STAFF REPORT

TO: Environment & Planning Subcommittee

FROM: Neil Tyson, Consent Planner (Water) and Joseph Thomas, Resource Scientist - Water

REFERENCE: RM050340

SUBJECT: **B J and G M SOWMAN - REPORT EP05/10/05** - Report prepared for 21 October 2005 hearing

---

1. APPLICATION

B and G Sowman (the applicant) farm a 320 hectare plus dairy farm at Uruwhenua. They have applied (RM050340) for a change of conditions of their current consent NN020416 to increase the authorised rate of taking and use of water for irrigation of an additional 30 hectares of land subject to an unchanged term expiring on 31 May 2019 and otherwise unchanged conditions. The writer understands that if consent is granted the applicant seeks to combine this consent with NN020416, which would be appropriate as there is only one intake pump.

1.1 Current Consent and Application Details

Water Permit NN020416 and RM050340

Location:	*Takaka River, Uruwhenua*
Legal Description (at take point):	*Pt Sec 4 SQ 8*
Category of Water Source:	*Surface water*
Tributary:	*Takaka River*
Catchment:	*Takaka*
Zone:	*Takaka Surface*
Map reference:	*NZMS 260 N26:9520-2520*

Current Maximum rate of take:	**Proposed Maximum rate of take:**
103 litres/second	*120 litres/second (an additional 17 l/sec)*
8,900 cubic metres/day	*10,369 cubic metres/day*
62,300 cubic metres/week	*72,583 cubic metres/week*
Area irrigated:	*241 hectares*

Legal Description of areas currently irrigated:

i. Lot 1 DP 17733
ii. Pt Sec 1 SQ 8
iii. Pt Sec 10 SQ 11
iv. Pt Sec 12 SQ 11
v. Pt Sec 12 SQ 11
vi. Pt Sec 13 SQ 11
vii. Pt Sec 141 SQ 11

viii. Pt Sec 4 SQ 8
ix. Pt Sec 5 SQ 8
x. Pt Sec 6 SQ 8
xi. Pt Sec 7 SQ 11
xii. Pt Sec 9 SQ 11
xiii. Sec 1 SO 14649
xiv. Pt Sec 2 SQ 8 Valuation 1870028800 (Sparrow property)
xv. Pt Sec 8 SQ 8 Valuation 1870028400 (Lenz property)

Legal Description of new area to be irrigated:

xvi. Sec 9 Sq 8 being part of Valuation 1870029100

2. BACKGROUND AND NOTIFICATION

The applicant was granted their original water permit NN020416 following a hearing on 15 September 2003. That application attracted seven submissions.

In July 2004, the Consent Planner (Water) under delegated authority, granted a variation (change of conditions) of NN020416. At the same time, the applicant withdrew an application to increase their authorised rates of taking in favour of a *change of conditions* application. The application under Section 127 RMAct involved irrigation of additional land described as Pt Section 2, Square 8 Valuation 1870028800 (Sparrow) and Pt Section 8, Square 8 Valuation 1870028400 (Lenz). A second consent to authorise the laying of pipes across the Takaka River to provide for the irrigation of the Sparrow property (see RM030484) was also granted.

Reasons given for granting the 2004 applications was that the effects of the taking of water were fully assessed during the original application hearing and no change in rates was proposed. A condition of the original water permit NN020416 requiring a farm management plan including information on the water-holding characteristics of the irrigated soils had been provided. The farm plan identified that 300 mm/ha/week was an adequate application rate that would avoid drainage of irrigation water beyond the pasture root zone. The consented application rates under NN020416 were therefore reduced, which allowed a greater area (ie the Sparrow and Lenz properties) to be irrigated. Therefore, the allocation of 62,300 m^3/week at 300m^3(30mm)/ha/week provided for a fully irrigated area of 207 hectares or could be spread more thinly over the maximum area the applicant proposed to irrigate which was 241 hectares. It was noted at the time that actual usage through the applicant's water meter was just 6,300 m^3/week.

The application was assessed as a *discretionary* activity and was processed on a non-notified basis as Council staff were satisfied that any adverse effects of the change would be minor.

