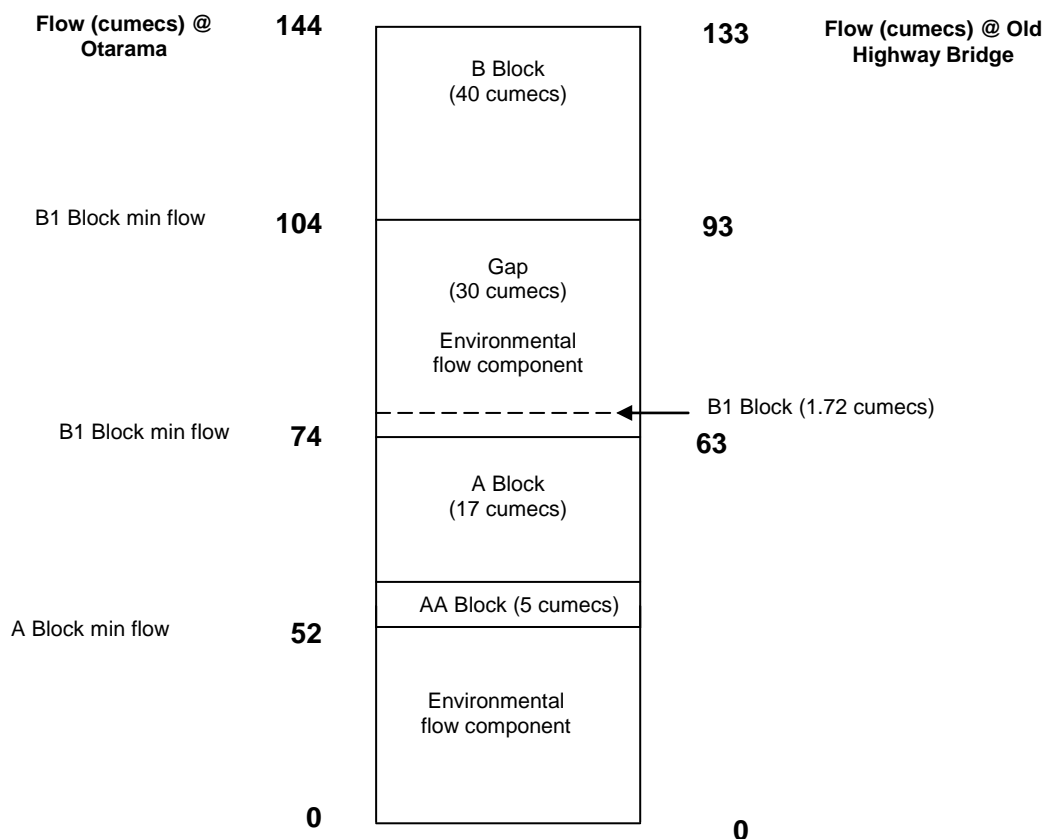
**2.19** There is a further variation to the PPC1 proposal which would involve a 20 cumec gap. We have some evidence on that regime but it was not the subject of further evidence at the resumed hearing and accordingly we have not focused on this option.

**The Waimakariri River Regional Plan and Proposed Plan Change 1**

**2.20** We must be primarily guided by the operative plan. We have discussed the key provisions of the operative Plan in Minute 9. PPC1 to that plan was notified on 8 August 2009 and amongst other things introduces the so called '30 cumec gap'. Ms Veltman for Ecan produced the following useful summary diagram of the water allocation provisions of PPC1; we have added OHB flow on the right side of her diagram (see Figure 2):

**Figure 2**

*Schematic representation of PPC1 flow and allocation regime for the Waimakariri River below Woodstock*



**2.21** As discussed below the PPC1 allocation for A block takes is slightly less than has in fact been allocated. We also note that Ms Veltman said that the assessment by ECan staff of effects of the various take scenarios canvassed for PPC1 has assumed all A permit water is taken year round, not just during the irrigation season as assumed by Mr Duncan and Mr Tipler. The revised CPW proposal, does not require B permit water outside of the irrigation season.

- 2.22 The effect of the proposed amendments is that once PPC1 becomes operative (and if it stays in its current form) a take as now proposed by CPW would become a *prohibited activity*, because it would not comply with the new standards for take which include the so called 30 cumec gap between the existing takes and any further takes. In the interim, the activity status of takes which do not meet the 30 cumec gap regime is fully "discretionary".
- 2.23 We had not originally requested the officers to make a recommendation in relation to a take regime since we regarded that as a matter which depended upon the evidence presented at the hearing. Prior to the resumed hearing we requested that the officers now make a recommendation to us based upon the evidence heard by then, and the further evidence filed by CPW and in light of the notification of PPC1. The officers recommended that we impose the PPC1 requirements as conditions of the CPW consent if we decide (as we now have) to grant consent. Fish and Game and the Director General of Conservation (whilst remaining opposed to the grant of consent) support that recommendation.
- 2.24 So far as the ECan officer's recommendation is concerned, that appeared to be based primarily on the fact that PPC1 has been adopted by the Canterbury Regional Council, rather than on any assessment of the evidence before us as to the merits of various regimes. We of course must base our conclusions on the latter.
- 2.25 Not surprisingly, CPW is strongly opposed to either a 28-30 or 20 cumec gap. Either regime would significantly limit the frequency and duration of time that CPW would have access to any Waimakariri water and would thereby limit the volumes which could be obtained by it and consequential scheme reliability. CPW argues that we should put little weight on PPC1 and submits that the evidence suggests that its proposal is sustainable and will adequately mitigate adverse effects.

### 3. OUR APPROACH TO SETTING A TAKE REGIME FOR CPW

#### Our approach to Proposed Plan Change 1

- 3.1 In Minute 9 we made the following observation:

*"The Applicant and others also observed that it is not for us to come up with an allocation regime for the river via the current process. Although that is correct, it is also a little artificial. In reality CPW is seeking to take all, or most of what is left in the river after existing users and in-stream needs are catered for. If consent is granted to CPW, then any changes to the plan will only be applicable to others if there is still water left over for allocation after CPW's reasonable needs are catered for. **In practice our starting point must be to identify how much more water can sustainably be taken from the river at various flows, at particular times of the day and year.**"*

- 3.2 Although in practice, the CPW take may render the PPC1 flow regime redundant, our role is not to fix an allocation regime for the river. Our role is to determine what is *sustainable* in the context of this particular application after weighing the environmental costs and benefits of alternative take regimes. We must focus on the adequacy of proposed *mitigation* measures, and management of cumulative effects, rather than coming up with an optimal *allocation regime* for the river.
- 3.3 Section 88A (1A) of the Act requires us (and the Environment Court on Appeal) to consider and decide the application on the basis of the activity classification as it

was at the time the application was lodged. Accordingly we must determine the application as a *restricted discretionary* activity not a discretionary or prohibited activity. In any event, even if we gave full weight to PPC1 the CPW proposal would only be a fully *discretionary activity* until PPC1 becomes operative, which will not occur prior to a final decision being issued by us in relation to the CPW proposal.

**3.4** For the reasons set out in Minute 9 we have also concluded that the take should be "*bundled*" with the other water permits to divert and use and the overall water activities should be regarded on a fully discretionary rather than restricted discretionary basis. However while we have concluded that our discretion is not restricted, the activity classification does remain as restricted discretionary. PPC1 does lend support to our view that our discretion should not be limited to the effects of the proposal *near the point of take*, and to that extent we do give some weight to that part of PPC1 which (but for section 88A) would make the application fully discretionary.

**3.5** Section 88A (2) of the Act requires us to have regard to PPC1, however the weight which it is to be accorded is a matter for our discretion. We have concluded that we should accord little weight to the proposed take regime in PPC1 for all of the following reasons:

- (a) Firstly, our decision must be based on the evidence before us;
- (b) Secondly, as discussed above, the Act requires us to consider and decide this application on the basis of the activity classification (including standards) which applied at the time the application was made;
- (c) Thirdly, the new standards are discretionary until such time as they become operative (at which time new applications in breach of the standards would be prohibited);
- (d) Fourthly, if the new standards survive the first schedule process and the Canterbury Regional Council ultimately considers that the new standards need to be enforced against CPW it can do so via a review under section 128(1) (b) of the Act. In the meantime CPW and others are entitled to contest the new provisions and we must not pre-judge the outcome of that;
- (e) Fifthly, the hearing of submissions on PPC1 has not yet occurred, therefore the likely outcome of the plan change is highly uncertain.

**3.6** We further note that our primary role is to decide upon a take regime which is *sustainable* and which achieves, so far as is practicable, the principles of the Act and the objectives and policies of the WRRP. That requires an overall balancing between the economic benefits to be derived from irrigation and avoiding or mitigating adverse effects on instream values. That is not necessarily the same as the Regional Council's responsibilities in setting a management regime for the river. While sustainable management of the resource is the goal of both processes, we must give significant weight to the plan as it is, whereas the Council in amending that plan is governed by the slightly different requirements of section 32 of the Act.

**3.7** The latter will also require the Council to balance the costs and benefits of various alternative flow regimes. That balancing process is currently at a very early stage. The Council has not yet considered submissions and we are unsure as to the

extent to which it has taken into account the impacts of the '30 cumec gap' proposal on CPW or other irrigators. It is not for us to pre-judge what the outcome of that weighing process may be. At the present time the Council has not embarked upon the exhaustive hearing process which we have been involved in for the last 20 months. It has not heard evidence as to the advantages and disadvantages of the competing regimes. Indeed the current CPW proposal has not been considered by the Council when deciding to notify PPC1.

- 3.8** The situation is somewhat unusual, in that the flow regime developed by the Council seems to have developed as a specific response to the CPW proposal. However, at this stage, it is ourselves not the Councillors who have heard the evidence relating to the CPW proposal, and the 30 and 20 cumec gap proposals. We can only act on the evidence we have heard, rather than whatever was before the Council when it decided to notify PPC1.
- 3.9** We also consider that it would be unfair to the Applicant to put much weight on this part of PPC1. Essentially this proposal has been developed by the Council at the 11th hour of the hearing and many years after the application was lodged. In our view it would be unfair on the Applicant to now put anything other than very modest weight on the plan change. CPW has spent millions of dollars getting to this point in reliance on the existing plan. It has then modified its proposal based on developments during the hearing and in response to our preliminary views. It has heard the evidence relating to the 20-30 cumec gap proposals and has responded to that. In our view, it is now entitled to have that evidence weighed by us on its merits in the context of the purpose of the Act, little influenced by the fact the PPC1 has been notified.
- 3.10** Neither we nor the Applicant are critical of the Council for having introduced the plan change. As we pointed out in Minute 9, the current plan is clearly deficient and needs to be amended. The Council has been aware of that since the Central Plains application was lodged some years ago. In an ideal world the PPC1 change would have been introduced and determined before this hearing began. Given that this did not occur, it was important that it be introduced as soon as possible in case this application was unsuccessful. However, it is another matter to say that the proposed take regime should be applied to this Applicant simply because it is in the PPC1.
- 3.11** We have considered various decisions of the Environment Court regarding the weight to be given to proposed plan provisions introduced after an application has been lodged. There are few instances where provisions have been introduced after evidence has been heard at first instance. What is clear is that the weight to be given to new provisions is a matter for our discretion. In all the circumstances of this application we have concluded that we should put very little weight on the take regime in PPC1 and should focus on the evidence we have heard on the merits of various regimes including that which has now been incorporated into PPC1. We think that the other aspects of PPC1 which are largely "tidy up" matters, are worthy of greater weight. We note that the objectives of the WRRP have not changed as a result of PPC1 and we have given considerable weight to those and to the relevant policies and assessment criteria in the Plan. PPC1 focuses on a method of achieving objective which we have given rather less weight to.

### **Our overall approach to setting the take regime**

- 3.12** In summary, although we have put little weight on PPC1, we have fully considered and given considerable weight to the 27-30 cumec gap flow regime (which was

already before us prior to PPC1) and the Applicant's proposal along with the 20 cumec proposal. We have also considered the options of declining consent for the take and for granting it based on the Applicant's earlier proposal. We addressed those wider options in Minute 9 where we concluded that the original proposal was not sustainable.

- 3.13** As discussed above, we have assessed the various options based on the evidence before us and have not given the '30 cumec gap' proposal any additional weight merely by virtue of the fact that the Council has advanced it as a proposed plan change for public submission. However, we have fully considered the relative merits of that proposal and the Applicant's proposal.
- 3.14** Section 5 of the Act requires us to ensure that the Waimakariri water resource is managed so as "*to enable people and the community to provide for their social, economic and cultural well being*" ....and to..... "*sustain the potential of the resource to meet the reasonably foreseeable needs of future generations..... safeguard the life supporting capacity of the river and other resources and adequately avoid, remedy or mitigate adverse effects on the environment*". In this context we must consider the reasonable needs of the farming community to take and use the water and thereby enhance the life supporting capacity of soils and provide for economic wellbeing, along with the needs of the Community now and in the future to maintain sufficient flows in the river to provide for ecological needs and for present and future recreational use and other social and cultural needs.
- 3.15** In comparing the different mitigation proposals before us, we have been primarily guided primarily by Part 2 of the RMA and the relevant objectives, policies and assessment criteria in the WWRP. We have also had regard to the provisions in PPC1 The result is a list of matters we have taken into account grouped approximately in the following order according to the weight they must be given and their relevance to the issues before us.

#### **Section 5**

- Safeguarding the life supporting capacity of the resource
- Sustaining the potential of the resource to meet the reasonably foreseeable needs of future generations
- Enabling people and communities to provide for their social economic and cultural well being
- (adequately) avoiding remedying or mitigating the adverse effects of the take on the environment.

#### **Section 6**

- Preservation of the natural character of the river and its margins
- Protection of the significant habitat of indigenous fauna (in particular endangered indigenous bird populations)
- The relationship of Māori and their culture and traditions to their ancestral waters.

