
in the matter of: the Resource Management Act 1991

and

in the matter of: applications for resource consent by applicants in the
Lower Waitaki River Catchment under the Waitaki
Catchment Water Allocation Regional Plan

Brief of evidence of **Sarah Margaret Dawson**

Dated: 28 August 2008

1.0 QUALIFICATIONS AND EXPERIENCE

- 1.1** My full name is Sarah Margaret Dawson. I am a Director and Senior Principal Planner of Boffa Miskell Limited - Planners, Landscape Architects and Ecologists. I hold the qualifications of Bachelor of Engineering (Chemical) with First Class Honours and Master of Science (Resource Management) with Distinction from Canterbury University. I am a Full Member of the New Zealand Planning Institute, and a Member of the Resource Management Law Association of New Zealand, the International Association of Impact Assessment and the New Zealand Association of Impact Assessment. I was a recipient of the New Zealand Planning Institute's Distinguished Service Award in 1999.
- 1.2** My experience and particular expertise has been set out in detail in my evidence in relation to the applications by North Bank Tunnel Concept (NBTC) and Hunter Downs Irrigation Limited (HDI). I will not repeat this material here. To the extent that it is relevant, it should be taken as applying to this evidence.

2.0 INTRODUCTION

- 2.1** I have been asked by Meridian Energy Limited (Meridian) to present evidence in relation to:
- An outline of those parts of the policy analysis I undertook in my NBTC and HDI evidence which may be of relevance to these applications for abstraction from the Lower Waitaki River;
 - Various other matters I understand have been raised at the hearing, namely:
 - Whether "Diversions" are included within Rule 6 / Table 5?
 - Justification for Separate Annual Allocations above and below Black Point
 - Measurement of Minimum River Flow based on Rolling Averages
 - Contribution of Tributaries to the Flow in the Lower Waitaki River
- 2.2** In preparing my evidence, I have reviewed:
- The NBTC resource consent applications and the evidence presented to that hearing;

- The HDI resource consent applications and the evidence presented to that hearing;
- Relevant parts of the Waitaki Catchment Water Allocation Regional Plan (WRP);
- Relevant evidence of others, namely the evidence presented on behalf of Meridian, and the evidence of Mr Boyes.

2.3 I have read the Code of Conduct for Expert Witnesses and agree to comply with it. I have complied with it in the preparation of this brief of evidence.

3.0 MINIMUM RIVER FLOW OF LESS THAN 150m³/s

3.1 The evidence I presented for NBTC included a discussion on the policy implications of the 110–150m³/s monthly variable, 'Alternative Flow Regime' (AFR) between Waitaki Dam and Black Point. In turn, the evidence I presented during the HDI hearing included a discussion on the policy implications of a full 90m³/s of abstraction with a 100m³/s minimum flow regime. However, my conclusions in relation to HDI were based on expert assessments that mainly focused on the effects of the HDI and the other major takes downstream of Black Point.

3.2 Prior to presenting this evidence I had, therefore, not provided an assessment of:

3.2.1 The possibility of taking water from the Lower Waitaki River on the basis of a 100m³/s minimum flow upstream of Black Point; or

3.2.2 The possibility of taking water (primarily for irrigation) on the basis of the AFR flow regime, but without flushing flows or other specific mitigation proposed during NBTC.

3.3 Despite the above, my previous assessments can offer some assistance in determining the current applications for abstractions from the Lower Waitaki. Both my previous sets of evidence included a discussion, and my opinion, regarding the nature of the WRP and applications that would result in a minimum river flow in the Lower Waitaki River less than the minimum flow of 150m³/s specified in Rule 2 / Table 3. To the extent that this discussion is relevant to the setting of minimum river flows for other applications for water take and use from the Lower Waitaki River, this discussion is contained in:

- Paragraphs 59 – 62 of my NBTC evidence and paragraphs 46 – 49 of my HDI evidence, regarding the foreshadowing by the WRP of consideration of non-complying activity applications; and
- Paragraphs 63 – 65 of my NBTC evidence and paragraphs 50 – 52 of my HDI evidence, regarding whether it is appropriate for applicants to apply for a flow regime that is inconsistent with the WRP.

4.0 POSSIBLE FUTURE FLOW SCENARIOS

- 4.1** My previous evidence has primarily focused on the NBTC and HDI applications.
- 4.2** During the HDI hearing I provided some discussion around minimum flows and flow sharing for all consent holders in the Lower Waitaki River catchment. In the next section of my evidence I expand upon that discussion. I note that Mr Jowett has also presented further evidence, in addition to his own NBTC and HDI analysis, that describes the nature of any incremental effects from other abstractions on in-river habitat (both upstream and downstream of Black Point). To an extent this addresses some of the uncertainties around the effects of taking water from the river at lower flows – particularly upstream of Black Point - and I have now been able to consider this somewhat further in my analysis.
- 4.3** It is my understanding that Clarkesfield Holdings (1996) Limited and Waihao Downs Irrigation Limited seek a minimum flow of 100m³/s (with Clarkesfield being a non-consumptive hydro-generation scheme upstream of Black Point).
- 4.4** As I currently understand it, the majority of other applicants seek to rely on the NBTC AFR (or 'MRNAG') regime. This is the monthly variable NBTC minimum flow regime without flushing flows, the control over short-term flow variability provided by one large abstraction, and the proposed NBTC-specific mitigation. I understand that the MRNAG applicants have also provided some discussion around the possibility of a 100m³/s minimum flow should a suitable agreement be possible with Meridian.
- 4.5** I also understand that three applicants are seeking a minimum flow of 150m³/s, although they also appear to be in general support of the MRNAG applicants.
- 4.6** There are accordingly a number of possible (and potentially over-lapping) minimum flow scenarios for the Lower Waitaki River. I have attempted to address these in my evidence.