This application (RM050340) for resource consent to take additional water from the Takaka River for irrigation was initially lodged on 2 May 2005 and the applicant sought a non-notified process. A preliminary assessment by staff concluded that additional information was required to process the application and was formally requested on 3 May 2005. The information particularly involved confirmation of actual metered water use by the applicant since the consent was granted in 2003.

The reply to the further information request was provided on 7 June 2005. At that time or shortly after the applicant amended the rates to those now applied for. The application was publicly notified on 13 August 2005 with the submission period closing on 9 September 2005.

Under TRMP Policy 30.2.4, Council is obliged to allocate water on the basis of priority in time (ie first in, first served) where there is still water available for allocation. This application by Mr Sowman was received before the Harwood application (RM050605) and therefore has priority in time provided there is water available for allocation.

1.2 Submissions

A total of thirteen submissions have been received to the B J and G M Sowman application and are summarised below. Eight of these 13 submitters have also submitted to the A D Harwood Ltd application and many were original submitters to the Sowman consent NN020416. A letter was also received from Transpower advising that high voltage lines pass over the applicant's property and advising the applicant should be aware of potential conflicts as irrigation water and transmission lines do not mix. However, no concerns were raised presumably because a K Line system is proposed and the setback requirements were satisfied.

Mark Manson

Mr Manson submitted in opposition to the application, and to the original application NN020416. Mr Manson submits that the maximum take should be restricted to 33% of the 5 year flow. He is concerned that the proposed abstraction is excessive and with the statement that "..the river goes dry anyway" when in fact it continues to flow (just underground). Mark Manson has previously cited detrimental effect on the river's water quality and suggested regular monitoring of river flow and water quality downstream of the abstraction site to be undertaken. Also a realistic minimum flow set at which the taking of water should cease.

Mr Manson submits that any further allocation should wait until TDC has completed its water policy for the region. Mr Manson does wish to be heard in support of his submission.

Sonia Browne

Sonia Browne has submitted in opposition to the application, and to the original application. She opposes further "commercial" extraction of water from the Takaka River and states that the recent irrigation has lead to adverse effects on their swimming hole and the upstream movement of the drying zone some 5-800 metres. She believes the river is now more polluted and the applicant's stock continue to cross the river. She is concerned about the accuracy of the current monitoring mechanisms.

Their original submission had been concerned that the proposed abstraction of water will result in increased drying of the river, particularly the swimming hole adjacent to the Bray property; limit the length of time that the river flows past their property; result in a detrimental effect on water quality as a result of less water in the river (reduced assimilative capacity) coupled with potential contaminant resulting from intensification of farming practices (e.g. increased stocking rates, fertiliser use, and stock directly accessing the river). If consent was granted they sought:

- adequate water for fire fighting is made accessible;
- irrigation be restricted (and enforced) should the Cobb Power Station generation pattern change;
- soil moisture levels are monitored and that irrigation rates are restricted accordingly;
- records are kept of river levels and flow rates and are audited annually along with the soil moisture monitoring and irrigation rates; and
- stock be prevented from accessing the river and that riparian areas are fenced and planted to mitigate potential effects of intensification of farming practices and loss of amenity value as a result of reduced flows.

Sonia Browne wishes to be heard in support of their submission.

D Perreau

Deidre Perreau opposes the application, and opposed the original application. She submits that the recent irrigation has lead to altered rates and duration of drying of the river bed and contamination of swimming holes and, until a prolonged drought occurs (to see the effects of the current consents), that it is too soon to grant new consents.

In her previous submission, Ms Perreau wished to see strict monitoring of the quantity of water taken and a continued assessment of the effects of taking the water if consent is granted.

Fish and Game New Zealand

Fish and Game New Zealand – Nelson/Marlborough Region (F&G) note that the Takaka River is a trout fishery of regional importance. F&G do not oppose the taking of water during normal flows, however, they do have concerns with the taking of water during low flows. Whilst noting that the Takaka River dries naturally below Lindsays Bridge, F&G are concerned that the existing and proposed abstraction may have altered the rate and duration that this drying occurs.

F&G raise the issue of cumulative effect on the river flow from the effects of Cobb Hydro, other existing consents and the other (Harwood) application. They believe this will have additional effects on the rate at which the river dries up and length of time it is dry.

F&G seek clarification whether the upper drying zone boundary has shifted upstream and whether this may be due to recent irrigation.