#### **Section 7**

- Maintenance and enhancement of amenity values (including in particular recreational amenity values) and the quality of the environment.
- The protection of the habitat of trout and salmon
- Kaitiakitanga
- The ethic of stewardship (The regional Council as steward of this public resource)
- The efficiency of the proposed use of the water resource.
- Intrinsic values of ecosystems
- The effects of climate change

### **Assessment criteria in the plan**

- (a) *The reasonable need for the quantities of water sought, and the ability of the applicant to abstract and apply those quantities.*
- (b) *The availability and practicality of using alternative supplies of water including alternative public or community reticulated supplies.*
- (c).....
- (d) *For surface takes:*
  - (i) *the effects the take has on river flows, and consequential effects on those values identified in (a) to (h) of Objective 5.1, near the point of take;*
  - (ii) *the effects the take has on other authorised takes.*
- (e) *The collection, recording, monitoring and provision of information concerning the exercising of the consent in accordance with Section 108(4) of the RM Act.*

### **Objective 5.1 and Policy 5.1 of the WRRP**

Policy 5.1 of the WRRP is to "control" the taking and use of surface water so that "the braided character of the Waimakariri river, aquatic ecosystems and habitats, wetlands, amenity based on the river and groundwater recharge are protected." This is related back to Objective 5.1 which, amongst other matters, seeks to preserve the natural character of waterways, maintain and enhance amenity values and protect the habitat of trout and salmon. We appreciate that the methods under Policy 5.1 do not refer to the resource consent process, however in our view we are still required to have regard to the Policy and the objective it serves which in any event closely mirror part 2 of the Act.

### **Rule 5.1 of the WRRP**

The activity shall comply with the following standards and terms:

...

- (d) For "A" Permits, the taking of water, downstream of Woodstock, from the Waimakariri River or its tributaries, or from hydraulically connected groundwater shall:
  - (1) cease whenever the "unmodified flow" is at or below the "Minimum Flow" for "A" permits specified in Table 2 (41000 l/sec); and
  - (2) whenever the "unmodified flow" is above the "Minimum Flow" for "A" permits and at or below the "Minimum Flow" for "B" permits that are specified in Table 2, be reduced to no more than the proportion of the maximum allowable rate of take determined by the following formula:  
The "unmodified flow" minus the "Minimum Flow" for "A" permits, divided by the "Allocation Limit".
- (e) For "B" Permits, the taking of water, downstream of Woodstock, from the Waimakariri River or its tributaries, or from hydraulically connected groundwater shall cease whenever the "unmodified flow" is at or below the "Minimum Flow" for "B" permits specified in Table 2 (63000 l/sec).

**3.16** Later in this Minute we assess the proposal against the relevant plan provisions which overlap with the considerations in Part 2 of the Act. We have set out our primary Part 2 conclusion in the summary above and in Minute 11.

**3.17** The key question for us is whether the Applicant's proposed take regime will adequately address these matters, or whether the more restrictive requirements of the 30 cumec gap regime or some variation of that are required. We do not see it as our role to decide which of these regimes is *optimal* or *best* from an instream

perspective. In our view we are required to decide which of these regimes will achieve an appropriate balance between the economic benefits for the productive use of water and an adequate (sustainable) level of protection of instream values.

- 3.18 We note that enabling people and communities to provide for their social economic and cultural well being is a key part of the sustainable management but does not override the other section 5 matters. We also note that in the present case there is some tension between the economic wellbeing of the Community and social and cultural wellbeing. We accept that the recreational and other in stream values of this river to the people and communities of Canterbury and beyond are significant.

### **Existing Environment and Cumulative Effects**

- 3.19 The existing consented AA, A and B1 allocations (using the terminology from PPC1) form part of the *existing environment* for the term of the consents. This includes the 1 cumec of A water which has been transferred to CPW by NTPL. Accordingly, we are only concerned with the potential impact of the additional 24 cumecs of B permit water which CPW seeks to access.
- 3.20 There has been some suggestion that the existing consented takes already have or will (with the addition of the NTPL consent once implemented) have adverse effects on recreational opportunity and other in stream values. Clearly the existing A takes do have some impact on in stream values. The effect of these is to “flat line” the river at the minimum flow of 41 (and sometimes down to 36 cumecs) during periods of low flow. However this impact and resultant effects are part of the "*existing environment*" which have been authorised by consents and which are envisaged by the WRRP. These are also effects which would continue under PPC1 if it is implemented in its current form. We must limit our assessment to the **additional** effects which CPW would have. This will of course include cumulative effects. We have focussed on the combined effects of the CPW take in conjunction with all of the consented takes. However, unlike PPC1 we are not seeking to mitigate existing effects.
- 3.21 Finally we observe that in terms of deciding the starting point for the CPW take, we have concluded that we should take into account all of the existing consents and losses from the river to ground water. One of the objectives of the WRRP and PPC1 is to ensure that so far as possible measured flows at the OHB do not drop below 41 cumecs. Of necessity that means that the CPW take (apart from its 1 cumec of A water) should not start until 41 cumecs plus the sum of all existing consented takes including connected ground water takes. There has been some confusion as to what this total allocation figure is, but that can be resolved in the context of finalising conditions. CPW would also have access to flows below that figure to the extent that others are not utilising their allocation at any particular time. The effects of any take of allocated water are within the *existing environment* and are therefore not of relevance to our inquiry. We discuss this point further on in this Minute.

## **4. INSTREAM VALUES**

- 4.1 We have discussed the instream values of the Waimakariri River in Minute 9 and observed that: *The recreational and intrinsic amenity provided by the river are components of social and cultural wellbeing. The Waimakariri provides very high recreational amenity for the following activities:*

- *Kayaking for the Coast to Coast event and generally for beginner and intermediate kayaking and training downstream of the Gorge and for intermediate kayaking in the Gorge.*
- *Jet boating (most highly used and accessible jet boating resource in the country and highly valued for its braided characteristics).*
- *Recreational salmon and trout fishing (highly valued salmon fishery with very high use, close to the City and readily accessible for much of its length below the Gorge. Along with the Rakaia, Rangitata and Waitaki, a nationally significant salmon fishery and also a valued trout fishery).*
- *Whitebaiting at the river mouth.*

**4.2** *The river also has other recreational amenity values but those listed above are the most significant. Of these activities, the most sensitive to the take regime are kayaking, jet boating and salmon angling. All of these are addressed to some degree by the WRRP minimum flow, however the evidence we have heard leads us to conclude that the minimum flow does not by itself provide full protection of amenity values or ecological values.*

**4.3** *We will need to consider the impact of the proposed take regime in terms of any increase in the frequency and duration of sub optimal (low) flows for any of these activities. That impact will vary with the time of year. We will also need to consider the impact of any loss of variability in flows in terms of these activities.*

**4.4** *We must also consider the impact of the proposed take regime on (in no particular order):*

- *Salmon and trout habitat.*
- *Salmon passage.*
- *Recreational uses other than those listed above.*
- *Ecological values including nuisance algal growths, macro-invertebrate communities, native fish and river bird life.*
- *Sediment transport and river morphology (braided river characteristics).*
- *Water quality including assimilative capacity for existing pollutants.*
- *Recharge of the Christchurch and Kaiapoi aquifers.*
- *Effects on existing users including in particular Waimakariri Irrigation Ltd and those taking from gallery intakes downstream.*
- *Māori cultural values.*

**4.5** *Section 7 requires us to have particular regard to the ethic of stewardship and to kaitiakitanga. Ngai Tahu are kaitiaki of the river, and the Regional Council is the "steward" of the resource on behalf of the Crown and the community. Accordingly in the present hearing we exercise a stewardship role. The rivers can be regarded as the commons which the regional council as steward must manage in the best interest of the whole of the community.*

## 5. THE EXISTING FLOW AND TAKE ENVIRONMENT

- 5.1 The following is largely taken from Minute 9, but has been amended to reflect the further evidence heard in October 2009.
- 5.2 The existing year round minimum flow as specified in the WRRP is an "*unmodified flow*" of 41 cumecs as measured at the OHB.
- 5.3 The term "*unmodified flow*" is defined as being the flow (at OHB) "*as if no take was occurring*". That is, one must add to the indicated flow at OHB the sum of all actual takes including stockwater takes and some proportion of connected groundwater takes, in order to determine the *unmodified flow*.
- 5.4 The WRRP provides for 22 cumecs of 'A permit' takes. These takes may operate to their maximum until the river reaches an "*unmodified flow*" of 63 cumecs (41+22 cumecs) at the Old Highway Bridge. As the flow reduces to an unmodified flow of 41 cumecs these takes are reduced in proportion to the size of the consented take and must cease at 41 cumecs, apart from takes for stockwater, which are not subject to the minimum flow restriction. In practice, ECan has granted consent for slightly more than 22 cumecs of A permit water and we must treat that as being part of the existing environment. As best we can ascertain (from Table of the section 32 report to PPC1) the actual allocation of A permits is around 22.6 cumecs (4.457 to stock takes and 18.1 to others including NTPL and the stream depletion portion of groundwater takes adjacent to the river). However, PCC1 only makes allowance for 17 cumecs of A takes. Because of the uncertainties and the fact that PPC1 provides for a lesser A block than has been allocated, we will refer to approximate flow figures. The final details of trigger flows for conditions will need to be finalised in our decision next year.
- 5.5 When discussing flows one must distinguish between *recorded flows* which are measured at the OHB, modified or *residual flows* (which are the modelled flows at OHB under various scenarios, *unmodified flows* which are the flows which would have occurred at that point but for abstraction, and *upstream flows* which at Waimak Gorge will be the recorded flow less any abstraction plus about 7.7 cumecs of loss to groundwater from the river.
- 5.6 When river users speak of flows, they are usually referring to the flows at the OHB, which are the flows shown on the ECan website and available by telephone. For compliance purposes, mean daily flows are used (excluding flows during the period of tidal influence) and accordingly do not represent a flow at a particular time of day. The ECan website and presumably the freephone provide instantaneous flows. It must also be remembered that there is a delay between the effect of any take at the Gorge bridge and its influence downstream, and also between any flow triggered at Otarama and its effect at OHB. For the purposes of comparing take regimes it is the residual flows at the OHB which are most relevant.
- 5.7 The A allocation includes 2.72 cumecs of A permit water granted to NTPL which has not yet been utilised. In addition NTPL has been granted consent to take the first 1.24 cumecs of 'B permit' water and another consent holder has been granted consent to take a further 0.48 cumecs bringing the total consented B take to 1.72 cumecs (under PPC1 these are labelled B1 takes).
- 5.8 There was uncertainty as to whether if CPW is granted consent, it or NTPL has priority to the 3.96 cumecs of A and B permit water. The Court of Appeal has

determined that CPW has priority to that water and we understand that NTPL has withdrawn its appeal. Subsequently, NTPL has transferred 1 cumec of A water to CPW. Accordingly for the purposes of this hearing CPW is now not applying for any A permit water and is applying solely for B permit water. It also seems to be common ground that the first 1.24 cumecs of B permit has been allocated to NTPL and notwithstanding the Court of Appeal decision, that is no longer contested by CPW.

**5.9** We note that since NTPL is not yet operating, the evidence relating to the existing environment for fishing and other issues does not yet include NTPL. When river users refer to residual flows they are referring to flows without the NTPL take (which is what is shown in Tables 1 and 2).

**5.10** There was some confusion as to how much A and B water has already been allocated and accordingly what the starting point for any further B allocation (or B gap) should be. We have had various exchanges with ECan officers, Mr Duncan and Mr Tipler over the last two weeks and as best we can tell, the situation would operate is as follows:

- 41 cumecs A minimum flow at the OHB;
- 4.46 cumecs to stock takes (unrestricted by minimum flow) AA takes under PPC1;
- 15.38 cumecs allocated to operating A takes;
- 2.72 cumecs A take to NTPL (of which 1 cumec has been transferred to CPW);
- 18.1 cumecs to A takes (15.38+2.72);
- 63 cumec B minimum flow;
- 1.72 cumecs to B takes (NTPL + another) - B1 under PPC1;
- 65.28 cumecs is the flow at which the total allocation to existing consents can be taken (41+ 4.46 +18.1+1.72).

**5.11** We understand CPW accepts that what was intended by the WRRP was a minimum flow of 41 cumecs at the OHB and accordingly it accepts that the existing A and AA takes and the consented B (B1) takes should be allowed for, which would seem to bring the starting point for B takes to 65.277 cumecs (leaving aside PPC1). However we note that because of uncertainties as to the extent of the A block, Mr Tipler has modelled the effects of the CPW proposal based on a starting point of 64.72 (63 +1.72) rather than 65.28 cumecs. This does not make any difference to our assessment of the competing take regimes but will make a difference to the wording of conditions.

**5.12** We have proceeded on the basis that CPW is now seeking to take on a one-to-one sharing basis, flows above an unmodified OHB flow of around 65 cumecs, up to a flow of around 113 cumecs. Within this flow band, 24 cumecs would stay in the river and 24 would be available pro rata to CPW in addition to its one cumec of A permit water.

**5.13** Under the PPC1 gap proposal, CPW would not be able to commence taking B water until an unmodified flow of 93 cumecs at the OHB and could then take the next 24 cumecs up to 117 cumecs. Under this regime the river would be "flat lined" at the OHB, at a flow of around 71 cumecs if all of the allocated A and B1 and CPW water is taken simultaneously.

**5.14** The position is complicated by PPC1 which also sensibly shifts the minimum flow point to Otarama upstream of the CPW and existing takes. Based on correlations between Otarama and unmodified OHB flows, PPC1 sets minimum flows at 11

cumecs higher than at the OHB (which we understand is not accepted by all parties). We understand that the 11 cumecs may be adjusted in future if flow gaugings improve the correlation.

- 5.15** For present purposes we have assumed Otarama flows are 11 cumecs higher than unmodified OHB flows.
- 5.16** Implementing the PPC1 approach the relevant figures based on Otarama are:
- 5 cumecs to AA takes (unrestricted by minimum flow; compares to 4.457 currently allocated);
  - 52 cumecs A min flow at Otarama (equivalent to 41 at OHB);
  - 17 cumecs to A takes (compared to the 18.1 cumecs allocated);
  - 74 cumec B1 minimum flow (said to be equivalent to 63 at OHB);
  - 1.72 cumecs to B1 takes (NTPL + another);
  - **75.72** cumecs total existing allocation (52+5+17+1.72);
  - 104 cumec B minimum flow (said to be equivalent to 93 at OHB).
- 5.17** We find it a little peculiar that PPC1 is inconsistent with the allocations in Table 2 of the section 32 report. It seems to us, that based on existing allocations, if there is to be a 30 cumec gap it should commence at an Otarama flow of 106.28 cumecs (65.28 + 11 + 30). However, this is academic, since for reasons we will come to, we have not adopted the PPC1 approach. We also note that in practice there is probably little difference between a 27 cumec and a 30 cumec gap in terms of mitigation of effects.
- 5.18** Using “naturalised” flows at the OHB shows that a flow at the OHB of 41 cumecs is maintained with a flow at Otarama of 52 cumecs. CPW accepts that with Otarama as the measurement site and no B gap, it would be able to start taking at an Otarama flow of around 76 cumecs and would then take on a one to one sharing basis up to about 124 cumecs. Based upon the revised figures above, it seems to us that the starting point should be 76.277 cumecs at Otarama (52+4.457+18.1+1.72). However, this is a matter which can be sorted out in the context of conditions.
- 5.19** Under the PPC1 proposal, CPW would not be able to commence taking until the Otarama flow is 104 cumecs and could then take the next 24 cumecs above that up to a flow of 128. Flows between 128 and 144 cumecs would be available to be allocated to other applicants. Flows between 76.3 – 104 cumecs (at Otarama) would be unavailable for allocation.
- 5.20** For the purposes of our discussion we will continue to refer to flows at the OHB since that is how the evidence has been expressed to us, that is where reported flows are recorded and that is the site referenced in the current WRRP.
- 5.21** To determine the likely impact that the proposed CPW abstraction will have on the hydrology of the Waimakariri River, it is necessary to first derive a time series of “unmodified” flows from which the effects of historic abstractions have been removed. Mr de Joux (for Fish and Game) has created an ‘unmodified flow’ series for the Waimakariri at the OHB by adding measured or estimated actual takes to the measured ‘residual’ flows at OHB for 1967-2007.
- 5.22** Mr de Joux’s unmodified flow series has been accepted by Mr Tipler and Mr Duncan. We note for consistency of comparison, all three modellers have only used data from 1 June 1967 to 31 May 2001, because that was the timescale of Mr Tipler’s original modelling. We understand that the 2001-2007 period is

atypical, with lower median (91 cumecs) and mean flows (115.3), so if the longer period is used for modelling, results will differ slightly from the 1967-2001 period already used.