5.0 UPSTREAM OF BLACK POINT AND THE NBTC OUTFALL

Without NBTC Operational

- 5.1 The current minimum discharge flow at Waitaki Dam under the existing resource consents is 120m³/s. Meridian has historically operated a 30m³/s buffer flow with an operating minimum discharge at the Dam of 150m³/s (although I understand that lower flows have occurred on rare occasions over the past two years and might occur again in the future). The evidence of Mr Henderson at the NBTC hearing provided an analysis of the actual measured flows at Waitaki Dam under the current river flow regime from 1979 to 2005.
- 5.2 Mr Potts' evidence (Table 5) is that (as at 19/08/08) there are consents granted and currently in processing for a total of 6.20m³/s for agricultural and horticultural use from the main stem of the Lower Waitaki River between Waitaki Dam and Black Point / NBTC outfall. There is a small additional flow allocated for other abstractive activities. Figure 1 in Mr Jowett's evidence also gives a graphical representation of the small cumulative abstraction associated with existing and proposed takes below Waitaki Dam but upstream of Black Point.
- 5.3 The flow regime that will result from the granting of the proposed irrigation consents, in conjunction with the existing resource consents for abstractive use, between Waitaki Dam and Black Point / NBTC outfall would be the existing flow regime less up to 6.2m³/s (approximately) at peak irrigation season. Mr Henderson's description of the existing flow regime (1979 - 2005) at Waitaki Dam included the following:
- Minimum discharge – 120m³/s (although effectively 150m³/s most of the time historically)
 - Mean flow - 382m³/s
 - Median flow – 369m³/s
 - Short-term variability (daily, weekly and monthly)
 - Freshes and flood flows.
- 5.4 As reduction in flow of 6.2m³/s (approximately), if all irrigation / abstractive uses were approved, would only occur during the peak irrigation season. For the majority of the time there would be little change to the flow and accordingly Mr Henderson's description is still relevant.

- 5.5** On this basis, Mr Jowett has been able to conclude that, above Black Point, abstractions will result in very little change to the flow regime, and would only have a minor effect on instream habitat. Although it is relatively infrequent that the Lower Waitaki River is at or near its minimum flow, it is necessary to address the options of how the river might be operated during times of low flow.
- 5.6** If consent conditions were structured such that each abstractive user started reducing their rate of take at 190m³/s until they stopped taking completely at 100m³/s, as measured at the Kurow Gauge, there would only be a possible maximum reduction in flow of 6.2m³/s between Waitaki Dam and the Black Point / NBTC outfall, from the total possible Lower Waitaki River abstraction of 90m³/s under the WRP (Table 3).
- 5.7** To describe an example, if the discharge at Waitaki Dam is at the minimum historically operated by Meridian (150m³/s), then abstractors upstream of Black Point / NBTC outfall could be restricted to a maximum abstraction of 3.4m³/s (being 50/90 of their total 6.2m³/s allocation), if all abstractors were required to start reducing their take when flow at Kurow Gauge (effectively downstream of the Dam) reaches 190m³/s. This would reduce the minimum river flow immediately upstream of the Black Point / NBTC outfall to 146.6m³/s. If the discharge at Waitaki Dam fell to its consented minimum of 120m³/s, then, under these circumstances, only a maximum of 1.4m³/s could be abstracted upstream of Black Point / NBTC outfall (being 20/90 of their total 6.2m³/s allocation).
- 5.8** This would get more complex, if irrigation consents were granted with minimum flow conditions based on the NBTC AFR regime. Although, without NBTC being operational, it would be relatively infrequent that river flows were at or below the monthly variable AFR minimum flows, if ramping down conditions were adopted the extent and nature of the abstraction reductions would vary from month to month. However, there would be periods when abstractors could be subject to restrictions – particularly in the peak summer period when the AFR regime has minimum flows that are above the existing minimum discharge requirement for Waitaki Dam.
- 5.9** If ramping down provisions, or flow sharing at times of low flows, were not provided for with an NBTC AFR minimum flow regime, then there would still be periods when these abstractors could be subject to complete restrictions. The analysis undertaken by Mr Henderson for his evidence at NBTC was based on the actual flows at Waitaki Dam between 1979 and 2005. However, Mr Henderson and the other experts revised their analysis for HDI to focus on the entire 73 years of inflow records (based

on the Plexos modelling). This analysis showed that there were longer periods of low river flows prior to 1979 that could, depending on the minimum flow, have a significant effect on irrigation restrictions. Mr Henderson also described the likely effects of climate variability and the nature of flows under the future operation of HDI.