F&G want the resource consent declined unless there are conditions limiting the taking of water to above a particular flow threshold that will protect brown trout and the native fishery such that the drying zone boundary does not shift upstream.

F&G wish to be heard in support of their submission.

Royal Forest and Bird Protection Society NZ Inc

Royal Forest and Bird Protection Society NZ Inc (RF&B) submitted in opposition to the application, and also opposed NN020416.

RF&B oppose the application in the absence of Council having adequate data on the effects of this application and cumulative abstraction on the Takaka River and Pupu Springs. In the absence of allocation limits and a full assessment of the uses and values of the Takaka River, RF&B submit it is important to not over-allocate the resource.

RF&B are critical of the application rates which should be 9000 m^3/week for 30 hectares (at 30mm/ha/week) not 10,500 m3/week (actually 10,283 m^3/week) and are critical of the previous non-notified consent process that allowed the change of conditions of NN020416 and increased area irrigated. RF&B identify a potential inconsistency regarding Policy 31.1.11 TRMP and seek for the consent to be declined but suggest conditions if it is granted including a five year duration and limiting application of water to 50mm per rotation. RF&B wish to be heard in support of their submission.

Nicole King, Galen King, Marie Westerink, Klaus Wagmann, Kirstie Macleod, Brad Heising and Bridget Mainsell

These submitters oppose the granting of consent for reasons including the need to protect the river from over-exploitation, protect amenity and landscape values. Submitters cite adverse effects and a deterioration of water quality resulting from dairying including river crossings by the applicant's own cows and that it is detrimentally affecting community use of the river for swimming and recreation. Various submitters oppose the use of a public resource (i.e water) by individuals to an extent that changes the river eco-system. Various submitters suggest a moratoria on new consents say for five years.

Of the above, Galen King and Klaus Wagmann do not request to be heard and Bridget Mainsell's submission was late some three-four days late.

Summary of Issues Include:

Whilst acknowledging that the Takaka River dries naturally below Lindsays Bridge, many submitters are concerned that the existing and proposed abstraction will lead to increased rates and duration of drying of the river bed and lead to loss of swimming holes, as well as their contamination. Observations by locals is that the upper drying zone boundary has shifted upstream and there is concern this may be due to recent irrigation.

Key technical resource issues are:

- The % exceedence relevant to the TRMP:
- Degree of river drying exacerbations and habitat effects
- Karst system recharge

Concern that the abstractive allocation is too great and may not be restricted to 33% of the five year flow.

Concern that the affects of the proposed abstraction are not fully known and flow is important for underground recharge. That further allocation should wait until TDC has completed its investigations and water allocation limits for the region are established.

Concern about detrimental effects on the river's water quality including stock access and crossing of the river and of the effects of dairying landuse on water quality.

Question what if any are the results of suggested monitoring of river flow and water quality downstream of the abstraction site. Until a prolonged drought occurs (to see the effects of the current consents), it is too soon to grant new consents.

Submitters suggest various conditions to avoid, remedy or mitigate the adverse effects of the proposed taking of water.

Statutory Provisions

The Council's obligations and responsibilities when deciding this application are primarily contained in Section 104 of the RMA. This section sets out those matters which, subject to Part II of the RMA, the Council should have regard to when considering the application and any submissions received. Section 104 requires the Council to have regard to any relevant objectives, policies, rules or other provisions of a plan or proposed plan. The relevant plans to this application are:

- Tasman Regional Policy Statement;
- Transitional Regional Plan; and
- Proposed Tasman Resource Management Plan.

1.3 Tasman Regional Policy Statement

The Tasman Regional Policy Statement (TRPS) became operative on 1 July 2001. The TRPS specifies the overriding policies of the Tasman District Council when preparing other resource management plans and when considering any application for any resource consent.

Of relevance to this application is Policy 7.4 of the TRPS.