**5.23** There was some confusion at the hearing over whether flows described by various submitters for particular in-river needs were *measured* (residual) flows, or unmodified flows. As we understand it, many river users such as anglers, kayakers and jet boaters interrogate ECan's telemetered flow site at OHB to determine whether flows are suitable for their activities. In that case, those flows are actual or measured flows rather than unmodified, and an adjustment will be required when converting actual flow needs for purposes of consent conditions to 'unmodified flows'. Mr Callander's evidence for Waimakariri Irrigation Ltd (**WIL**) (his Table B1) suggested some ECan consents refer to measured flows and others to unmodified flows. We understand from Mr Fietje that this is being rectified by ECan by varying the conditions of consents, as reflected in PPC1.

**5.24** We again note that when looking at hydrological and consequential impacts, we must consider the *additional effects* of the CPW proposal along with any *cumulative effects* which would be caused by CPW in conjunction with the effects of already consented takes. Fish and Game in particular, submitted that the existing effects are already unacceptable and therefore any further adverse effects will be unsustainable. We have concluded that existing effects are not unsustainable but also acknowledge that there is only a limited amount more water which can be taken sustainably. There is a need for a precautionary approach which is the rationale for PPC1 but which we think can also be achieved under the CPW proposal with some modifications.

## **6. POTENTIAL HYDROLOGICAL IMPACTS**

**6.1** We will briefly consider the potential hydrological impacts of the various mitigation (take) regimes which have been addressed in evidence, with particular focus on the amended CPW proposal and the proposed '30 cumec gap' proposal in PPC1 (which is stated to be a B permit minimum flow of 93 cumecs (63+30) at the OHB or 104 cumecs (93+11) at Otarama).

**6.2** In Minute 9 we discussed the various take regimes we had heard evidence on. We will now largely focus on the amended CPW proposal and the PPC1 proposal, the latter being very similar to the de Joux 100 cumec B minimum flow option, which has been reviewed in evidence.

**6.3** CPW's scenarios also assumed access to 11.5 cumecs of winter A water from WIL. However, with both WIL and NTPL considering storing winter water for their schemes, we note that the availability of winter A water is not certain. There is also a legal issue as to whether WIL has been allocated winter A water or whether its consent is limited to taking during the irrigation season. Our preliminary view is that WIL could only have been allocated winter water if it applied for such, because ECan could not grant more than what was applied for. We note that NTPL has not been allocated winter water.

**6.4** In this context, we observe that our earlier summation of existing allocations and our Table 1 reflect the situation during the irrigation season. Outside of the irrigation season the allocations are considerably less. For the purposes of our comparison we have focussed on the impacts of the various take regimes during the irrigation season.

- 6.5** We also note that the river can recede to a flow of around 36 cumecs because irrigation abstractions can reduce the actual flow to 41 cumecs, and then a further 4.5 cumecs can be abstracted for stock water uses. The full exercise of existing A permits causes considerable periods of flat lining between late February to early May. This flat lining occurs at sub optimal flows for fishing and boating and accordingly we accept that the existing takes are already having an adverse effect on recreational amenity and other values. Any additional effects caused by the CPW take will be cumulative effects.
- 6.6** Climate change is a consideration for us when deciding on the merits of take regimes. Mr Fietje's section 42A report for ECan quoted Dr McKerchar's advice that the percentage changes in the Rakaia and Waimakariri Rivers mean annual flows over the next 35, years due to the effects of global warming, are expected to be of similar levels to long term fluctuations in rainfalls and flows that have occurred over the last 50 years. A CPW take regime restricted on the basis of actual flows means of course that the scheme – not the river - will bear the brunt of any changes in the flow regime caused by climate change.
- 6.7** Mr Tipler clarified why no annual volumetric limits were needed for river takes (as opposed to groundwater takes where a portion of water taken is from storage, not from a flow source). Although we agree with that logic, we note that it is critical that the legal allocation of water for each consent holder is clearly defined. This may require some limits on monthly, seasonal or annual rates and/or volumes of take.
- 6.8** We found both Mr Tipler's and Mr Duncan's evidence at the resumed hearing very useful in synthesizing take regimes in relation to flow needs. We are now faced with weighing 2 options: 1:1 flow sharing above an unmodified flow of 65.277 cumecs, or a gap of 28-30 cumecs before the CPW take starts, as envisaged by PPC1.
- 6.9** Each of these remaining options has slightly different impacts on key hydrological parameters. Because of the minimum flow regime in the river, neither option would have any impact on the frequency or duration of unmodified or residual flows below 41 cumecs. However they have a differing impact on:
- Flow variability.
  - The frequency and duration of low to intermediate flows approaching but above the minimum.
  - The timing of such lower flows.
  - Average flows between the flows at which B takes commence and cease.
  - The frequency and duration of flows within flow bands most suitable for fishing, jet boating, kayaking and maintenance of instream ecological values.

### **Evidence for resumed hearing**

- 6.10** Mr Tipler presented hydrological evidence relating to the amended CPW proposal at the hearing in October 2009. He also compared that with the proposed '30 cumec gap' proposal. Mr Duncan did the same on behalf of ECan officers. Both witnesses were in full agreement. Mr de Joux for Fish and Game also provided a

brief written comment and we do not understand him to differ on the hydrological effects of the various regimes.

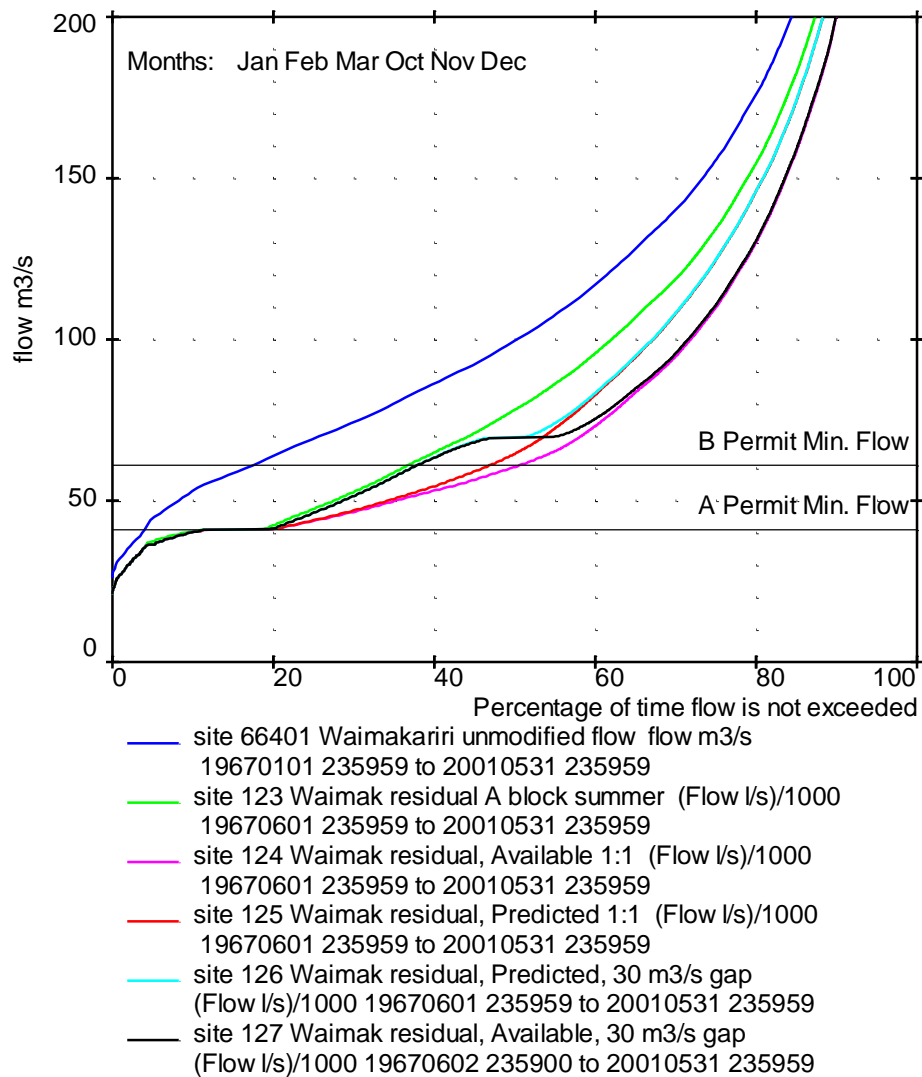
- 6.11** We now have the details of the Applicant's amended proposal and have modified Table 2 from Minute 9 accordingly – refer Table 1 below.

**Table 1 The effect of various take regimes on residual flows at the OHB**

<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>
unmodified flow OHB	pre CPW (without NTPL) modified flow	pre CPW (with NTPL) modified flow	PPC1 with CPW modified flow	CPW proposal modified flow	CPW take under its proposal	CPW take under PPC1
43.0	38.5	38.5	38.5	38.5	0.0	0.0
45.0	40.5	40.5	40.5	40.5	0.0	0.0
47.0	41.0	41.0	41.0	41.0	0.0	0.0
49.0	41.0	41.0	41.0	41.0	0.0	0.0
51.0	41.0	41.0	41.0	41.0	0.0	0.0
53.0	41.0	41.0	41.0	41.0	0.0	0.0
55.0	41.0	41.0	41.0	41.0	0.0	0.0
57.0	41.0	41.0	41.0	41.0	0.0	0.0
59.0	41.0	41.0	41.0	41.0	0.0	0.0
<b>61.0</b>	<b>41.0</b>	<b>41.0</b>	<b>41.0</b>	<b>41.0</b>	0.0	0.0
63.0	43.2	41.0	41.0	41.0	0.0	0.0
65.0	45.2	42.4	42.4	42.4	0.0	0.0
66.0	46.2	43.4	43.4	42.8	0.6	0.0
67.0	47.2	44.4	44.4	43.3	1.1	0.0
<b>69.0</b>	<b>49.2</b>	<b>46.4</b>	<b>46.4</b>	<b>44.3</b>	2.1	0.0
71.0	51.2	48.4	48.4	45.3	3.1	0.0
73.0	53.2	50.4	50.4	46.3	4.1	0.0
75.0	55.2	52.4	52.4	47.3	5.1	0.0
77.0	57.2	54.4	54.4	48.3	6.1	0.0
<b>79.0</b>	<b>59.2</b>	<b>56.4</b>	<b>56.4</b>	<b>49.3</b>	7.1	0.0
81.0	61.2	58.4	58.4	50.3	8.1	0.0
83.0	63.2	60.4	60.4	51.3	9.1	0.0
85.0	65.2	62.4	62.4	52.3	10.1	0.0
87.0	67.2	64.4	64.4	53.3	11.1	0.0
<b>89.0</b>	<b>69.2</b>	<b>66.4</b>	<b>66.4</b>	<b>54.3</b>	12.1	0.0
91.0	71.2	68.4	68.4	55.3	13.1	0.0
93.0	73.2	70.4	70.4	56.3	14.1	0.0
95.0	75.2	72.4	70.9	57.3	15.1	1.5
97.0	77.2	74.4	70.9	58.3	16.1	3.5
<b>99.0</b>	<b>79.2</b>	<b>76.4</b>	<b>70.9</b>	<b>59.3</b>	17.1	5.5
101.0	81.2	78.4	70.9	60.3	18.1	7.5
103.0	83.2	80.4	70.9	61.3	19.1	9.5
105.0	85.2	82.4	70.9	62.3	20.1	11.5
107.0	87.2	84.4	70.9	63.3	21.1	13.5
<b>109.0</b>	<b>89.2</b>	<b>86.4</b>	<b>70.9</b>	<b>64.3</b>	22.1	15.5
111.0	91.2	88.4	70.9	65.3	23.1	17.5
113.0	93.2	90.4	70.9	66.4	24.0	19.5
115.0	95.2	92.4	70.9	68.4	24.0	21.5
117.0	97.2	94.4	70.9	70.4	24.0	23.5
<b>119.0</b>	<b>99.2</b>	<b>96.4</b>	<b>72.4</b>	<b>72.4</b>	24.0	24.0
121.0	101.2	98.4	74.4	74.4	24.0	24.0
123.0	103.2	100.4	76.4	76.4	24.0	24.0
125.0	105.2	102.4	78.4	78.4	24.0	24.0
127.0	107.2	104.4	80.4	80.4	24.0	24.0