- 5.10** By comparison, and although it might still be preferable to provide for some form of flow sharing at low flows under a 100m³/s minimum flow, as I explained above, there would never be periods of complete restriction above Black Point.
- 5.11** Under the most extreme alternative, if no minimum flow was to be imposed on all 6.2m³/s of existing and potential abstractive use consents between Waitaki Dam and Black Point / NBTC outfall, then at most there would be a maximum 6.2m³/s reduction in flow immediately upstream of Black Point / NBTC outfall from the 120 m³/s minimum flow released at Waitaki Dam.
- 5.12** Overall, given the minor difference in flow that could potentially be experienced upstream of Black Point / NBTC outfall compared with the flow regime discharged from Waitaki Dam, the evidence relating to the existing Lower Waitaki River environment is relevant to the effects of up to 6.2m³/s of abstraction without the NBTC flow regime being operational.
- 5.13** In my NBTC evidence, although I assessed the proposed NBTC flow regime against the relevant WRP and other relevant policies, I did not undertake a full policy analysis of the existing Status Quo flow regime. However, in undertaking my policy analysis of the proposed NBTC flow, I compared the proposed NBTC situation with the existing Status Quo flow regime in terms of consistency with the relevant policies. I have outlined the relevant paragraphs of my NBTC evidence above. To the extent that this analysis refers to the existing flow regime in the river between Waitaki Dam and Black Point, then I consider it is relevant to the potential long-term operation of the Lower Waitaki River, if NBTC is not operational, even with the small change to the flow regime from the potential cumulative abstractions in this reach.
- 5.14** In my HDI evidence, I addressed the policy implications of taking the full 90m³/s of abstraction with a 100m³/s minimum flow regime downstream from Black Point. However, my assessment did not cover the policy implications of abstractions above Black Point. As I said above, Mr Jowett has now concluded that, upstream from Black Point, the cumulative abstractions will result in very little change to the existing flow regime, and would only have a minor effect on existing instream habitat.

5.15 Nevertheless, my policy analysis for HDI did include aspects that were unrelated to the particular reach of the river and its flow regime and, I consider, were more generally applicable to any application for irrigation abstraction from the Lower Waitaki River under the WRP. I will refer to these in more detail in my evidence below (in paragraph 6.4). They relate to:

- The derivation of the 100m³/s minimum flow for irrigation;
- The allocation of water to agricultural and horticultural activities anticipated by the WRP;
- The level of reliability of irrigation water abstraction anticipated by the WRP;
- The management of irrigation water, particularly in relation to water quality, water sharing, efficient and reasonable use, and the use of farm management plans.

Some of these considerations are equally relevant to the current hearing process.

With NBTC Operational

5.16 If NBTC is granted, the minimum river flow, with NBTC operating, immediately downstream of Waitaki Dam would be the NBTC minimum river flow of 110-150m³/s, varying monthly. NBTC proposes to provide water flows for existing and future abstractors, between Waitaki Dam and Black Point, over and above the NBTC minimum river flow at Waitaki Dam.

5.17 Potential tributary or groundwater inflows downstream of Waitaki Dam are not relied upon to make-up any additional flow for these irrigation abstractors over and above the flow to be provided at the Dam. These flows would still support the Clarkesfield hydro application.

5.18 Accordingly, the policy analysis included in my NBTC evidence is relevant to the minimum flows that would continue to be provided for in the river between Waitaki Dam and Black Point / NBTC outfall, as follows:

Waitaki Catchment Regional Water Allocation Plan (WRP):

- Objectives and policies to sustain the qualities of the environment of the Lower Waitaki River – paragraphs 71 – 147 of my NBTC evidence;

- Objectives and policies relating to the effects of the NBTC flow regime on other existing and potential abstractive water users – paragraphs 173-177 of my NBTC evidence.

Canterbury Regional Policy Statement; New Zealand Coastal Policy Statement; and Canterbury Regional Coastal Environment Plan:

- Paragraphs 183–184, 188 and 192-193 of my NBTC evidence

Iwi Policy Documents:

- Paragraphs 186-188 of my NBTC evidence

Part II Resource Management Act (RMA):

- Paragraphs 194 – 207, 209 – 213, 216 – 225 of my NBTC evidence.

5.19 My NBTC evidence is therefore very relevant to the potential long-term operation of the Lower Waitaki River, if NBTC is operational.

6.0 DOWNSTREAM OF BLACK POINT AND THE NBTC OUTFALL

6.1 This section of my evidence is relevant to Waihao Downs Irrigation Limited and to the Chalmers application – both of which are located below Black Point.

6.2 As noted above, the river flow modelling, assessments of effects, and policy analysis undertaken for Hunter Downs was undertaken on the basis of cumulative effects with all other existing and potential water abstractors – i.e. with 90m³/s of maximum abstraction downstream of Waitaki Dam, and within the limits specified in Tables 3 and 5 of the WRP. These cumulative assessments were applied to the river downstream of the major irrigation abstraction point near Black Point (where the Morven Glenavy (Stonewall), Hunter Downs and Bortons Pond irrigation intakes are located) and at the most-downstream major irrigation abstraction point at Bells Pond (Morven Glenavy). In addition, analysis was undertaken on the basis of cumulative downstream effects from both NBTC and all existing and potential water abstractors, bearing in mind that any water flowing through the NBTC diversion tunnel would be returned to the river upstream of the first major irrigation abstractions at Black Point.

6.3 The river flow modelling, assessments of effects and associated policy analysis for Hunter Downs assumed a minimum river flow of 100m³/s at the Kurow Gauge, with all abstractive users starting to reduce their takes when flow at the Kurow Gauge (effectively downstream of Waitaki Dam) reaches 190m³/s. Accordingly, under such minimum flow conditions, downstream from the most-downstream major irrigation abstraction point at Bells Pond, the minimum flow in the river would be 100m³/s. The majority of the river flow reduction to 100m³/s would occur between Black Point and Bells Pond, where and when the majority of the major irrigation abstractions occur. Using the same example as above, if the flow at Waitaki Dam is at the minimum currently operated by Meridian (150m³/s), abstractors upstream of Black Point / NBTC outfall could be restricted to a maximum abstraction of 3.4m³/s, reducing the minimum river flow immediately upstream of Black Point / NBTC outfall to 146.6m³/s. Between Black Point / NBTC outfall to Bells Pond, abstractions would effectively reduce the flow to 100m³/s, with total abstraction downstream of Black Point / NBTC outfall being restricted to a maximum abstraction of 46.6m³/s under these circumstances.