Policy 7.4 states:

The Council will:

(i) preserve the natural character of wetlands, rivers and lakes, and

(ii) protect and enhance or support the protection and enhancement of natural, recreational, cultural, intrinsic, and instream features and values of wetlands, rivers (including karst rivers), and lakes, in particular those that are of international, national, or regional significance;

and in determining significance of such water bodies for such values, the following criteria shall be applied:

(i) size of the water body; and

(ii) diversity of species and abundance of populations of indigenous flora and fauna supported by the water body; and

(iii) rarity of any species of flora or fauna, or of habitat type, associated with the water body; and

(iv) condition of the water body; and

(v) special scientific, recreational, cultural, or amenity values of the water body; and

(vi) recognised international, national, or regional importance of the water body; and

in relation to all significant wetlands, rivers, and lakes, the risk adverse effects on their natural, recreational, cultural, intrinsic or instream values shall be relevant to achieving such protection or enhancement.

1.4 Transitional Regional Plan

The Transitional Regional Plan (TRP) provisions relating to the allocation of minor uses of water under certain circumstances is considered to be replaced by the TRMP. The TRP provided no policy guidance for the allocation of water resources.

The TRP contains the Water and Soil Bylaw 1990 which covers the use of the regions watercourses until replaced by provisions under the TRMP. Sections 2.4.1, 2.4.2 and 5.1.1 of this bylaw require that a resource consent be obtained for any structure in a watercourse including intake structures. No new structures are required under this application.

1.5 Tasman Resource Management Plan - Part V - Water

The proposed Tasman Resource Management Plan (TRMP) was publicly notified on 25 May 1996. Part V of the TRMP details the policies and rules for the management of the District's water resources and was publicly notified on 3 November 2001.

Under the provisions of the TRMP the application falls under Rule 31.1.6 and is a *restricted discretionary* activity. The Council has limited its discretion to a number of matters listed in the TRMP. There are no outstanding references to Rule 31.1.6 relevant to this application.

With regard to subclause (a) of Rule 31.1.6, Figure 31.1F does not specify an allocation limit for the Takaka River, but rather, notes that Policy 30.1.9 to Policy 30.1.12 should be referred to. This can now be read as Policy 30.1.9 to Policy 30.1.11, as Policy 30.1.12 is deleted.

Policy 30.1.9 states:

When assessing resource consent applications to take water, particularly those applications to take water from water bodies where no allocation limit has been established, to take into account actual and potential adverse effects, including cumulative adverse effects of the proposal in combination with any existing authorised takes, on:

(a) natural character of the water body and its margins;

(b) associated wetlands;

(c) cultural and spiritual, amenity and recreational values;

(d) aquatic habitat, including plants and animals;

(d) other water users;

(e) water reserved for other uses;

(f) hydrological regime of the water body;

(g) capacity to dilute contaminants;

(h) uses and values identified in Schedule 30.1;

(i) sustainable yield of an aquifer.

(i) sustainable yield of an aquifer and the sustainable short and long term yield of a bore based on assessment of yields over five and 100 days.

Schedule 30.1 does not list the Takaka River as being of national or regionally significant value, however, notes that the management objectives are to:

- maintain water flows to protect aquatic and wildlife habitat, especially native fisheries; and

- to maintain flows to protect cultural, spiritual and landscape values.

Policy 30.1.11 states:

30.1.11 Except:

(i) as otherwise provided by a water conservation order, or

(ii) for rivers in the Moutere gravel catchments;

to manage the allocation of water for consumptive uses from rivers that:

(a) have no established minimum flow or allocation limit; and

(b) do not have regionally or nationally significant aquatic habitat value as identified in Schedule 30.1;

so that the cumulative abstraction between November and April inclusive, other than in relation to hydro power, from the proposed and all existing authorised takes from the river does not exceed 10 percent of the 5-year, 7-day low flow, provided that up to 33 percent of the 5-year, 7-day low flow may be allocated if the cumulative adverse effects listed in Policy 30.1.9 from the proposed take in combination with any other authorised take are avoided, remedied or mitigated.

The implementation of the above policy is probably the most significant issue raised in submissions. RF&B also interpret Policy 30.1.11 as restricting consents granted under it to their being exercised only *between November and April inclusive.* However, staff's interpretation is that the policy guides allocation (in the absence of an allocation limit) and for irrigation consents this may extend beyond these specified months provided the use is for irrigation.

Also of relevance to this application are Policies 30.2.4, 30.2.9, 30.2.14 and 30.2.17.

Policy 30.2.4 states:

To continue to allocate water on the basis of priority in time for any application for a water permit where there is still water available for allocation.