- 6.12** For the purposes of this table we have used the existing allocation figures from Table 1 of the PPC1 section 32 report. This results in the CPW proposal starting at 65.3 cumecs unmodified flow and the PPC1 gap regime starting at 93 cumecs (104 at Otarama). Obviously the actual comparisons will vary depending upon what assumptions are used for existing allocations. However, the table should be accurate to within about half a cumec.
- 6.13** The table allows current observed residual flows (Column B) to be related to unmodified flows in column A. It allows a given flow under the CPW (E) and PPC1 (D) regimes to be compared to the flow that would otherwise have been in the river naturally (A), currently without NTPL (B), and as it would be with NTPL (C). Columns F and G show the rate of take for CPW under each proposal for each flow.
- 6.14** The shading shows the changes to flow bands as a result of the two scenarios and has been related to current observed flows. The bolded figures show what current observed flows would equate to under each regime. By way of example a current flow of 59.2 cumecs equates to an unmodified flow of 79 cumecs. Under the CPW proposal at an unmodified flow of 79 the modified flow would drop from 59.2 currently to 49.3 cumecs. Under the PPC1 proposal it would drop to 56.4.
- 6.15** The pre CPW (without NTPL) column in Table 1 does not include the consented NTPL take. Accordingly it reflects the current situation as seen by river users rather than what is legally allowed. Not all takes are fully exercised, nor may they all be fully operating at any one time, hence these flows reflect what might be described as the 'worst case'. The post CPW scenarios are based upon it having access to 1 cumec of A permit water and include the NTPL take. We will focus on the effects of the remaining 24 cumecs of B abstraction since the effects of the A allocation and what will be called B1 are envisaged by the WRRP and are already consented.
- 6.16** Table 1 illustrates how the CPW proposal (in conjunction with NTPL) will reduce current flows of 41 to 60 cumecs (unmodified flows of 47 to 80) to a new modified range of 41 to 50 cumecs. This is relevant to our discussion of effects on boating and fishing amenity. At the other end of the spectrum one can see that under the CPW proposal future residual flows above about 73 cumecs will have been drawn from current flows above 100 cumecs (unmodified flows of about 120 cumecs). This is relevant to our discussion of turbidity and fishability.
- 6.17** Mr Duncan also provided the flow duration curves below (Figure 3) for the irrigation season October to April inclusive, to visualise the periods of time that flows are at particular levels. We found this useful for comparing the revised CPW proposal (CPW 'predicted' is red), with the 30 cumec gap scenario (CPW 'predicted' is light blue) and existing allocations (green).
- 6.18** The main difference between the 1:1 and 30 gap scenarios evident from this plot is the flat-lining of flows for the 30 cumec gap at around 70 cumecs. All options are flat lined at 41 cumecs and no option makes any difference to the duration of the minimum flow.
- 6.19** In simple terms, this plot shows that if the 1:1 flow sharing option as proposed by CPW is approved, flow durations will move to the right from the green line to the red above 41 cumecs. If the 30 cumec gap option is approved, the change is from the green line to the light blue. The envelope of flow between the red and light blue lines (under the black) represents the volume of water either left in the river or allocated to CPW depending upon which option is approved.

**Figure 3 Flow Duration curves for the irrigation season**



**6.20** We heard that under a 1:1 sharing regime, CPW’s maximum take of 25 cumecs would be taken between 1% of the time (‘predicted’ scenario) and 20% of the time (‘available’ scenario), compared to 24% of the time for the original scheme proposal. Mr Tipler projected that median Waimakariri flow for the ‘predicted’ scenario would fall from 80.2 cumecs pre-CPW to 76.6 with CPW operational, compared with 70.2 cumecs for the ‘available’ take scenario. We note that these are medians over the whole of the year and reflect the fact that CPW would not be taking much, if any, water outside of the irrigation season. The changes to monthly **medians** over the irrigation season would be more relevant. We also note that these statistics and the "predicted" line in Figure 3 slightly underestimate the effect of CPW since they assume that CPW has access to Barhill Chertsey water which may only be a temporary situation.

**6.21** The revised scheme under the CPW take regime, would extend the average number of days that the Waimakariri River is at, or below, the minimum flow of 41 cumecs, from 49 pre-CPW to 52 with the CPW take operational. This is the effect of the CPW A take (which is part of the CPW take shown in Table 1). The CPW take would have the greatest effect on Waimakariri flows during typical summers

rather than dry summers, because during the latter B permit takes would be restricted for significant periods of time.

- 6.22** The comparisons of the revised scheme versus the original scheme, discussed above, are positive for the river, however it is the timing and effects on ranges of river flow most suitable for instream values and recreational activities which are most relevant and which we have focussed upon.
- 6.23** We asked Mr Tipler to provide flow statistics to show the effects of the revised CPW water take proposal on the numbers of days that river flows would be within the flow bands: 50-60 cumecs; 60-70 cumecs; and 70-80 cumecs. Table 2 below is based on his Table 4 and compares the incremental change between pre- and post-CPW statistics. The pre-CPW statistics reflect the effects of existing A and so-called B1 permit takes, rather than the natural flow regime. The post-CPW statistics are for Mr Tipler's 'predicted' versus 'available' CPW take scenarios, as well as for the PPC1 gap proposal. At our request he has added statistics for the case that Barhill Chertsey (BCIL) water is no longer available to CPW from the Rakaia (shaded). Results are given as an average over the full period of record used at the start of this hearing (1967-2001) and for dry, typical and wet years. With Mr Duncan's assistance, we have also added in the figures for the 40-50 cumec band. The "available" figures are in effect a "worst case" scenario of CPW taking up to its full allocation over the irrigation season at the same time as others are also taking up to their maximums.
- 6.24** We have been advised that Mr Duncan's numbers in the 40-50 cumec band may not be based on exactly the same modelling assumptions as Mr Tipler has used, but also understand that the differences in days between the scenarios are not affected between the two sets of numbers. In other words, our conclusions hold regardless.

**Table 2: Frequency of flows within specified flow bands**

Scenario	Flow Band	Before CPW				After CPW			
		67-01	70/71	89/90	95/96	67-01	70/71	89/90	95/96
		Average Period	Dry Year	Typical Year	Wet Year	Full Period	Dry Year	Typical Year	Wet Year
Days total		12419	365	365	365	12419	365	365	365
1:1 Sharing 25 Max W/O BCIL - Predicted	40 - 50 cumec	35	23	33	22	38	28	35	24
1:1 Sharing 25 Max - Available		35	23	33	22	50	33	46	33
30 Gap 25 Max - Available		35	23	33	22	35	23	33	22
1:1 Sharing 25 Max W/O BCIL - Predicted	50 - 60 cumec	34	35	56	13	42	33	60	13
1:1 Sharing 25 Max - Available		34	35	56	13	46	39	72	20
30 Gap 25 Max - Available		34	35	56	13	34	35	56	13
1:1 Sharing 25 Max W/O BCIL - Predicted	60 - 70 cumec	35	18	35	6	34	20	36	13
1:1 Sharing 25 Max - Available		35	18	35	6	36	26	34	14
30 Gap 25 Max - Available		35	18	35	6	35	18	35	6
1:1 Sharing 25 Max W/O BCIL - Predicted	70 - 80 cumec	31	17	28	36	27	16	27	35
1:1 Sharing 25 Max - Available		31	17	28	36	26	18	24	39
30 Gap 25 Max - Available		31	17	28	36	53	38	50	64

**Table 3: Change in frequency of flows (days) in each band**

	40-50 cumecs	50-60 cumecs	40-60	60-70	70-80
CPW take – Predicted without BCIL water	+3 average +2 typical	+8 days + 4	+11 +6	-1 days +1	-4 days -1
CPW take - Available	+15 average +13 typical	+12 days +16 days	+27 +29	+1 days -1	-5 days
CPW take – 30 cumec gap	0 average 0 typical	0 days 0 days	0 0	0 days 0 days	+22 days +22

**6.25** What is evident from these statistics is as follows:

- Both the ‘predicted’ and ‘available’ take scenarios draw flows down from higher flow bands, with the result that flows would occur more often in the 40-50 and 50-60 cumec bands, a similar time for the 60-70 cumec band and slightly less in the 70-80 cumec flow band.
- As the PPC1 30 cumec gap proposal would not allow CPW to begin taking water until at least an unmodified flow of 93 cumecs, the PPC1 proposal would result in no change in flows within the 40-60 cumec, 50-60 cumec and 60-70 cumec flow bands, but on average a 72% increase in the incidence of flows in the 70-80 cumec flow band as compared to what is already consented. This is because the PPC1 regime “*flat lines*” flows at around 71 cumecs.
- The CPW proposal results in a significant increase in the time the river would be in the 40-60 cumec flow band. The most significant increase is in the frequency and duration of flows in the 40-50 cumec band.
- Changes from dry, to typical, to wet years are highly variable, depending on the pattern of flows and dry spells, but likely to be greater in dry to typical years than wet ones.
- The typical year (1989-90) figures are different from the average over the period of record.

**6.26** The potential effects of these changes are commented upon below for each of the relevant river uses and values.

**6.27** Mr Tipler also responded to our concern (para 9.88 of Minute 9) about mitigating the effects of prolonged low flows during summer. He showed that the revised CPW scheme would have little effect on the frequency and duration of low flow events below 41 cumecs. This is because the CPW take (apart from the already consented 1 cumec from NTPL) is B block water. We also note that CPW proposes to allow for the passage of freshes after prolonged low flows.

## 7. POTENTIAL EFFECTS ON NATURAL VALUES

### Salmon and Trout Habitat

- 7.1 At para 9.84 of Minute 9, we concluded that for the 25 cumec take under the original CPW proposal..... *'the effects of the CPW 20/25/240 take regime would have been acceptable in terms of trout and salmon habitat (and also for native fish and bird habitat) and that the suggested flow sharing may further reduce the potential for adverse effects.'* The recent change from 5:5 flow sharing to 1:1 flow sharing has even greater potential to reduce adverse effects.
- 7.2 We take from Dr Hayes' original extensive analysis of various water take options, that the effects of 1:1 flow sharing as opposed to a 20 or even 37 cumec gap for B permits would cause little change to salmon and trout habitat, because the impacts in question are already caused by the pre-existing flow regime and will not increase. As discussed earlier, it is not our role to endeavour to mitigate effects which are already authorised under existing consents. We also observe that there was little evidence that these existing impacts are at an unsustainable level. The river continues to sustain an outstanding salmon fishery.
- 7.3 We conclude that the revised CPW proposal (30-24-1:1) would not have any significant additional effects on salmon and trout habitat beyond those which have already been authorised under existing consents (noting that the NTPL consent has not yet been utilised and will add to current effects).

### Salmon Passage

- 7.4 We stated at para 9.85 of Minute 9 that *"we consider it important in making our decision on the take regime, to ensure that the hydrological characteristics which make these rivers so popular for fishing are adequately protected."*
- 7.5 We also accepted Dr Glova's view that prolonged periods at or below the minimum flow of 41 cumecs are already hindering salmon passage upriver during the critical summer months. Dr Glova was of the view that passage for adult salmon and trout in the Waimakariri River would not be likely to be adversely affected by a 40 cumec CPW take as it would be mainly limited to Class B water during the irrigation season. With a reduced CPW take and flow sharing, any effects would be further reduced.
- 7.6 On that basis, we conclude that the revised CPW proposal (30-24-1:1) would not further hinder salmon passage, provided that freshes following prolonged periods of low flow are allowed to pass.
- 7.7 As discussed later we have concluded that after more than 14 days of flatlining (i.e. flows less than or equal to 41 cumecs at OHB) there should be no CPW "B" Block take during freshes or floods until the measured flow exceeds 130 cumecs at OHB, or has persisted for two days if the peak flow rate does not reach 130 cumecs. We recall Dr Glova's opinion (para 9.88 of Minute 9) that a 14 day period would be beneficial for salmon passage. However, this is 7 days less accrual time than allowed for in the PPC1 which uses 21 days. Given that the CPW proposal does not involve a '30 cumec gap', we think a more precautionary approach is appropriate. We will however hear further evidence on this point if CPW has a different view.

## Flow Requirements for River Birdlife

- 7.8** At para 9.100 of Minute 9 we reported Dr Hughey's assessment that a suitable flow range for bird nesting habitat is 60-90 cumecs for the breeding season October to December. Mr Duncan has used 55-95 cumecs and included September. We assume that this is because the number of river braids is predicted to be at a maximum for that flow range. In any event we have taken a conservative approach and have assessed CPW effects on birds based on that 55-95 cumec range.
- 7.9** Mr Tipler suggested that the revised CPW proposal would improve conditions for river dwelling birds compared to the current WRRP take provisions, with the percentage of time in the 55-95 cumec flow band increased from 31 to 35% for the 'predicted' take scenario and 31 to 39.9% for the 'available' take scenario. Mr Duncan's data suggests that the 30 cumec gap scenario would take this latter percentage up to 53%.
- 7.10** We were interested to know what proportion of the 55-95 cumec range would be drawn below 55 cumecs, as that is likely to be more critical than the percentage within the preferred range. Mr Tipler provided the following table showing days within each flow range:

**Table 4: Changes in flows for river bird preferred flows 55-95 cumecs Sept-Dec**

Period 1 Jun 67 - 31 May 01 1:1 Sharing 25 max							
	Before CPW			After CPW			Total
	Flow			Flow			
	< 55m <sup>3</sup> /s	55 - 95m <sup>3</sup> /s	> 95m <sup>3</sup> /s	< 55m <sup>3</sup> /s	55 - 95m <sup>3</sup> /s	> 95m <sup>3</sup> /s	
September	52	345	623	52	345	623	1020
October	95	272	687	201	314	539	1054
November	95	330	595	217	368	435	1020
December	202	363	489	361	330	363	1054
Total	444	1310	2394	831	1357	1960	4148

- 7.11** We conclude from these data that there would, on average, be a slight increase in flows within the 55-95 cumec range preferred for river birds. Increases are generally mid breeding season. However, we note that the incidence of flows below 55 cumecs approximately doubles from an average of 13 per year to 24. That increase would be in the 41 to 55 cumec range. This can also be seen on Tables 2 and 3 above. There is an increase of, on average, 11 days per year in the 40-50 cumec band and a further 12 days in the 50-60 cumec band although not all of these days will be during the breeding season.
- 7.12** We concluded at para 9.95 of Minute 9 that the main potential effects of water abstractions on birdlife of the Waimakariri River relate firstly to potential reduced protection of nests and nesting birds from the effects of predators, and secondly to maintaining suitable potential nesting and feeding habitat. The habitat issue is addressed through ECan's river fairway management, and maintenance of the flood dominated flow regime which will continue.
- 7.13** Mr Duncan had earlier presented evidence of the relationship between river flow and the numbers of channels (hence number of islands protecting birds) at Crossbank. For flows of 55 cumecs there are about 8.5 channels compared to 10.5 at 95 cumecs. Dr Mabin's analysis indicated a 2% reduction in wetted fairway width for river flows of 60 and 40 cumecs respectively. Dr Hughey for the Department of Conservation (DOC) indicated an average annual increase of 8

days with flows less than 55 cumecs while Table 4 has confirmed an average increase of around 11 days.