6.4 Accordingly, the policy analysis included in my HDI evidence is relevant to the flow regime that would occur in the river downstream of Black Point / NBTC outfall (particularly downstream of Bells Pond) as a result of the cumulative abstraction of existing and potential water abstractors (including those that are the subject of these consent applications) , as follows:

Derivation of the 100m³/s minimum flow for irrigation abstractions:

- Paragraphs 16 - 22 of my HDI evidence

Waitaki Catchment Water Allocation Regional Plan (WRP), including incorporated and other relevant provisions of the Proposed Natural Resources Regional Plan for Canterbury (PNRRP):

- Discussion of the Explanation contained in the Plan and in the Waitaki Allocation Board decision on the WRP, the Objectives and Policies and the relevant Rules, regarding the allocation of water for irrigation anticipated by the WRP - paragraphs 23 - 38 of my HDI evidence;
- Discussion of the high level of reliability anticipated by the WRP for irrigation water – paragraphs 39 – 45 of my HDI evidence;

- The relationship between the objectives, policies and rules of the WRP and those of the PNRRP – paragraphs 54 – 66 of my HDI evidence. However, I note that the matter of weight to be applied to those PNRRP provisions incorporated into the WRP was incorrectly referred to in my HDI evidence in paragraphs 67-69. I now understand that those PNRRP provisions are to be applied as though they are operative, even though they are only proposed provisions in the PNRRP. My conclusions from the discussion of the relevance of those provisions in the context of the WRP for the Lower Waitaki River remain the same (paragraphs 133 – 136 of my HDI evidence). In my opinion, Tables 3 and 5 provide for a significant allocation of water for irrigation in the Lower Waitaki River catchment. In my HDI evidence I stated that the cumulative effects of 90m³/s of abstraction, at a minimum flow of 100m³/s compared with 150m³/s, will not significantly increase the effects of reduced contaminant dilution in the Lower Waitaki River, although risks would be exacerbated during infrequent, very dry seasons. The risks for nuisance periphyton growths and for contact recreation already occur in the existing situation and require addressing through better catchment-wide land management practices.
- Objectives and policies to sustain the qualities of the environment of the Lower Waitaki River – paragraphs 72 – 159 of my HDI evidence;
- Objectives and policies relating to the allocation of water to agricultural and horticultural activities – paragraphs 160-174 of my HDI evidence;
- Objectives and policies regarding the need for the reliability of irrigation water abstraction provided by the 100m³/s minimum flow – paragraphs 185 – 194 of my HDI evidence;
- Objectives and policies relating to the ability of existing and potential abstractive water users to have appropriate access to water from the Lower Waitaki River (within the WRP allocation limits) – paragraphs 195 - 202 of my HDI evidence;
- Policies relevant to the importance of the 100m³/s minimum river flow to hydro-electricity generation from the Waitaki Power Scheme – paragraphs 203 – 205 of my HDI evidence.
- Objectives and policies relating to the efficient and reasonable use of water by water abstractors and users, including incorporated provisions and other related policies from the PNRRP – paragraphs 207 – 212 of my HDI evidence.

- Objectives and policies relating to water sharing during times of low water availability – paragraphs 213 – 214 of my HDI evidence.
- Policies relating to water quality in the receiving environment where the abstracted water is to be used, including incorporated provisions and other related objectives, policies and rules from the PNRRP – paragraphs 215 – 235 and 243 of my HDI evidence.

Other Relevant Policy Documents:

- In general – paragraphs 285 of my HDI evidence.
- *Canterbury Regional Policy Statement* – paragraphs 278 and 290 of my HDI evidence.
- *New Zealand Coastal Policy Statement and Canterbury Regional Coastal Environment Plan* – paragraph 277 of my HDI evidence.
- *Waimate District Plan* – paragraph 280 of my HDI evidence.
- *Iwi Policy Documents* – paragraphs 281 – 284 of my HDI evidence.

Part II Resource Management Act (RMA):

- Paragraphs 248 – 274 and 282 - 302 of my HDI evidence.

6.5 My HDI evidence also included discussion regarding the conditions proposed by the applicants for the HDI resource consents, including the use of Scheme and Farm Management Plans and Water Supply Agreements as requirements of provision of water from the Scheme to the individual water users. To the extent that discussion of these proposed conditions and management arrangements are relevant to other applications for water take and use from the Lower Waitaki River, this discussion is contained in paragraphs 303 – 322 of my HDI evidence. I concur with the evidence provided by Mr Potts in relation to Farm Management Plans and by Mr Norton in relation to mitigation measures for water quality effects (his paragraphs 26 – 30).

7.0 SPECIFIC MATTERS

7.1 I will now address various other matters I understand have been raised at the hearing.

8.0 WHETHER “DIVERSIONS” ARE INCLUDED WITHIN RULE 6 / TABLE 5?

8.1 On a straight reading of Rule 6, in my opinion, the annual volume of any surface water diversion does fall within Rule 6(1) and would, therefore, need to fall within the total annual volumes set out in Table 5 when combined with all other takes, uses, damming or diversions. Otherwise, the diversion would need to be considered as a non-complying activity in terms of Rule 16. The Plan includes a specific provision in Rule 6(2) for an exclusion from Rule 6(1), for water taken or diverted and returned to the same water body in the vicinity, but only for water used for micro hydro-electricity or fisheries and wildlife. This makes it appear that the WAB had considered whether diversions should be excluded from the operation of Rule 6(1), but had decided to make this exclusion only for these specific water uses.