The Harwood application was received after the Sowman application and therefore the Sowman application has priority in time provided there is water available for allocation.

Policy 30.2.9 states:

To take into account, when assessing any application to take water, any:

(a) provisions that may exist for the reservation of water;

(b) effects on other water users;

(c) measures taken for water conservation and to ensure efficient water use including monitoring water use;

and for any application to take water for irrigation;

(d) the soil water holding characteristics of the soil being irrigated;

(e) the influences of climate on crop water demand;

(f) measures to monitor soil moisture levels and water application rates.

(See also 30.1.9)

Policy 30.2.14 states:

To seek to maintain or establish a minimum security of supply for all water users by establishing allocation limits and trigger levels for rationing whereby a reduction in 35 percent of the allocated amount is expected during a 10-year drought for permits to take water from surface or ground water bodies during summer periods.

Policy 30.2.17:

To promote, encourage and require, as appropriate, water conservation practices in the use of water through:

(a) water use practices which minimise losses of water;

(b) water use practices that use water more efficiently;

(c) encouraging water users to use less water;

(d) encouraging the re-use of water;

(e) requiring the storage of water for any new dwelling not connected to a reticulated water supply.

Policy Planner Mary-Anne Baker has advised that, with regard to the above policies and the plan provisions relevant to this application, the TRMP can be considered effectively operative.

1.6 Informal Policy – Pre Part V - Water

It is also relevant to mention the informal "Takaka Valley Water Management Policies" adopted by the Nelson Marlborough Regional Council in 1991. This policy document envisaged the completion of a *Takaka Valley Water Management Plan* by 1994, but is still not prepared. It is considered that some regard should be had to these interim albeit informal policies as they contain more detail regarding management objectives than the TRMP.

Various management issues are identified in the informal document including protection of the Pupu Springs recharge area from contamination and significant reductions in recharge. Furthermore, an interim allocation limit of 500 L/sec was adopted for the recharge area.

Council's consent database currently shows (see Appendix) that total allocation is 321 L/sec within the recharge area of the Waikoropupu Springs, comprising 80 l/sec allocated to groundwater users and 241 L/sec to surface users. A map will be provided at the hearing identifying the assumed recharge zone boundary.

1.7 Status and Conditions

As a *restricted discretionary* activity under Rule 31.1.6 of the TRMP, conditions on various matters over which Council has reserved control (see Rule 31.1.6(1)-(12)) can be adopted including the following:

(1) The quantity, rate and timing of the take not otherwise specified above, including rates of take, rostering or rationing steps . . . and any other requirements to maintain any minimum flow or level given in Schedule 31.1C.

(3) The effects of the take, use or diversion on other uses or values of the water body or coastal water, including those given in Schedule 30.1.

(5) Effects on other water users.

(6) The effects of the take, use or diversion including takes from groundwater, either by itself or in combination with other existing takes, on aquatic and riparian ecosystems, fish and eel passage and flows in rivers, coastal streams or coastal waters, including in estuaries.

(8) Installation of water meters as provided for in Schedule 31.1B or in Policy 30.2.11.

(9) Information to be supplied or monitoring requirements.

(10) Measures to achieve efficient water use or water conservation, including sealing of artesian bores, preparation of property water management plans, and measures to monitor water use.

(12) Financial contributions, bonds and covenants in respect of the performance of conditions and administration charges (Section 108 of the Act).

(13) Any effects of coastal water take, use or diversion on water quality, the life-supporting capacity of ecosystems and their intrinsic values, and general sustainability issues relating to natural resources, including fisheries resources.

(14) The nature, scale and distribution of beneficial effects resulting from the proposed water take, use or diversion

The conditions of consent required under the TRMP in this Takaka Zone are relatively few. However, issues include ensuring that water taken is used efficiently and, furthermore, that individual consent holders continue to require the water allocated to them in their consents.

As provided for in the TRMP, Council has also previously reserved the right to require a property water management plan from the consent holder. These plans are to identify more accurately an individual property's irrigated soil type(s) and their soil's moisture-holding capacity. Also, data on the existing irrigation equipment and application rates that achieve efficient water application while avoiding subsurface drainage and surface run-off etc. A property water management plan should also document other efficiency measures, including leak detection programme, repairs and maintenance.