- 7.14** We conclude from these data that although flows in the preferred range are increased for the 'after CPW' scenario, the average increase of 11 days per year in the 40-55 cumec flow range may have some adverse impacts on birdlife through the predicted decline in numbers of islands (which provide protection from predation). It is possible that the significant increase in flows in the 55 to 95 range will offset adverse effects from the increase in the 41-55 cumec range. We also note that mitigation of the duration of low flows as proposed below for boating amenity may also incidentally mitigate effects on river birdlife.

### **Nuisance Periphyton and Macroinvertebrates**

- 7.15** One of the stated rationales for the PPC1 flow regime is to minimise the risk of nuisance algal growths occurring. Dr Meredith's conclusion for ECan's section 32 report, is that of four allocation regimes (two low gap regimes and two 1:1 flow sharing) those with a flow gap were preferred over the flow sharing because they increase the number of days that flows would be within a generally preferred flow band of 50-100 cumecs or 50-150 cumecs. We note that the 1:1 sharing option also delivers this benefit albeit not as much. Most of the increase in duration under the CPW proposal is at flows below full flushing flows. We have concluded that whatever allocation regime is chosen, the best mitigation for avoiding nuisance periphyton growth is provision for passing freshes after periods of low flows.
- 7.16** In Minute 9, we concluded with respect to potential for nuisance periphyton (slime) growths to increase with reduced flows, that the regular freshes in the Waimakariri would continue to dominate the freshwater ecology of the river system and accordingly the CPW take was unlikely to increase the risk of nuisance growths.
- 7.17** Two measures of the sloughing capacity of river freshes are the statistics FRE3 (the occurrence of 3 times the 'natural' median flow) and MIN3 (3 times the prescribed 41 cumec minimum flow). Comparing the original CPW proposal with the revised proposal shows a slight reduction in the frequency of both statistics. We remain of the view that the river ecology will remain dominated by freshes, provided allowance is made for summer freshes to pass, as proposed for the original scheme. With freshes being allowed to pass after prolonged low flows (as discussed above in our discussion of salmon passage), we conclude that nuisance periphyton growths are unlikely to be exacerbated by the revised CPW take. We note in passing Dr Meredith's observation that algal mats have occurred not just in summer, but also autumn/winter/spring therefore provision for passage of freshes should apply throughout the irrigation season.
- 7.18** The CPW proposal is consistent with that. We have concluded that in the absence of the proposed '30 cumec gap', a precautionary approach would be to reduce that period to 14 days. This also has the potential to mitigate the potential minor effects on salmon passage. Based upon both the evidence we have heard and the section 32 analysis for PPC1, we consider that this mechanism in conjunction with one to one flow sharing will provide adequate mitigation of the risk of nuisance growths and will ensure that effects on river ecology will be minor. We discussed how this regime would be triggered because it is important that it be initiated based on instantaneous flows not average daily flows. It would also sensibly be triggered based on flows at Otarama because those will allow time for CPW to cease taking at the Gorge and allow passage of the fresh down

the river to OHB. A condition which implements this in a practical manner should be devised.

- 7.19** We were not provided with any evidence to support the view expressed in the section 32 assessment for PPC1, that a 30 cumec gap before B takes commence would necessarily be any more effective in addressing this issue than would the CPW proposal. We also note that the CPW 1:1 sharing proposal maintains natural variability in flows to a greater extent than the PPC1 does. That regime would result in additional flat lining at flows around 71 cumecs. It seems to us that this might have the potential to increase periphyton production outside of the main braids and in any event is unlikely to have a substantial mitigating effect.
- 7.20** In relation to changes in macroinvertebrate productivity (food for fish and birds) with flow, we had a range of expert opinions but the critical factor was whether a decline in macroinvertebrates – if it happened – could adversely affect fish or bird populations. We heard that food was unlikely to be limiting for those populations, so even if a reduction occurred, effects would likely be minor. We note that this conclusion is reinforced by further modelling reported in the section 32 analysis for PPC1 which suggests that changes in summer *Deleatidium* productivity under either 1:1 or 30 cumec gap flow regimes would be less than minor. We conclude similarly, that such effects would be less than minor.
- 7.21** The conditions of consent will require some periodic monitoring and assessment of the effects of the CPW take on nuisance growths and on macroinvertebrate production.

#### **Native Fish**

- 7.22** Our conclusion in Minute 9 as to potential effects on native fish remains applicable: *"Given the low density of the migratory fish present and the common widespread distribution of upland bully we conclude that for the range of scenarios canvassed so far, the effects on native fish populations in the Waimakariri River would be low."*

#### **Effects on Sediment Transport and River Morphology**

- 7.23** At paras 9.116 and 9.117 of Minute 9 we concluded that *"effects of a maximum 25 cumec take on sediment transport in both rivers would be minimal. The effects on channel landforms, other water intakes, river protection works, gravel extraction and river mouth behaviour are therefore also likely to be insignificant....and that the proposed take is unlikely to have any impact on the complex braided nature of the river, because river morphology is dominated by large floods, which will continue"*. That conclusion still holds.
- 7.24** We did note that we would consider requiring a monitoring condition, probably linked to a review condition, if we were convinced by Dr Hayes' concern that reduced flows could improve water clarity thereby impairing fishability. As discussed below under Salmon Angling Amenity, we have not been convinced that changes to resuspension or settlement of sediment downstream of the CPW take now proposed, is likely to have any more than a minor effect on turbidity or fishability. Nevertheless we are of the view that there should be a requirement for a pre and post take study of this issue.

## Effects on Water Quality including Assimilative Capacity of Pollutants

**7.25** While low river flows may result in slightly elevated water temperatures in the Waimakariri River, we concluded in Minute 9 that even if that happened, thermal refuges will remain, and temperature-sensitive species would be able to use these refuges to avoid thermal stress. We noted the similarity to the situation with the Rangitata Diversion Race take of 30 cumecs from the Rangitata, where flood disturbance was found to dominate any temperature effects. Dr Meredith noted the benefits of freshes for mitigating temperature increases between the Gorge and OHB, which in summer can move from 16-18 up to 22-23 degrees. He noted that fish cease being active at around 19 degrees. Allowing freshes to pass has the added benefit of refreshing (reducing) water clarity, which benefits both fish movement and angling.

**7.26** We are of the view that the minimum flow, flow-sharing, and the summer fresh regime discussed earlier, will adequately mitigate any potential temperature effects of the revised CPW take, to the point that consequential effects will be minor.

## **8. RECREATIONAL FLOW REQUIREMENTS**

**8.1** In Minute 9 we concluded that boating and angling amenity were among the values potentially most impacted by the CPW proposal. We concluded that the original take proposal would not be sustainable in large part because of these impacts. We noted the following:

*"As Mr Taylor noted for CPW, the Waimakariri and Rakaia Rivers, are nationally important for tourism. The Waimakariri River also has the highest recreational usage of any South Island river, with uses including salmon angling, trout angling, estuarine fishing, jet boating, picnicking, walking, swimming, whitebaiting, power boating, water skiing, jet skiing, yachting, canoeing, rafting, bird watching, mountain biking, hunting, river crossing training and sight-seeing.*

*The Waimakariri River is the most popular river in Canterbury for jet boating and the most heavily boated river in New Zealand. The lower reaches also provide opportunities for relatively easy but interesting kayak trips. The Coast to Coast multi-sport race in February is the best known of all the events on the river. The Waimakariri Gorge Bridge area is used as a transition point from paddling to cycle racing. Recreation events include three kayaking events held in December, February and May, which attract hundreds of participants in total. The annual Rangers Salmon Fishing Competition at the Waimakariri Mouth is in March. Commercial jetboating is mainly in the gorge, which is above the areas now being considered for the Waimakariri intake."*

### **Flows for Kayaking**

**8.2** We concluded in Minute 9 that optimal flows for kayaking are in the range 80 – 150 cumecs (measured/residual OHB flows). There was some variance of opinion as to whether flows from 70 to 80 cumecs fall in the preferred or less preferred range. There was consensus that flows of between about 60 to 70 cumecs are adequate but becoming marginal, because they present some risk of damage to race boats and are less enjoyable than higher flows. 50 cumecs was considered by kayakers to be the minimum acceptable flow. We note that Mr Duncan has used the full flow range 50 – 150 cumecs year round as the suitability range for kayaking in his PPC1 assessment for ECan. This includes some flows

which are marginal (50-60 cumecs) so we have focussed on the full range 60-150 cumecs as suitable for kayaking.

- 8.3** We concluded in Minute 9 that any increase in the frequency and duration of flows below 60 cumecs would, depending upon timing, have a significant effect on kayak amenity. Any increase in the frequency or duration of flows between 60 to 80 cumecs would have some adverse effect but not as great. We also noted that kayakers prefer variability in flows and do not favour flat-lining, particularly at sub-optimal flows. In that context the PPC1 which has additional flat lining at a flow of 70 cumecs, which is adequate but not preferred, is not necessarily as desirable as the CPW 1:1 flow sharing.
- 8.4** We refer to Table 2 and our synthesis table of the change in the average number of days in each flow band (Table 3). It is apparent that the revised CPW proposal will draw flows into the 50-60 cumec range for on average 8 more days each year (predicted scenario). The occurrence of flows in the 60-70 cumec range is not greatly affected (1 day more on average) there would on average be 4 days less each year in the 70-80 cumec flow band.
- 8.5** With the assistance of Mr Duncan we have added to our Tables 2 and 3 the figures for the 40-50 cumec flow band (which we had not asked Mr Tipler to provide). The CPW proposal results in an average increase of around 11-13 days per year of flows in the 40-50 cumec range (approximately a 24% increase) and 19 days over the 40-60 range. Given that flows of less than 50 cumecs are regarded as unsuitable for kayaking and flows in the 50-60 cumec range are marginal, it is clear that CPW proposal will cause a reduction in kayaking amenity.
- 8.6** The 30 cumec gap option shows a large increase in days within the 70-80 cumec band (some 22 days/year) and no change for lower bands. This is expected as taking would not begin until 71 cumecs (41+30). Flows in the higher suitability ranges for kayaking would be drawn down into the less preferred range even under the 30 cumec gap regime. While at first sight the increase in flows in the 70-80 band may seem desirable, as noted above, much of this increase would be as a result of the flat lining at 70 cumecs and there would be less variability in the 70-80 cumec flow range than under the CPW proposal.
- 8.7** Clearly any substantial increase in flows of less than 70 cumecs during periods of high kayak usage of the river would reduce amenity values. We noted in Minute 9 that "*the summer regime would need to largely maintain suitable flows at least at weekends, and during holidays and afternoons*".
- 8.8** As shown in Tables 2 and 3 above, the CPW take (predicted without BCIL) would increase the number of days in the 50-70 flow range by on average 7 days per year.
- 8.9** We do note that the CPW proposal will no longer affect the winter training or the winter race series, since it does not require winter water. However it does have the potential to have some impact on training for the Coast to Coast event during the summer, since some of that training occurs downstream of the proposed intake.
- 8.10** We have concluded that an additional condition is needed to mitigate these potential effects.
- 8.11** We favour something along the following lines to further mitigate potential effects on kayaking, jet boating and salmon angling amenity values:

- No taking by CPW (under this B permit consent) at unmodified OHB flows of below (say) 75 cumecs between 9am and 9pm on Saturdays and Sundays, each weekend between November and March inclusive, and on all public holidays, and on every day during the period commencing the Friday before Christmas each year through to the end of February.

**8.12** The objective of the condition would be to reduce the occurrence of flows below 55 cumecs at OHB during the peak usage periods. We have concluded that with this additional mitigation measure or similar, the effects of the take regime on kayaking will be no more than minor. We also observe that this additional mitigation will also further reduce the potential for adverse effects on jet boating amenity, fishing amenity and other instream values. Tables 2 and 3 suggest that this additional restriction would not in fact be applied very often and therefore should not be particularly onerous for CPW. However, it would be useful if CPW could model how often and how much this restriction (or whatever variations may be proposed) would apply.

**8.13** These are our tentative views as to an adequate mitigation regime. We would like to hear from the kayaking and jet boating submitters and from CPW as to the merits of our suggestion. An alternative or additional approach may be to limit afternoon or early evening takes on say 2 out of 3 weekdays over summer.

### **Flows for Jet Boating**

**8.14** In paras 9.18 to 9.21 of Minute 9 we summarised jet boating usage of the Waimakariri below the Gorge:

*"The majority of launching occurs at the SH1 bridge and hence the section from there to the pylons is the most heavily used part of the river and the most heavily used river reach in the country. This is also the section which novice and intermediate drivers use the most.*

*The reach from the Pylons to the Gorge bridge is well used but not as much as the lower reach. It is the flows in the section downstream of the Waimakariri Irrigation Ltd (and eventual Ngai Tahu) intake to SH1 which are most critical. That is because there are multiple braids in the Pylons (Crossbank) area and those braids can become quite shallow and/or narrow at lower flows. This increases the risk of grounding, and conflict with kayakers and anglers.*

*At low flows this area can become quite challenging and there is an increased risk of accidents particularly for novice to intermediate drivers and their passengers. There is also a greater potential for conflict with kayakers and anglers. Jetboating occurs all year round and can occur at all times from dawn to dusk. Some anglers use jetboats for access. The most use occurs in summer, particularly from late afternoon, at weekends, public holidays and during the December-January holiday period."*

**8.15** Despite quoting Mr Adams at para 9.23 of Minute 9, we appear to have reached an erroneous conclusion in the following paragraph about the flow requirements for jet boating, probably because of confusion between measured and unmodified flows. We concur with Mr Duncan in his analysis for PPC1 that most jet boaters prefer actual flows in the range 40-70 cumecs (rather than our 70-100 cumecs) and mainly in the months of December to March. Mr Adams noted January to February as particularly important jet boating months.

- 8.16 Periods when flows are drawn below 50 cumecs in summer would have some impact on novice jet boaters between the pylons and the OHB. Figure 3 indicates that between October and April flows below 50 cumecs would occur for 6% more of the time (34-28%). There would be no change in the occurrence of flows below 40 cumecs. The statistics in Table 3 indicate that flows in the 50-70 cumec range would occur as often, or more often, for the 'predicted' and 'available' CPW scenarios, compared to pre-CPW. However as discussed in relation to kayaking, there would be quite a substantial increase in days where flow is in the 41-50 cumec range and also a lesser but still significant increase in the days in the 50-60 cumec range. Our interpretation of the jet boating evidence is that flows in the 41 to 55 cumec band are likely to be unsuitable, or at least higher risk, for novice boaters. Accordingly the CPW proposal would have some impact on jet boating amenity.
- 8.17 We are of the view that this impact could be adequately mitigated by way of the proposal we have suggested earlier in our discussion of kayaking. We have suggested that times of likely high jetboating and/or kayaking use, CPW should not commence taking until an unmodified OHB flow of 72 cumecs. Another way of addressing this would be to require CPW at these times, to not cause the flow at the OHB to drop below 55 cumecs when that would not otherwise have occurred. However the merits and practicalities of this suggestion will need to be considered further. For example, there is perhaps a case for setting this additional restriction at a residual flow of 60 rather than 55 and or for extending it into March to capture the remainder of the salmon angling season.
- 8.18 We will need to hear further from CPW, jet boaters, kayakers and fishing interests before we can finalise this condition. However for present purposes we have concluded that a condition of this general type can adequately address the potential adverse effects of the proposed take regime. In passing, we observe that during the periods this restriction would apply there may be no need to also have one to one flow sharing once the flow is over the trigger flow.