8.2 However, I do not believe that this could have been intended by the Waitaki Catchment Water Allocation Board (WAB) as this interpretation now appears to lead to some unintended consequences.

8.3 As Mr Potts stated in his evidence-in-chief to the Hunter Downs hearing (in paragraph 77), he understands that he was the only person who presented evidence to the WAB hearing regarding allocation rates and volumes. He noted that the majority of the numbers included in the allocation rates and volumes in the WRP were from his evidence and, therefore, based on his interpretations. In that evidence, he did not include diversions that are associated with a take, where the diverted water is returned to the river in close proximity to where it was diverted. Nor did he include diversions that do not leave the river margins or are non-consumptive, such as for the Nicol Salmon Farm at Kurow. In that instance, which Mr Potts included as allocation for “*Industrial and commercial activities*”, the annual volume with the diversion would be 31.5Mm³/year, which is substantially greater than the annual volume of 1Mm³/year allocated for this category in Table 5. As Mr Potts said in his Hunter Downs evidence, he would have expected that this allocation would have reflected this large salmon farm diversion if the WAB had anticipated non-consumptive diversions that do not leave the river margins.

- 8.4** I understand that, if diversions are to be included within the application of Rule 6, Table 5, then there is insufficient annual allocation for agricultural and horticultural activities between Waitaki Dam and Black Point to provide for all existing abstractions, much less any additional abstractions. I have reviewed the WRP, Annex 1 Decision and Principal Reasons, and the Section 32 Report, to see if I can find any direction as to the WAB's thinking when setting the allocation volumes in Table 5.
- 8.5** *Policy 12* is the principal policy relating to the establishment of the allocation to each activity. It lists the matters that have been taken into account in establishing the allocations. The Explanation to this policy states that it describes the approach used to make allocations among the activities set out in Objective 2, and that any activity that falls outside the allocations in Rule 6, Table 5, must demonstrate the effect of granting the consent on the entitlements to other activities over the timeframe of the consent. *Policy 12e* recognises the importance of irrigation for agriculture and horticulture, but in my view, the policy does not give any guidance as to whether or not the WAB intended to provide for all the existing abstractions for these activities between Waitaki Dam and Black Point, or any additional use for these purposes.
- 8.6** *Policy 14* covers the situation where consideration is given to applications to take, divert, or use water outside the Waitaki catchment, and that regard should be had to the extent to which the availability of water to current and reasonably foreseeable in-catchment needs would be reduced. The Explanation to this policy discusses the primacy placed on providing for current and projected in-catchment needs for water before taking water out of the catchment. This indicates that the WRP is intending to provide for more than just current water needs, and that some projected needs within catchment are anticipated to be provided for – certainly before enabling out-of-catchment allocation.
- 8.7** *Policy 28* relates to the replacement of existing consents and requires the consent authority to maintain the inclusion of the replacement of an existing consent, if granted, in any allocation limit or priority band on the water body concerned. The Explanation refers to the need to consider the efficiency of use of water when considering the replacement of an existing consent. But it also recognises the value of the existing investment. Whilst there may be some implementation of efficiency savings in the replacement of existing consents, this policy and its explanation does not give any indication that some existing consents will need to be refused, or

severely constrained, in order to provide for water to be shared with other reasonably foreseeable, new water users in the future.

8.8 *Policy 46* envisages existing and new consents for agricultural and horticultural activities being granted from the Lower Waitaki River in the future. Although this policy anticipates different levels of reliability between existing and new consents for these activities, in my opinion, it clearly anticipates through Policy 46 (ii)c. that new consents for agricultural and horticultural activities in the Lower Waitaki River will be provided for with the annual allocations for those activities. It does not differentiate between above and below Black Point, but in my opinion, if it was not anticipating any provision for new water allocation for these activities upstream of Black Point, it would have stated this here.

8.9 In the WAB's Decision, in several places, it is stated that allocation to activities has had regard to existing and foreseeable demands:

- paragraph 195 – *“Allocation to activities had regard to existing and foreseeable demands, ...”*
- paragraph 197 – *“Rule 6, Table 5 of the Plan sets out the annual allocation and provides for ... growth in agricultural and horticultural uses ...”*
- paragraph 207 – *“Evidence from the community irrigation schemes...lower catchment , together with the submissions of individual irrigators and evidence from a number of experts enabled the Board to gain a comprehensive appreciation of the extent of the current irrigation infrastructure in the that area.”*
- paragraph 208 – *“There were a number of submissions to the Board describing possible further expansions of irrigation based on takes from the lower catchment. ... On reviewing all this material in the context of the policy framework of this Plan, it is the Board's judgement that there is a realistic potential for further development of some 53,000 hectares of spray irrigation in the foreseeable future, with an associated annual volumetric requirement of 350 million cubic metres ... The total annual provision in the Pan for agricultural and horticultural activities in the lower catchment is therefore 1,250 million cubic metres.”*

8.10 Considering these statements together, it is my interpretation that the WAB thought that it was making adequate provision in Table 5 for an annual allocation from the

lower catchment to existing agricultural and horticultural activities, as well as for reasonably foreseeable growth in water use by those activities. There is no indication that this was only the case downstream from Black Point, and that upstream there was insufficient allocation for existing takes and diversions for these activities, and no provision for any future growth.