The ability for Council to review the quantities and rates of water authorised under each permit in response to the property water management plan is also appropriate.

Any consent conditions must be within the scope of the Council's stated discretion.

Assessment of Affects

The applicant proposes to irrigate an additional 30 hectares of pasture for dairying and has applied to take 10,283 m^3/week of water at a maximum rate of 17 L/s. This volume of water will be sufficient to irrigate their previously authorised area of 241 hectares at the irrigation rate of 30 mm/week.

The applicant's property is bounded to the east by the Takaka River. Water is to be sourced directly from the Takaka River approximately 850 metres downstream of Lindsay's Bridge at their current site and no new structure is required.

The primary environmental effects of the proposed take on the Takaka River are considered to be:

- decreased flows in the Takaka River and effect on extent of river drying;
- impacts on groundwater recharge to both local unconfined gravel and to the deeper underlying karst groundwater linked to Waikoropupu Springs ;
- impacts on the quality and availability of aquatic habitat; and
- impacts on the intrinsic, amenity and recreational values of the Takaka River downstream of the abstraction site.

1.8 Takaka River Flows

Significant recharge to the underlying aquifers (both the alluvial gravel and karst aquifers) occurs from seepage from the bed of the Takaka River as it flows across the alluvial deposits of the main Takaka Valley. The karst aquifer is unconfined in the valley floor below Lindsays Bridge and directly underlies the alluvial valley infill.

There are two river flow loss patterns observed over two distinct reaches of the Takaka River. These being from where the Takaka River exits a narrow gorge downstream of the Harwoods flow recorder site down to just below Lindsay's Bridge, and secondly, downstream of Lindsay's Bridge to the confluence of the Takaka River and Spring Brook. Flow down the second reach (below Lindsay's Bridge) typically ceases to a varying extent most summers. The duration and extent of river drying depends upon flows in the river and the underlying groundwater conditions. The lower area is referred to as the drying zone. The proposed take is a short distance upstream of the drying zone.

A number of detailed investigations were undertaken prior to the original Sowman hearing to assess the hydrology and hydrogeology of the Takaka River as part of the consent renewal process for the Cobb Power Station. Based on data from the Harwoods flow recorder and a number of flow gaugings further downstream at Lindsay's Bridge, the flow losses in this reach have been estimated at 750 L/s as a constant over time and do not appear to be related to river flow rates[1].

Drying at the downstream end of the drying zone occurs when flows at the Harwoods flow recorder falls to 7,000 L/s and at the upstream end of the drying zone when flows at Hardwoods reach 3,500 L/s [2]. Based on the estimated loss of 750 L/s over this reach this equates to a flow of approximately 6,250 L/s and 2,750 L/s at Lindsay's Bridge end respectively.

The new proposed take of 120 L/s is still small compared to these flows being only 1.9% of the flow at the onset of drying at the downstream end of the drying zone and 4.4% of the available flow at the onset of drying at the upstream end of the drying zone. Checking Council's database shows a total maximum instantaneous take currently of about 159 l/s upstream of the applicant's take point. The proposed increase of 17 L/s would bring total abstraction to 176 l/s and, if the Harwood application RM50605 is considered, the total increases to 216 l/s.

The effect of the new total abstraction (ie 176 L/s) is small, being 2.6% and 6.4% respectively of the flow at the onset of drying at lower and upper ends of the drying zone. This increases to 3.4 % and 7.8 % if the Harwood application take rate is included. Importantly, the effect of the Cobb Power Station was not considered as this water is ultimately discharged back into the Takaka River. The storage of water in the Cobb reservoir and past operation of the power station has resulted in the release of water during the drier summer months and hence augmented (ie increased) summer flows than would otherwise naturally occur.

The effect of the existing total take (159 L/s) or the proposed increased take (176L/s) is considered small. However, all consented takes upstream of the drying zone increase the degree and duration of river drying. The extent and degree of river drying is difficult to quantify as it is varies depending on background groundwater conditions, natural and augmented Takaka River flow conditions (i.e. Cobb generation) as well as prevailing climatic patterns. During average flow, groundwater and climatic conditions, staff's assessment is that the proposed increase in take is unlikely to significantly alter the occurrence and duration of flows ceasing in the drying zone. The effect would be more pronounced during the drier conditions and an upstream creep of 3-400 metres is possible.