#### Flows and turbidity for salmon angling

- 8.19 We concluded at para 9.51 of Minute 9 that current residual flows of around 70-100 cumecs are preferred for angling, but that optimal conditions for salmon angling depend not only on flow but turbidity. Optimal turbidity is around 0.4 – 1m clarity as measured by the black disk method. We concluded at para 9.75 that *"there is obvious potential for conflict between angling needs and CPW's desire to take as often and as much as possible (up to 25 cumecs) during the irrigation and fishing season."*
- 8.20 Mr Duncan as part of ECan's section 32 assessment for PPC1 has evaluated the effects of various allocation regimes in terms of effects on a preferred salmon angling flow range of 70-100 cumecs for December to April inclusive (as well as for river birds, discussed above). He concluded that the 30 cumec gap (his 27 cumec gap) between A/B1 and a 40 cumec B permit block would adequately meet flow requirements for salmon angling if one accepts the optimal flow range as 60-100 cumecs.
- 8.21 Mr Tipler used Mr Duncan's analyses to show that the revised CPW proposal would increase the incidence of flows in the preferred 70-100 cumec range, whether the 'predicted' or 'available' take scenarios are used. His calculations show the 'predicted with BCIL' CPW take would **increase** the time that December to April flows are 70-100 cumecs, from the current 15.7% to 18.4% (and 17% if

'available' water were taken by CPW). He accepted that the 30 cumec gap option would improve this to 22% of the time. Also see Tables 2 and 3 earlier.

- 8.22** The fact that the CPW proposal would increase the amount of time that flows would be in the preferred flow range, does not necessarily mean that it would increase fishing opportunity. We accept Dr Hayes' point that the reason the preferred upper flow limit for salmon angling is 100 cumecs is not because of the flow *per se*, but because turbidity is often too high above 100 cumecs. We agree that drawing higher flows from the over 100 cumec range into the sub-100 cumec flow range through extraction will be drawing a portion of unsuitable high turbidity water into the **currently** preferred range. Mr Tipler calculated that this unsuitable portion would be less than 50% of the flows in the range.
- 8.23** As can be seen from Table 1, current residual flows at OHB of 107 cumecs (above about which flow, the river is usually too turbid for good fishing) coincide with an unmodified flow of 127 cumecs. This would be a flow of about 80 cumecs under both the PPC1 and the CPW proposals. In other words, under either proposal, residual flows of 80-107 cumecs which are currently usually fishable, would become generally unfishable because they would be derived from flows which are too turbid.
- 8.24** At the other end of the range, flows of 50 to 60 cumecs, which are currently usually too clear for good fishing, would become suitable for fishing in terms of turbidity because these residual flows would be at times/flows where turbidity is generally suitable.
- 8.25** Currently the river is considered too clear for fishing at a recorded flow of below 50 cumecs. These coincide with an unmodified flow of 70 cumecs. With CPW, an unmodified flow of 70 cumecs will coincide with a recorded flow of around 45 cumecs. Under CPW, flows in the 45-50 cumec residual range will be starting to become too clear and flows above a residual of about 75 will be starting to become too turbid.
- 8.26** Accordingly, we have focussed on the amount of time that the river would be in the residual flow range of 50 to 75 cumecs, where turbidity will generally be suitable for fishing (currently at unmodified flows of about 70 to 120 cumecs at OHB).
- 8.27** Table 3 above, shows that under the CPW proposal the number of days in the 50 to 70 cumec range will **increase** as compared to the current consented situation. The PPC1 would increase this even more, however under PPC1 the river is flat lined at flows of around 70 cumecs, which equate to current residual flows of 74 to 96 cumecs, which are within the optimal turbidity range. In our view, the CPW regime which maintains natural variability within this range, is preferable to PPC1 which would have the effect of maintaining the river at a stable flow during the best turbidity condition. We heard from anglers, and others, that variability of flow is valued and there was also some evidence that slight variations of flow, as would occur with one to one flow sharing, may stimulate fish movement through the system.
- 8.28** A second approach is to assess the occurrence of residual flows when the optimum turbidity would occur. We asked Mr Duncan to evaluate this. Turbidities occurring within the preferred flow range of 70-100 cumecs would occur within the flow range 57-85 cumecs for the CPW 'predicted' scenario, 55-76 cumecs for the 'available' scenario, and 67-86 cumecs for the 'predicted' take occurring under the PPC1 30 cumec gap option. Importantly, his analysis concludes that "*if turbidity*

*is the main criterion governing fishability, then abstractions do not change the duration that the river is suitable for salmon angling".*

- 8.29** Mr de Joux for Fish and Game noted that while the CPW proposal would increase the number of days within the fishable flow and turbidity range, some of that increase would be at the lower end of the range where Mr Hayes' study suggests that fishable area would be reduced. We accept that this is correct. Tables 2 and 3 confirm this and show that most of the increase is within the 40 to 60 cumec range.
- 8.30** As noted above the number of days in the 40-50 cumec range will increase under the CPW predicted proposal by about 24%. Currently these flows are too clear for fishing, but under CPW, flows in the 45-50 cumec range will often be suitable for fishing in turbidity terms (since they are derived from flows of suitable turbidity).
- 8.31** We accept that CPW residual flows of 45 to 75 cumecs which should have suitable turbidity conditions, may not provide the same angling amenity as current residual flows of 52 to 101 cumecs, from which these new residual flows would be derived (see Table 1). This is because at these lower residual flow there will be less fishable water and fewer angling "lies". This is reflected in Mr Hayes' evidence as to the reduction in fishable area with flow.
- 8.32** In summary, flows in this range will generally be fishable in terms of turbidity, but there will be less fishable water available to anglers. It is not clear to us the extent to which this angling amenity will be decreased as a result. In particular, there was little evidence to suggest that "fishable area" between the Gorge bridge and the SH1 is currently a limiting factor for angling or is likely to become so. In wet and dry years the number of days in this range will hardly change. In typical years there will be a modest increase in days within this range. Some of those days will be outside of the peak fishing season and many, if not most, of them will not coincide with weekend days and holiday periods when there is the most pressure on fishable area.
- 8.33** On balance we have concluded that with the additional mitigation discussed above in relation to boating, potential effects on fishing amenity will be minor and sustainable. We accept that the PPC1 regime may better mitigate effects on fishable area, but on the other hand it would result in less variability of flow during times of fishable flow. We are not convinced that the PPC1 flow regime would be significantly better for angling.

#### **Flow Requirements for Whitebaiting**

- 8.34** We commented in Minute 9 that *"intuitively it seems possible that sustained periods at a particular flow (flat lining) may be undesirable"*. With the bypassing of freshes after 21 days at low flows (if they were to occur at all in the spring whitebaiting season) we believe effects of the proposal on whitebaiting are likely to be minor.

#### **Flow Requirements for other forms of Recreation**

- 8.35** In relation to other forms of river *recreation*, we repeat our comments from Minute 9:

*"We heard from Mr Taylor for CPW and Mr Canham for Fish & Game and DOC about the many other recreational uses of the lower river, including estuarine*

*fishing, picnicking, walking, swimming, power boating, water skiing, jet skiing, yachting, rafting, bird watching, mountain biking, hunting, river crossing training and sight-seeing. The Waimakariri is more popular than the Rakaia because of its proximity to Christchurch and its ease of access. We do not have sufficient information to be able to reach any firm conclusions regarding the flow requirements of these users. However, as a general rule sustained periods of low flows are likely to not be preferred."*

- 8.36** The 1:1 sharing proposed in the revised CPW proposal would likely meet the flow variability requirements of such users. The additional mitigation we have suggested in relation to kayaking and jet boating will also assist.

### **Effects on Aquifer Recharge**

- 8.37** We commented as follows in Minute 9 (paras 9.122 and 9.124):

*"A reduction in river flows into the Christchurch aquifers does increase the risk that off-shore groundwater discharge will decline and therefore increases the risk of salt water intrusion to the Christchurch groundwater system, but this is a matter of degree. Our preliminary view is that given that the take would be occurring at relatively low flows, such an effect is unlikely...."*

*Our tentative conclusion is that these risks are not significant given the estimated average steady state losses of 7 to 8 cumecs, but we do consider more monitoring of river-aquifer recharge mechanisms by ECan would be desirable to assist long-term management of the Christchurch aquifers."*

- 8.38** Mr Paul White gave further evidence on behalf of Ngai Tahu at the reconvened hearing as did Mr English. On questioning, Mr White referred to an analysis of the portion of groundwater recharge attributable to flood flows in the Waimak compared to recharge under non-flood conditions where he concluded that *groundwater recharge associated with relatively high flow events in the Waimakariri River is a relatively small proportion of average groundwater recharge. Therefore average groundwater recharge from Waimakariri River is dominated by groundwater recharge from Waimakariri River baseflow.*
- 8.39** This analysis supports the thesis that recharge to the Christchurch aquifers from the Waimakariri is only weakly correlated with flows, and is probably related more to both wetted fairway area and water depth. Mr Tipler indicated in Table 1 of his evidence for the October hearing that the revised CPW proposal would take on average between 77m cubic metres (MCM) annually from the Waimak for the 'predicted with BCIL' and 222 MCM for the 'available' take scenario. These volumes are 27-77% of the 288 MCM calculated for the original 20-25-240 scheme. We also note that Mr Scott's analysis supporting the s32 analysis for PPC1 similarly concludes there would be little difference for groundwater recharge between the 1:1 flow sharing and a 30 cumec gap allocation option.
- 8.40** We are satisfied that the amended proposal from CPW with flow sharing and a much reduced maximum take is unlikely to have any more than a very minor impact on aquifer recharge. Over most of the range of flows, the CPW take will be a very small proportion of overall flow. We also observe that there is little evidence to suggest that the current takes (which in total are of similar magnitude) have resulted in a fall in aquifer levels.

## Effects on Existing Water Users

- 8.41 We commented in Minute 9 that the exercise of B permits (such as CPW's) should not impinge on the reliability of supply for the A permits. Our earlier discussion highlighted the difficulty we have had in determining the exact A permit allocation for the Waimakariri. This will need to be determined and preferably agreed among the relevant parties so that conditions can be set which **avoid** the potential impairment of A permit reliability identified by Mr Callander. It seems to us that this can be addressed by requiring that CPW not to commence its B permit take until a modified flow at OHB of about 65 cumecs, or about 76 cumecs at Otarama. However, this is a matter for discussion in the context of conditions.

## Effects on Māori Cultural Values

- 8.42 In Minute 9 we commented that "... *we have no specific cultural concerns against which to judge impacts of a water take from the Waimakariri.*" Ngai Tahu presented further submissions relating to Te Waihora, archaeological sites, mixing of waters, and groundwater impacts but did not express concerns about the take from the rivers. Accordingly we rely upon the ECan Regional Policy Statement and WRRP for guidance on cultural values of the rivers.
- 8.43 We are satisfied that the proposed take regime is unlikely to impact upon the mauri of the river or the relationship of Māori to the river.

## 9. COMPARISON OF THE CPW AND PPC1 TAKE REGIME

### Mitigation of instream effects

- 9.1 We have discussed this in some detail above. We accept that the PPC1 proposal would better mitigate the impacts of the CPW take on:
- The extent of suitable angling water and number of lies at the lower end of the preferred flow and turbidity range.
  - The amount of time that flows will be in the sub optimal or marginal flow ranges for jetboating and kayaking.
  - The amount of time during the bird nesting season when flows are in the less than 55 cumec range at which there may be some increase in predation.
- 9.2 We have nevertheless concluded that on balance, the CPW proposal with some additional restrictions which we have suggested, will provide adequate mitigation of these effects. We do not accept the CPW suggestion that its proposal will result in "betterment" in terms of any of these parameters.
- 9.3 We will need to decide on the final form of the requirement for additional restrictions on take to address these impacts. That is likely to require some limited further modelling by CPW of various options. That modelling should focus on further reducing the predicted increase in the time that the river would spend at flows in the 40-60 cumec ranges and in particular the 40-50 cumec range, during the peak summer and autumn periods (in particular December, January and February). We would welcome input from boating and fishing submitters and ECan officers as to an appropriate condition. As discussed earlier, on the days when this restriction would apply there may be no need to combine it with one to one flow sharing.

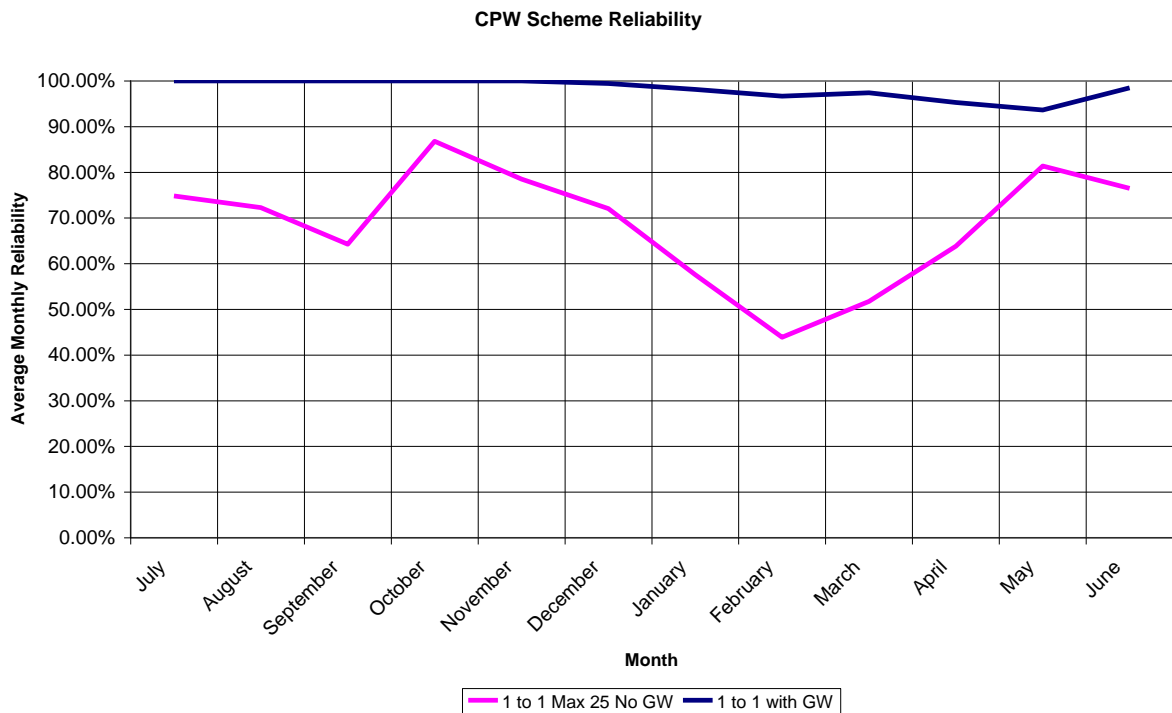
## Effects of the PPC1 proposed on CPW

9.4 Mr Tipler for CPW noted that there would be significant consequences for any scheme (including CPW) that involves water harvesting from the Waimakariri River, if the PPC1 30 cumec gap regime was adopted. This is primarily because of the poor level of reliability of supply created by limiting takes to moderate-high flows.