- 8.11** Similarly in the Section 32 Report, in Tables 21, 22, 25 and 26, there are several references to providing for “*the existing and reasonably foreseeable needs of agricultural and horticultural activities*”, including between Waitaki Dam and Black Point (Table 26). This table also refers to “*providing for a high level of reliability for supply for new resource consents taking water from the Lower Waitaki*”. Table 40 sets out the effectiveness of the technical efficiency provisions of the WRP, but indicates that this will not result in a significant amount of additional water for other users – “*Ensures that the maximum amount of water is available for allocation between activities and uses. However, it is not considered that this will result in a significant ‘freeing-up’ of water.*”
- 8.12** On the basis of this analysis of the Plan’s provisions, and the discussion in the Explanations, Decision and Section 32 Report, I consider that the WAB was anticipating that the provision in Table 5 for annual allocation for agricultural and horticultural activities between Waitaki Dam and Black Point would be sufficient to provide for the existing allocations and for the reasonably foreseeable future uses it was informed about at the hearing into the WRP. Whilst there is anticipated to be some limited redistribution of water over time, as a result of efficiency savings at the time of replacement of existing consents, I do not think that the WRP foreshadows this being the means by which reasonably foreseeable future uses will be provided with allocations. If it is decided that the diversions, which Mr Potts has never included in his analysis, should now be included with the ambit of Table 5, then it appears that the outcome in terms of ability to allocate to new uses will be different from that anticipated by the WAB at the time of preparing the WRP.

9.0 JUSTIFICATION FOR SEPARATE ANNUAL ALLOCATIONS ABOVE AND BELOW BLACK POINT

- 9.1** I understand that there has been some discussion regarding whether or not it might be possible to consider the allocations for agricultural and horticultural activities in Rows v. and vi. in Table 5 as being effectively amalgamated (i.e. that there is one

block of water to allocate annually to agricultural and horticultural uses downstream of Waitaki Dam of 1,250 million m³/year).

- 9.2** The Draft WRP did not separate the annual allocations for agricultural and horticultural activities upstream and downstream of Black Point. It included one allocation for the entire Lower Waitaki River from Waitaki Dam to the sea of 950Mm³/year. As Mr Potts set out in his Supplementary Evidence to the NBTC hearing in September 2007 (paragraphs 5 -7), Meridian's submission on the Draft WRP sought a spatial sharing of water allocation upstream and downstream of Black Point. With this approach in mind, Mr Potts provided his initial evidence to the WAB regarding the existing and possible future demand for water abstraction in the two separate reaches upstream and downstream from Black Point.
- 9.3** In its Decision (Annex 1), the WAB found that (paragraph 162) *"the use of two environmental flow regimes would enhance the opportunities for providing for competing demand for water of the Lower Waitaki River"*. Similarly, in paragraph 163, it is stated that *"by splitting the environmental flows into reaches upstream and downstream of Black Point to better provide for competing demands for different activities"*. Although these paragraphs of the Decision are discussing splitting the environmental flows, above and below Black Point, I consider that these comments are relevant to the difference in the allocations for agricultural and horticultural activities from these two reaches of the Lower Waitaki.
- 9.4** The minimum flow is the same for both reaches of the river. The differences in environmental flows between the reaches are the provision for flushing flows between Waitaki Dam and Black Point in recognition that a large allocation to hydro-electricity generation in that reach may keep the river flow reasonably flat without some provision for flushing flows; and the exemption for flows abstracted and returned above Black Point from the allocation limit, again in recognition of the large allocation to hydro-electricity generation in that reach. In my opinion, there is a clear direction in the WRP to provide for a reasonably large allocation to hydro-electricity generation in the reach from Waitaki Dam to Black Point, as a result of the limited provision for other activities (including a more limited allocation provision for agricultural and horticultural activities of 150Mm³/year). Whereas downstream from Black Point, where there is no ability to obtain a large allocation for hydro-electricity generation, it is here that the WRP has made a much larger allocation for agricultural and horticultural activities.

- 9.5** The splitting of the environmental flows and annual allocations upstream and downstream of Black Point, in order to better provide for competing demands for water from different activities, is also reflected in the Section 32 Report. Table 21 relates to the effectiveness of the Plan provisions for the division of the annual allocation of water between activities downstream of Waitaki Dam but upstream of Black Point. It states that the *“delineation of the Lower Waitaki at Black Point provides the opportunity for the water to be taken, used, and returned to the river upstream of Black Point creating opportunity for hydro-electricity generation on that reach of the Lower Waitaki River most suitable for this purpose.”*. This statement is not included in Table 22 relating to the reach of the river downstream from Black Point.
- 9.6** Tables 25 and 26 of the Section 32 Report tabulate the benefits and costs of the Plan provisions relating to the division of the annual allocation of water between activities between Waitaki Dam and Black Point (Table 25) and downstream of Black Point (Table 26). The only differences in the benefits listed in these two tables are that upstream of Black Point there is the opportunity for hydro power generation, and that that water returned to the river upstream of Black Point can then be used for other activities downstream. Both upstream and downstream of Black Point, these tables state that provision has been made for existing and foreseeable needs of agricultural and horticultural activities.
- 9.7** As with the Decision in Annex 1, I consider that the Section 32 Report supports my view that the Plan has specifically divided the water allocation differently upstream and downstream of Black Point in order that the allocation can be effectively shared between the competing demands for irrigation (agricultural and horticultural activities) and hydro-electricity generation. I consider that amalgamating the allocations for agricultural and horticultural activities upstream and downstream of Black Point in Table 5, and allocating more than 150Mm³/year of water to agricultural and horticultural activities upstream of Black Point would need to be considered in light of this split between competing demands that the WRP has specifically provided for. I will return to this below.
- 9.8** Rule 16 does provide for applications that would take the cumulative total of water allocated for agricultural and horticultural activities upstream of Black Point above 150Mm³/year, to be considered as non-complying activities. I note that the WAB's Decision in Paragraph 76 specifically states that it did not provide for these types of applications as prohibited activities, as it could not be confident that specific cases