The cessation of river flows in the drying zone are broken by freshes resulting from natural rainfall events or generation flows from the Cobb Power Station. Such flows are much larger than the proposed take. Whilst this take does have an effect on cessation of flow the resumption of full flow through the drying reach is more dependent on natural rainfall events and Cobb Power Station generation flows.

[1] *Hydrology of the Takaka River catchment and assessment of the effects of Cobb Power Station operation on groundwater in the catchment*, prepared for Transalta New Zealand by Institute of Geological and Nuclear Sciences Ltd, 2001.

[2] *Cobb Power Scheme – Takaka River Drying*, prepared for Natural Gas Corporation by Cawthron Institute (Cawthron report No. 635), May 2001.

The five-year seven-day low flow (average seven day low flow with a return period of five years) at the Harwoods recorder based on actual flow records is 1,588 L/s, however, this is affected by the operation of the Cobb Power Station where winter rainfall is stored and later released (as a result of hydro-electricity generation) over the drier summer period. Consequently, this is not the natural five-year seven-day low flow. The Council's hydrology section has estimated the natural five-year seven-day low flow (i.e. the flows that would occur in the absence of the Cobb Power Station) at the Harwoods flow recorder as 1,550 L/s, and 1,100 L/s at the downstream Lindsay's Bridge.

Policy 30.1.11 of the TRMP provides a guide to the allocation of water from rivers where the limit is not stated in the TRMP. Between 10% of the five-year seven-day low flow and up to 33% may be allocated from rivers if the cumulative adverse effects listed in Policy 30.1.9 are avoided, mitigated or remedied. The approach for Takaka is complicated by the presence of a drying zone a short distance downstream of the applicant's site. Surface flows resume downstream of the drying zone where there is a change in the underlying geology and as a result of inflows from tributaries and groundwater. A significant portion of this flow, particularly below the confluence with the Waingaro River, is not related to flows in the Takaka River above the drying zone. Therefore, in this instance it is reasonable to only consider the takes above the drying zone and not those below.

Granting this application would result in a total take of 176 l/s, which is 16% of the five-year seven-day low flow at Lindsay's Bridge. If the Harwood application is included the total becomes 19.6 % of the five-year seven-day low flow at Lindsays Bridge. However, the applicability of Policy 30.1.11 is at least questionable given the natural flow losses and become even more confusing in the river drying reach.

The extent that the adverse effects listed in Policy 30.1.9 can be attributed to the proposed take during periods of low flow is small but nevertheless there. Any further direct takes above the drying zone effect river drying. Further takes have a small individual effect but add cumulatively to compound the extent and degree of river drying. The principal effect of the proposed take is therefore to further reduce flow and cause further migration upstream of the river drying zone. At the same time, the effect is small compared with the natural variations.

The discharge from the Cobb Power Station has had a far greater impact on the flow in the Takaka River below Lindsay's Bridge in the past, including the onset and duration of zero flows in the drying zone. The effects of the Cobb Power Station are not necessarily adverse, as summer flows can be augmented from water being released from storage for hydro-electrical generation. Whilst past operation of the Cobb Power Station has been characterised by continual generation year round, albeit with daily variations, the renewed consent conditions, as granted, do not specifically limit the operation to any particular generation regime. It is conceivable that no, or very limited, generation could occur over the summer period when flows are naturally low. Hence effects of river takes would be more significant during low Cobb generation and drier climatic conditions.

Table 1: Flow Data

	MALF	Five-Year (Seven- day)	Lowest recorded
Harwoods		1550	
Lindsays		1100	
Pupu Springs	7600	6700	5300 (1973)

1.9 Effects on Pupu Springs and Adjacent Groundwater

The Takaka River is an important source of recharge to the underlying aquifer systems which includes the alluvial aquifers that are adjacent the river and the deeper karst aquifer that feeds Waikoropupu Springs. The GNS groundwater report that was commissioned as part of the Cobb Hydro scheme consent application concludes that flow losses from the Takaka River between the Harwoods recorder and Lindsay's bridge and the reaches downstream of Lindsay's Bridge contribute to flows in Pupu Springs. The report notes that in the order of 40% of the flow in Waikoropupu Springs is derived from the Takaka River. The rest of the 60% of the recharge is from other areas where karst recharge occurs in the Takaka catchment. Hence the net effect of consumptive abstractions (ie versus non-consumptive run-of-the-river hydro generation) on flow on Waikoropupu Springs will need to account for other abstraction within the recharge area as well. Council's consent database shows total allocation of 321 L/sec within the recharge area of the Waikoropupu Springs.