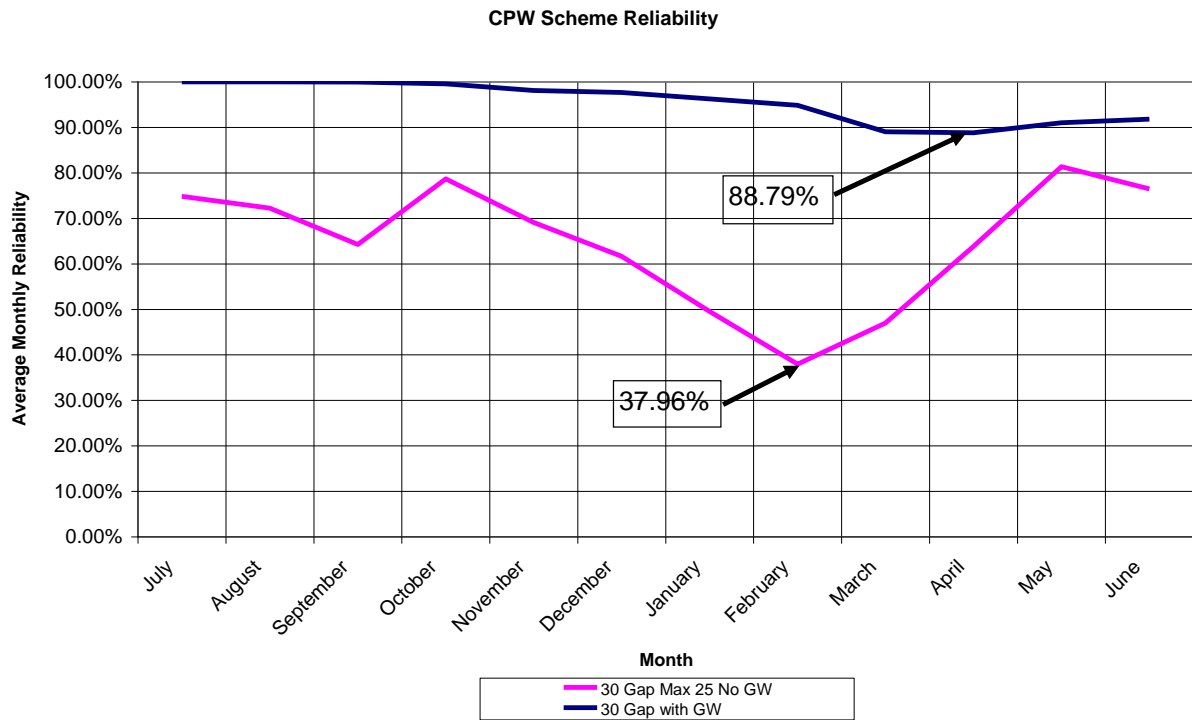
9.5 In response to our request, he presented the scheme reliability diagrams below (figures 4 and 5) and concluded:

*"The significant effects are a lowering of the reliability of the groundwater augmented half of the scheme from a minimum 95% in May to [a minimum of] approximately 89% in March. The second major effect is the lowering of the run-of-river half of the scheme from 45% in February to 38%."*

**Figure 4: Revised CPW Scheme Reliability with 1:1 flow sharing**



**Figure 5: Revised CPW Scheme Reliability with 30 cumeec gap**



**9.6** Mr Macfarlane provided estimated costs for on-farm storage to tide mixed or arable farmers over the January to March low reliability period. Based on this, Mr Tipler concluded that the cost to CPW shareholders of implementing the '30 cumeec gap' option as being more than \$100m.

**9.7** Mr Duncan subsequently provided the following summary of reliability under various water allocation options, based on an October to March irrigation season. The first column of Table 2 shows the proportion of time that any B Block water is able to be taken the second column shows the proportion of time the full take can be exercised, and the third column shows the average irrigation seasonal volume that would be available for abstraction by CPW for each of the abstraction options.

**Table 5 Effects of the proposed regimes on the ability of CPW to take water**

Flow regime	Percent of the irrigation season when B take starts <sup>1</sup>	Percent of the irrigation season when full take is available	Volume available (million m <sup>3</sup> )
CPW Predicted 1:1	80	48	436
CPW Available 1:1	80	48	544
Predicted 20 gap	62	44.5	419
Available 20 gap	62	44.5	524
Predicted 30 gap	54	39.5	404
Available 30 gap	54	39.5	498

<sup>1</sup> 1 cumec available for 96% of the time for all options

**9.8** The B take is significantly more restricted under the 30 cumec gap scenario than the 1:1 flow sharing, and this is also evident from Mr Duncan's flow duration curves presented earlier.

**9.9** We have concluded that the modest additional instream benefits from the PPC1 do not warrant the significant economic cost in terms of lost reliability to irrigators. As will be seen from our analysis above, it is debatable whether the PPC1 would deliver any significantly greater mitigation of instream effects than the CPW proposal would in conjunction with an additional condition targeted at times of peak recreational usage.

**9.10** We do however appreciate that the PPC1 would provide some additional mitigation and we commend Environment Canterbury for having taken a step to rectify the deficiencies in the current WRRP. However, on balance we have concluded that the CPW proposal in conjunction with a more targeted approach to further mitigation, would better achieve sustainable management in this case.

## **10. EFFICIENCY AND NECESSITY**

**10.1** Section 7 of the Act requires us to have particular regard to the *efficient use of natural and physical resources*.

**10.2** Policy 5.2 of the WRRP is to *promote efficiency in the use of water* and the explanation notes that ... *Efficiency involves both technical efficiency (avoidance of waste) and allocative efficiency (using water where it has greatest value). The reasonable and efficient use of water are matters required to be considered as part of the resource consent application process*

**10.3** The Plan also expressly reserves discretion in relation to:

*The reasonable need for the quantities of water sought, and the ability of the applicant to abstract and apply those quantities.*

**10.4** With one exception, we are satisfied that the proposed take regime and the intended use of water are efficient. In terms of *technical efficiency* the proposed

rates of use of water and restrictions on that are in accordance with the policies of the Proposed Natural Resources Regional Plan and are in our view efficient.

- 10.5** In terms of *allocative efficiency* we are satisfied that the use of water for irrigation is an efficient use of the resource. We accept that the water also has value for the environment if left in the river. However we are satisfied that the proposed take regime will adequately protect instream values. Accordingly, we are of the view that the limited quantity of water which can be taken under the proposed regime will be a better use of that resource than leaving those particular flows in stream.
- 10.6** There are no doubt other potential productive uses for the water, which may or may not be "better" or more productive uses of the water, however we must consider the proposal before us. The WRRP does not favour any particular form of out of stream use of water. The Canterbury strategic water study does provide some support for additional irrigation once in-stream needs are met.
- 10.7** One could mount an argument that reserving the water for use in a scheme, such as was originally proposed, with large scale storage would be a more efficient use of water, however there is no longer such a proposal before us. Furthermore, granting consent to CPW will not preclude it or others from exploring further storage options, which may make the use of water more efficient.
- 10.8** The proposed B gap regime in PPC1 perhaps implies that the Council currently sees keeping these particular flows in the river (ie between 74 and 104 cumecs at Otarama) as more efficient than allowing them to be taken for productive purposes. However, we have reached a different conclusion based on the evidence before us.

#### **Taking of winter water**

- 10.9** The Applicant seeks to have the same conditions applying to taking of water outside of the irrigation season as would apply during the season. We are not satisfied that this would be efficient. Nor in our view has CPW demonstrated that it has a "*reasonable need*" to access any Waimakariri water (or at least B permit water) out side of the irrigation season. Its amended scheme will only have limited on farm storage and no large scale off farm storage. Even if Lake Coleridge can eventually be utilised, that would not require winter water from the Waimakariri.
- 10.10** It seems to us that and during the winter on farm storage can be topped up towards the end of the irrigation season, or with Rakaia water, and if needs be Waimakariri A permit water. We also note that CPW will have access to additional A permit water during the winter to the extent that this is not being utilised by existing consent holders (for example NTPL does not have consent to take outside of the irrigation season).
- 10.11** We can understand CPW wanting to reserve the ability to develop large scale storage other than Lake Coleridge, however we are not convinced that it is appropriate for us to grant consent for something which is purely speculative at the moment. To do so would deprive others such as WIL and NTPL, the opportunity to make their own applications for winter water, for use in storage. The Act's allocation regime is a first in first served regime, unless the relevant plans provide otherwise (which they do not). It does not encourage "booking" of water where there is no current demand and the WRRP discourages that.
- 10.12** There is also the possibility of CPW utilising winter water for recharge of ground water, so as to in effect use the aquifers as storage. However, currently that

possibility (which may well have considerable merit) has not been fully explored and is not before us.

- 10.13** We are also concerned that if we were to grant consent to CPW for winter B permit water, which it does not require, it could then potentially transfer that part of the consent to another person either temporarily or for the duration of the consent. CPW has not indicated that it would do this, but it is a possibility. While this may arguably be an efficient way to move water allocations to where the demand is, that is speculation. Those who may seek water outside of the irrigation season should make out their own case for having a "*reasonable need for the quantities of water sought*" (an assessment criterion from the WRRP).
- 10.14** We would like to consider submissions from CPW, ECan officers and any others with a direct interest as to how best to address this in conditions. As we see it there are a number of options:
- Limit all of the CPW take (A and B water) to the irrigation season as was done for the NTPL take.
  - Limit all B take by CPW to the irrigation season.
  - Allow CPW to take winter water, but only up to such volumes as are required for use by existing shareholders within the CPW command area.

#### **Lapse period and term of consent**

- 10.15** This brings us to a related point. CPW has sought a 10 year lapse period for its consents. This would give it 10 years to have the scheme commissioned and taking water. We appreciate that even with the removal of the reservoir, dam, tunnel and upper intake from the equation, this will be a very costly scheme and it will not proceed until funding is secured. Nevertheless with the deletion of the most costly elements of the scheme, we think that it is not unreasonable to require CPW to have made "*substantial progress or effort towards giving effect to the consent*" (RMA s125(1)(b)(i)) within 8 years of the resolution of commencement (which allows for any appeals). If we make the lapse period at 8 years, CPW can apply for an extension if needs be at the end of that period. Provided that CPW has been making substantial progress with property acquisition, funding and final design, there would be no basis for a declining an extension even if it would take another few years to get to the point of commissioning.
- 10.16** If we were to grant a 10 year lapse period, then with extensions, that could mean that that the take would not commence for up to, say, 15 years after commencement or over 20 years from when the application was made. In our view, it would be inefficient to have the resource locked up and unavailable to others for so long. That would also be unfair on the landowners affected by the Headrace. This is a preliminary view and we will accept submissions on this point. (We note that we included an 8 year lapse period on the ACWT take).
- 10.17** CPW seeks a 35 year consent and we consider that this is an appropriate term given the very significant investment which is required and the fact that the consent may not be utilised for the first 5-10 years. There will of course need to be adequate monitoring and review conditions. The latter will ensure that if adverse effects are greater than has been predicted they can be addressed by way of additional restrictions on the take.

**11. CPW ACCESS TO UNALLOCATED A AND B1 WATER AND TO ALLOCATED BUT UNUTILISED WATER**

**11.1** In relation to both the Waimakariri and the Rakaia, CPW seeks to take water at flows below the restrictions which would otherwise apply, at times when that water is either not allocated to others, or at times when it is allocated but the full allocation is not being utilised.

**11.2** The NTPL consent for its Waimakariri take includes a condition which provides that:

*No water shall be taken between 1 May and 30 August inclusive other than water required for maintenance and testing purposes. The consent holder will give 48 hours prior written notice to the Canterbury Regional Council before commencing such temporary use.*

Except to that limited extent, it has no allocation of water during those months.

**11.3** It is also arguable that the other irrigation takes on both rivers, such as the WIL and BIL takes, are limited to take during the irrigation season because that was what was intended at the time of the application. However, that is a matter for the courts not for us to determine.

**11.4** As discussed above, we have concluded that CPW has not established that it needs access to B permit water outside of the irrigation season and we are not entirely convinced that it requires access to any more than 1 cumec of A water during the winter to keep a maintenance flow in its canal. It or the Canterbury Regional Council may be able to make out a case for utilising winter water for aquifer recharge, but that is not before us. Accordingly, we are of the view that unless we can be convinced otherwise, the same or similar condition, as imposed on NTPL, should apply to CPW.

**11.5** During the irrigation season CPW seeks access to water from both rivers which has been allocated, but is not being used at any particular time. It is not clear to us the extent to which existing allocations are under utilised. Certainly the Barhill Chertsey Irrigation scheme water is unutilised until the scheme is commissioned, and there may be other allocations which are not utilised to their maximum at all times.

**11.6** We can see no difficulty, in principle, with CPW taking water which has already been allocated to others at times when the consent holders are not fully utilising their allocations. The effects of such takes are already within the "*existing environment*" baseline. We accept that there may be some impacts as compared to the current situation if consents are fully utilised at all times during the irrigation season, however that effect is envisaged by the consents and the WRRP.

**11.7** On one view the consent holder's permission is not required for this to occur, since a consent does not confer ownership of the resource, and it is difficult to see how taking of water which is not required could amount to a substantial derogation from the rights conferred by the consent. However, we do not need to grapple with this issue since CPW is content to reach agreement with others via the mechanism of a water users group or otherwise.