would never arise, where it would be appropriate to grant consent to such non-complying activities. As I noted above, *Policy 12* provides the guidance for consideration of non-complying activities relating to the allocation of water to activities. *Policy 12i* notes that different annual volumes have been allocated upstream and downstream of Black Point, but it does not give any specific guidance regarding the differences in allocation between activities in Table 5. However, as I stated above, the Explanation does state that effects on entitlements to other activities must be considered, if additional water is to be allocated outside the allocations provided for in Table 5.

9.9 I consider it is, therefore, important to determine what other potential allocations would be affected, should additional water be allocated to agricultural and horticultural activities upstream of Black Point (i.e. more than 150Mm³/year). In my opinion, such an allocation upstream of Black Point, would not change the potential for 1100Mm³/year to be allocated to agricultural and horticultural activities downstream of Black Point. The annual allocation of 1100Mm³/year to agricultural and horticultural activities downstream of Black Point would remain a Discretionary Activity in terms of Rule 6. It does not seem to me to be reasonable to penalise applicants whose proposals come within that allocation and consider them differently, just because more than 150Mm³/year has been allocated upstream. In my opinion, the effect of allocating more than 150Mm³/year would be on entitlements to other activities in the same row of Table 5 (i.e. other allocations upstream of Black Point).

9.10 There seems to me to be three implications from exceeding the 150Mm³/year annual allocation limit upstream of Black Point:

- i. There would be less water available in that reach for hydro-electricity generation. If irrigation and hydro-electricity generation are both consented in that reach, with the same minimum river flows, when the flows in the river upstream are greater than the minimum flows (i.e. no water restrictions are being implemented), all additional water taken for irrigation is less water for hydro-electricity generation because the allocation for hydro-electricity generation is for "*All other flows*".
- ii. The river will approach its minimum flow more quickly and more often upstream from Black Point. When the river is approaching its minimum flow, if all consents have the same minimum river flow, with more water being abstracted upstream of Black Point, the river will approach its minimum flow in that reach more often and more rapidly and will be at its minimum flow more

often. This is on the basis that granting applications for more than an annual allocation volume of 150Mm³ will allow for a greater level of flow allocation in the upper reach of the Lower Waitaki River upstream of Black Point – provided that the total flow allocation from the Lower Waitaki River remains within the 90 m³/s flow allocation limit under Rule 2/Table 3.

- iii. The reliability of other abstractors upstream from Black Point will be decreased. As outlined above, as the river approaches its minimum flow more quickly and more often, all abstractors will need to reduce their takes more frequently and for longer periods, reducing the reliability for all abstractors. This concern is only an issue if there is some form of flow sharing between users.

Therefore, allocating more water than provided for in Table 5 can only come from some other allocation or from the river itself. Although, the environmental minimum flow may not be breached, additional allocation:

- Could affect other allocations to the same activity (agricultural and horticultural activities) by reducing their reliability;
- Would not affect other specific allocations to activities, as they each have their own annual allocations;
- Would reduce the annual volume of water available for hydro-electricity generation, as this allocation is simply for all remaining flows after all specific allocations have been made;
- Would cause the river to approach its minimum flow downstream of Bells Pond more quickly and more often at times of low inflows to the Lower Waitaki River.

9.11 Accordingly, I consider that any application to take, divert or use water that would result in more than the Table 5 annual allocation of 150Mm³/year to agricultural and horticultural activities, would need to be considered in light of the above effects on allocations to other activities, including hydro-electricity generation, and on the river's values.

10.0 MEASUREMENT OF MINIMUM RIVER FLOW BASED ON ROLLING AVERAGES

- 10.1** I understand evidence has been given that river flows for the purpose of determining minimum river flows for irrigation abstraction, should be measured as 24 hour or 72 hour averages.
- 10.2** Rule 2(1)a. states that minimum flows in the relevant river for any take, divert, dam or use should be as specified in Table 3, or the activity is to be considered as a non-complying activity. Row xvii of Table 3 specifies the minimum flow for the Lower Waitaki River (from Waitaki Dam to the sea), which is stated as being determined based on measurements at the Kurow recorder and on 1-hour rolling averages. If this method of determination of the minimum flow is not to be used, in my opinion, this is just another matter to be considered as a non-complying activity.
- 10.3** This non-complying activity aspect could combine with other non-complying aspects, such as a minimum flow less than $150\text{m}^3/\text{s}$, that would potentially result in cumulative effects on the river's values. For example:
- If a minimum flow of $150\text{m}^3/\text{s}$ is proposed, measured as an average over an hour, the extent to which the river flow downstream from any take, dam, divert or use could vary above and below $150\text{m}^3/\text{s}$ will be limited by how fast the flow could change in one hour (as a result of ramping rate controls or physical limits to a take, divert, dam or use varying the flow) and still remain as an average of more than $150\text{m}^3/\text{s}$.
 - However, if the flow is averaged over 24 or 72 hours, the river flow could vary above and below $150\text{m}^3/\text{s}$ by considerably greater amounts over those extended time periods, and still result in an average of $150\text{m}^3/\text{s}$. I note that Mr Jowett states that flows in the Lower Waitaki River currently have an average daily fluctuation of about $80\text{m}^3/\text{s}$.
 - If a minimum river flow of $100\text{m}^3/\text{s}$ is proposed, then the effects of varying above and below that flow level over 24 or 72 hour time periods would need to be considered along with the effects of the minimum flow itself.
- 10.4** I note that an assessment of the effects of minimum river flows less than $100\text{m}^3/\text{s}$ downstream of Black Point, or an assessment of minimum river flows less than the NBTC monthly varying river flow of $110\text{--}150\text{m}^3/\text{s}$ upstream from Black Point, were not considered in the technical evidence presented for Hunter Downs or NBTC, and I did not cover this aspect in my policy assessment. However, Mr Jowett has addressed