**11.8** The WRRP makes provision for the minimum flows in the plan to be achieved by "*reallocating available water within a "Water Users Group"*." Under PPC1 that would seem to be the only means of reallocating water, other than by way of

transfer. Currently it may also be possible for two or more consent holders to agree amongst themselves as to the temporary "transfer" of an allocation, and that is what would need to occur on the Rakaia unless a Water Users Group is set up.

- 11.9 We have not revisited CPW's proposed conditions to deal with this issue. However, we did include conditions to this effect in relation to the Ashburton Community Water Trust (**ACWT**) take on the Rakaia. CPW, ECan officers, NTPL, WIL and other consent holders should endeavour to reach agreement on an appropriate condition over the coming months. It may simply be a matter of requiring CPW to meet the current 41 cumec minimum flow (or whatever that translates to at Otarama) and meeting the one to one flow share at flows above that, as well as the summer minimum for recreational amenity which we have outlined above (or some variation of that). We seem to recall that the NTPL consent may also allow it to access unutilised A permit water. If that is the case then CPW and NTPL will need to agree as to who is "first in" for that.

## 12. ASSESSMENT AGAINST PLAN PROVISIONS

- 12.1 We now return to assess the proposed take regime against the operative plan provisions and PPC1 objectives and policies.

- 12.2 In terms of the operative plan (WRRP) the starting point is Objective 5.1, which is not amended by PPC1 and rule 5.1 and which limits our discretion to:

*The effects the take has on river flows, and consequential effects on those values identified in (a) to (h) of Objective 5.1, **near the point of take.***

- 12.3 For the reasons discussed earlier (and in Minute 9) we have concluded that we are not limited to considering effects "near the point of take". However, in case we are wrong in that view, we record that in the context of this plan, we regard the words "*near the point of take*" as including the river between the Gorge Bridge and at least the Willows or more sensibly, all the way to the sea.

- 12.4 Accordingly under the operative plan, WRRP, the provision is objective 5.1. The subsequent policies including the amendments proposed in PPC1 are intended to serve that objective. We set out the key provisions below:

### **Objective 5.1**

*Enable present and future generations to gain cultural, social, recreational, economic, health and other benefits from the rivers, lakes and wetlands in the Waimakariri River Catchment, and from hydraulically connected groundwater while:*

- (a) safeguarding their existing value for efficiently providing sources of drinking water for people and their animals;*
- (b) safeguarding the life-supporting capacity of the water, including its associated: aquatic ecosystems, significant habitats of indigenous fauna, and areas of significant indigenous vegetation;*
- (c) safeguarding their existing value for providing mahinga kai for Tangata Whenua;*
- (d) protecting wahi tapu and other wahi taonga of value to Tangata Whenua;*
- (e) preserving the natural character of rivers, lakes and wetlands and protecting them from inappropriate use and development;*
- (f) protecting outstanding natural features, and landscapes from inappropriate use and development;*
- (g) maintaining and enhancing amenity values; and*
- (h) protecting the significant habitat of trout and salmon.*

### **Policy 5.1**

*Set and maintain water flow, water level and water allocation regimes and control the taking, use, diversion, discharge and damming of surface water, and the taking of water from hydraulically connected groundwater, while achieving (a) to (h) of Objective 5.1, so that:*

*(b) below Woodstock (Figure 4 and Map 1):*

*(i) the braided character of the Waimakariri River, aquatic ecosystems and habitats, wetlands, amenity based on the river, and groundwater recharge from the river, are protected;*

### **Policy 5.2**

*Promote efficiency in the use of water.*

### **Matters restricting exercise of discretion**

*Environment Canterbury will restrict the exercise of its discretion when deciding to grant or*

*refuse a resource consent, and in imposing any conditions, to the following matters:*

*(a) The reasonable need for the quantities of water sought, and the ability of the applicant*

*to abstract and apply those quantities.*

*(b) The availability and practicality of using alternative supplies of water including alternative public or community reticulated supplies.*

*(c) In the case of takes from hydraulically connected groundwater:*

*(i) the effects the take has on surface water flows including the cumulative effects of the combined take from a person's bore field;*

*(ii) the effects the take has on neighbouring bores; and*

*(iii) the effects the take has on other authorised takes.*

*(d) For surface takes:*

*(i) the effects the take has on river flows, and consequential effects on those values identified in (a) to (h) of Objective 5.1, near the point of take;*

*(ii) the effects the take has on other authorised takes.*

*(e) The collection, recording, monitoring and provision of information concerning the exercising of the consent in accordance with Section 108(4) of the RM Act*

- 12.5** In essence the key assessment criteria under the WRRP remain unchanged under PPC1 which is focused on a particular method to achieve objective 5.1, rather than on changes to the objective or assessment criteria (except the removal of the words 'near the point of take'). We now discuss these key criteria.

### **Enable present and future generations to gain cultural, social, recreational, economic, health and other benefits from the rivers, lakes and wetlands in the Waimakariri River Catchment, and from hydraulically connected groundwater**

- 12.6** We have concluded that the proposal will allow significant economic benefit to be derived from the use of water from the river by present and future generations without significantly compromising the ability of the river to provide for the cultural, social, recreational, health or other needs.

### **Safeguarding their existing value for efficiently providing sources of drinking water for people and their animals**

- 12.7** The plan and existing consents provide for an allocation for these purposes. We are satisfied that the proposed take will not compromise the availability of ground

water for drinking supply purposes in Christchurch or on the north side of the river.

**Safeguarding the life-supporting capacity of the water, including its associated: aquatic ecosystems, significant habitats of indigenous fauna, and areas of significant indigenous vegetation**

- 12.8** We are satisfied that the proposed take will safeguard the life supporting capacity of the water. In particular we are of the view that the proposed take regime is unlikely to increase the presence of nuisance algal growths, is unlikely to have any more than minor adverse effects on aquatic ecosystems and in particular native fish, trout and salmon and macro invertebrates. We also concluded that with the mitigations proposed it is unlikely to have any more than minor effects on the habitat of significant bird species.

**Protecting wahi tapu and other wahi taonga of value to Tangata Whenua;**

- 12.9** We accept that the Waimakariri River is a taonga. We are satisfied that the proposed take regime will adequately protect that taonga and will not interfere with the relationship of Māori to the river.

**Preserving the natural character of rivers, lakes and wetlands and protecting them from inappropriate use and development**

- 12.10** We are satisfied that the proposed take will not of itself compromise the natural character of the river in any more than a minor way. In particular, the proposed one to one take regime allows for natural variability in flows to be maintained. We accept that the associated infrastructure will compromise the natural character of the river to a limited degree, but on balance we do not consider this to require that the take be declined. We do not regard the take or associated infrastructure as being an inappropriate use or development of the resource. We are also satisfied that the take will not affect the braided characteristics of the river.

**Protecting outstanding natural features, and landscapes from inappropriate use and development**

- 12.11** We have set out our conclusions in relation to this matter in Minute 11.

**Maintaining and enhancing amenity values**

- 12.12** We are satisfied that the proposed take with the various mitigations proposed will not have any significant adverse effects (including cumulative effects) on recreational amenity values. The take will slightly reduce amenity values from current levels. In particular, there will be a slightly greater occurrence of lower flows at which the fishable area will be reduced in the middle reaches of the river. To that extent, fishing amenity values will not be maintained or enhanced but we have concluded that this relatively minor impact is sustainable when weighed against the economic benefits of irrigation.

**Protecting the significant habitat of trout and salmon**

- 12.13** We are satisfied that the proposed take regime will protect the significant habitat of trout and salmon in the river.

**The braided character of the Waimakariri River, aquatic ecosystems and habitats, wetlands, amenity based on the river, and groundwater recharge from the river, are protected**

12.14 We are satisfied that the proposed take regime will adequately protect all of these characteristics from harm.

**Promote efficiency in the use of water**

12.15 We are satisfied that the proposed use of the water which will be taken will be efficient. The proposed use is not wasteful and will be limited to efficient application rates. We also consider that the proposed use is efficient in terms of 'allocative efficiency' (using water where it has greatest value). The proposed take regime will protect instream values and the water which can be taken will have high value for irrigation and food production. Whether that is the use which has greatest value is not something which we can determine.

**The reasonable need for the quantities of water sought, and the ability of the Applicant to abstract and apply those quantities**

12.16 We are satisfied that CPW has demonstrated a reasonable need for the quantities of water it has sought during the irrigation season and indeed would prefer have access to more water.

12.17 We are not satisfied that CPW has demonstrated a reasonable need for the same quantities outside of the irrigation season and will include a condition to limit the take to what is needed for the purposes of its currently proposed scheme.

**The availability and practicality of using alternative supplies of water including alternative public or community reticulated supplies**

12.18 We have considered the availability of alternative supplies of water for the scheme and have concluded that there are currently no such supplies available to the CPW scheme area other than those which CPW has targeted. In our view, the amended scheme makes more efficient use of existing groundwater supplies than the original scheme.

**The effects the take has on river flows, and consequential effects on those values identified in (a) to (h) of Objective 5.1, near the point of take**

12.19 We have addressed these effects in some detail in this Minute. We are satisfied that the proposed take regime will ensure that any adverse effects are sustainable.

**The effects the take has on other authorised takes**

12.20 Conditions will be imposed to ensure that the take will have no significant effect on the ability of other consent holders to take at the same rates and volumes as would be the case without CPW.

**Proposed Plan Change 1**

12.21 We have discussed the weight to be given to PPC1 earlier. PPC1 does not change Objective 5.1 or the first part of Policy 5.1 of the WRRP. The new Policy 5.1 (2) and resulting changes to rules is a method of achieving Objective 5.1. We consider that the take regime proposed by CPW, along with the minor

adjustments which we have signalled, will achieve the same purpose and will also achieve the purpose of the first part of Policy 5.1 which has not changed.

- 12.22** We have focused on the objectives of the WRRP. We have considered the rationale for the proposed gap between the B1 and B blocks, and have concluded that the gap is not required to mitigate the effects of the CPW take. The first rationale is to avoid "flat lining" the river. The CPW proposal avoids this and maintains natural variability better than the PPC1 proposal. The PPC1 proposal would increase flat lining, albeit that the additional flat lining would be at a flow around 70 cumecs which is considered suitable for most recreational activities and instream needs. Such flat lining would be additional to that which currently occurs at 41 cumecs. We are not convinced that having flat lining of the river at 70 cumecs is desirable. The evidence we have heard suggests that maintaining natural variability above the minimum flow is desirable.
- 12.23** The second rationale for the PPC1 regime is to maintain flushing flows "*that are important in washing algal growth and sediment from the river bed.*" As discussed above, we are satisfied that the proposed CPW take regime, including the more precautionary flushing condition, will maintain flushing flows at least as well as the PPC1 regime.
- 12.24** The third rationale for the gap, is to ensure variability for river users. The CPW regime will also do this and in our view, by avoiding flat lining at 70 cumecs may do so better than PPC1.
- 12.25** Another reason for the proposed gap, is to maintain flows for longer periods in preferred flow ranges. As discussed above, we have concluded that the CPW take regime with one modification, achieves this adequately. In our view, the slight reduction that the river will spend in some preferred ranges will not have any significant adverse effects on recreational amenity or ecological values. To the extent that the PPC1 regime would increase the time spent in preferred ranges, as compared to present, we note that CPW is not required to mitigate the effects of existing consented takes. However, we do accept that PPC1 may provide slightly "better" mitigation of effects on recreational amenity than the CPW proposal. We also acknowledge that our suggested additional mitigation measure is in practice a B gap approach albeit that the gap would be rather smaller and would only apply for limited periods.
- 12.26** Finally, the proposed gap is said to provide some leeway for the existing minimum flow to be reviewed if required. We think that this is a matter for future changes to the Plan and for the review process rather than a rationale for a gap.
- 12.27** The documentation in support of the proposed gap does acknowledge that there would be costs in terms of reliability of supply for irrigation. We are not sure whether the Council has fully assessed these costs, in comparison to the benefits of the proposal. We have done so and have concluded that most of the benefits of the PPC1 can be achieved at significantly less lost opportunity cost by way of the proposed CPW 1:1 take regime with the addition of a reduced (10-15 cumec) B gap only applying at times of peak recreational use. In our view this is a more efficient and sustainable outcome.
- 12.28** We appreciate that if our decision is upheld, the proposed amendments to Policy 5.1 and resulting amendments to standards and rules will need to be revised. Whilst we value the work that has been put into PPC1 and understand and agree with the reasoning for the proposed changes, we have more information available to us to assess an appropriate take regime than the Council had when it proposed

the change. We have concluded after a thorough review of the evidence provided, to this hearing, that Objective 5.1 of the WRRP can be adequately achieved with the conditions proposed and without the 30 cumec gap. The consequences of this in terms of the future of PPC1 is not a matter which we think we should put much weight on.

**13. PART 2 ASSESSMENT**

**13.1** We have drawn our conclusions based on an overall balancing as required by Part 2 of the RMA. Our Part 2 assessment can in part be found in Minute 11 and within our assessment against the WRRP plan provisions which are based upon Part 2. We have also set out our primary Part 2 conclusions in our earlier summary. In short, we are satisfied that the proposed take will be sustainable and will be in accordance with the principles of the Act.

**14. CONCLUSION**

**14.1** We have set out our key conclusions in the earlier summary section and in the assessment against plan provisions and do not need to repeat them here.

**15. FURTHER STEPS**

**15.1** Having set out our conclusions on the overall scheme and the Waimakariri take, we can now move on to finalising conditions. We will issue a further brief Minute on the Rakaia take regime and suggestions as to key issues in terms of conditions before Christmas. In the meantime we would like the officers of both Councils to start work on their recommendations as to conditions. In doing so they should work with CPW advisers and key submitters to endeavour to reach agreement on as much as possible.

**15.2** Our suggested timetable is for the officers' recommendations on conditions to be available to CPW and submitters by the end of January. Relevant submitters (being those who have called expert evidence on conditions in question) would have until 15 February to respond.

- 15.3 CPW would have until mid March to respond. We will then decide whether the hearing needs to be re convened. If that is necessary it would be in the last week of March or early April. If CPW desires a shorter timetable we are happy to try and accommodate that. However, we suspect that with the break almost upon us it may not be practical to bring these dates forward by more than a few weeks.

**Dated this 20<sup>th</sup> day of November 2009**


Philip Milne



Andrew Fenemor



Bob Nixon



Ray O'Callaghan



Independent Commissioners