this matter in his current evidence, where he says that a 24 hour average would mean that flows in the river below Bells Pond could be below a minimum of 100m³/s for about half a day at a time, even though the daily average would be greater than the minimum. He states that these excursions would be rare and that the overall effect of this habitat reduction is likely to be minor. He notes that increasing the averaging interval to 48 or 72 hours increases the risk of larger fluctuations and correspondingly greater effects.

- 10.5** The WAB's Decision at Paragraph 166 points out that Meridian sought that the minimum flow be measured as a rolling hourly rate of discharge, rather than an instantaneous flow measurement as required by the Draft Plan. The Board accepted this means of measurement, in the knowledge that this would mean that there could be "*brief and infrequent*" instantaneous excursions below the minimum flow. Mr Boyes (paragraph 59) and Mr Stewart (paragraphs 55 and 56) accept that there is a risk that the river flows may fall below the minimum river flow from Bells Pond to the sea, if a 24 or 72 hour average is used for the minimum flows at which the abstractions sought by MRNAG should cease. As discussed by Mr Jowett, whether this would result in adverse effects on the river's values in this downstream reach will depend on minimum flow sought and on the frequency and duration of the excursions below that minimum flow – whether they are brief and infrequent excursions as anticipated by the WAB's Decision or more frequent and/or extended.
- 10.6** On the basis of the above, clearly applications can be granted a non-complying activities to take, use, dam or divert water from the Lower Waitaki River, on the basis of a minimum river flow that is averaged over long time periods than hourly. However, in my opinion, the consequential effects of the river downstream falling below the minimum flow from time to time need to be considered cumulatively with the effects of the proposed minimum flow itself.

11.0 CONTRIBUTION OF TRIBUTARIES TO THE FLOW IN THE LOWER WAITAKI RIVER

- 11.1** I understand that it has been suggested that the contribution of the tributaries to the flow in the Lower Waitaki River should be taken into account when deciding the total flow of water that can be allocated to abstractive activities. I have examined this from the point-of-view of the WRP's relevant Rules and Policies.

- 11.2** Rule 2 /Table 3, row xvii, set the minimum flow for abstractions from the Lower Waitaki River as 150m³/s from Waitaki Dam to the sea. In theory, therefore, the contribution of the tributaries does supplement the river's flow downstream from Waitaki Dam and this additional flow could be abstracted from the river provided that the flow in the river does not fall below the minimum of 150m³/s all the way to the sea. However, in my opinion, this needs to be considered at every point in the river on every day or hour throughout every year.
- 11.3** By way of example, the water balance assessment of Ms Hartwell for NBTC was undertaken to ensure that releasing 110 -150m³/s at Waitaki Dam, and measuring this release only at the Dam, would ensure at least the same flow at the Kurow recorder and all the way down the river to Black Point.
- 11.4** If it could be determined on an ongoing basis, that the selected minimum river flow would not be breached between the abstraction / diversion point and the sea, then in theory it would be possible for abstractions to be approved that rely on the additional water provided by the tributaries to the main stem of the Lower Waitaki River. This would only be relevant when the river inflows at Waitaki Dam were low, as at higher inflows these abstractions would just be from main stem river flow (in the same way as all other abstractions) and would not be relying on additional tributary inflows.
- 11.5** In these circumstances, however, I consider that Policy 23 is relevant. *Policy 23* relates to restrictions during times of low water availability. It seeks to ensure that environmental flows are complied with by requiring all consent holders to restrict their rate of taking or diverting, when the amount of water available for taking or diverting is low. It is important to note that all consent holders are required to restrict their rate of takes or diverts, not just some, on the basis that there should be a sharing of the restrictions during times of low inflow. As I said above, relying on tributary inflows to allow more water to be abstracted is only relevant at times of low inflow from the Waitaki Dam, but Policy 23 indicates that, at such times, all consent holders are to share in the necessary restrictions. My interpretation is, therefore, that any reliance on tributary inflows should be shared across all consent holders (all should be able to gain from these inflows) and not just across a limited number of new applicants. The MRNAG applicants' proposal not to restrict their takes at times of low inflows at Waitaki Dam on the basis of tributary inflows is, in my opinion, contrary to the approach set out in Policy 23. Mr Boyes also acknowledges (paragraph 115) that the flow regime proposed by MRNAG is not in accordance with Policy 23.

11.6 I would just like to mention how the application for abstraction and discharge for hydro-electricity generation by Clarksfield is in a somewhat different situation from irrigation abstractions in this regard. The Clarksfield abstraction is returned to the river upstream of the major irrigation abstractions at Black Point; accordingly it is not included in the 90m³/s allocation limit. For this reason, this hydro-electricity generation abstraction does not affect the river flow downstream of the major irrigation abstractions (as it is returned to the river by then). It could not, therefore, influence whether or not the river falls to or below its minimum flow between these major irrigation abstraction points and the sea.