Based on Council flow records, the lowest recorded flow for Waikoropupu Springs main spring was 5,300 L/s in the 1973 drought. The seven day mean annual low flow (MALF) is 7600 L/s and the 7 day 5 year low flow is 6700 l/s. On the assumption that the entire flow loss from the Takaka River goes to Waikoropupu Springs (this is a conservative assumption as Waikoropupu Springs is not the only discharge point for the Arthur Marble aquifer system) the proposed increased Sowman take will increase the proportion from 1.9% to 2.3 % of the lowest recorded flow from Waikoropupu Springs. If all current takes upstream of the abstraction point were included the proportion increases from 3.0 % to 3.3 % of the lowest recorded Waikoropupu flow and if the Harwood application is considered this increases to 4.1 %. These percentages reduce for the seven-day five-year low flow at the main springs.

For the same flow data as above, if all current takes within the Waikoropupu Springs recharge zone are included the proportion increases from 6.0 % (i.e 321/5300) currently to 6.4 % (i.e 338/5300) of the lowest recorded Waikoropupu flow and if the Harwood application is considered this increases (i.e 378/5300) to 4.1 %. These percentages reduce for the seven-day five-year low flow at the main springs.

The current takes from the Takaka River and within the Waikoropupu Springs recharge zone compared with flow from the main Waikoropupu Springs are therefore significantly less than the guideline 10% even if both applications are granted. Having said that, there is not abundant water and it is timely to seek a full assessment of the uses and values of the Takaka River, connected aquifers and springs as suggested by submitters.

1.10 Aquatic Ecosystems

As discussed in this report the Takaka River below Lindsay's Bridge naturally dries during the summer period. Drying has a significant impact on aquatic ecosystems and in stream values. As the proposed take is small compared to the available flow at the time flows cease in the drying zone it is considered that it will have no significant effect on aquatic ecosystems within the drying zone. It is the operation of the Cobb Power Station that has the greatest effect on the onset and duration of drying in the Takaka River below Lindsay's Bridge. As previously noted the effects of the Cobb Power Station are not necessarily adverse and may be beneficial as summer generation will augment flows above those that would occur naturally.

Immediately below the proposed take and above the drying zone the taking of water may affect aquatic ecosystems during periods of low flow and may result in some loss of habitat. More significant loss of habitat would occur if abstraction continued to be taken during extreme low flow events. To limit these effects, the applicant has volunteered conditions restricting the taking of water during low flow. The recommended restrictions apply when the flows reach the natural five-year seven-day low flow level (i.e. the five-year seven-day low flow that would occur in the absence of the Cobb Power Station) which is considered to be 1,550 L/s at the Harwoods flow recorder.

Whilst the threshold for ceasing the taking of water is based on the estimated natural five-year seven-day low flow, when determining when it should apply it is to be based on the actual flow at Harwoods recorder in the Takaka River, irrespective of the operation of the Cobb Power Station. Therefore, if there are prolonged periods of no generation over summer it may not be possible for the applicant to take water for irrigation.

It is acknowledged that the proposed trigger flow where the taking of water shall cease is not necessarily in accordance with Policy 30.2.14. However, the approach continues that for the current consents and is considered reasonable given the absence of an allocation limit for this section of the Takaka River. In the absence of specified allocation limits and rationing requirements in the TRMP a conservative approach is recommended and is supported by submitters.

The recommended consent conditions require that the abstraction rate is reduced so that the taking of water ceases when flows in the Takaka River at the Harwoods flow recorder reach 1,550 L/s. The consent holder shall progressively reduce the maximum rate of abstraction in steps of approximately 33% such that estimated natural five-year seven-day low flow is maintained. The steps of 33% are primarily for simplicity for both the consent holder and the consent authority. Flow data is available from the Harwoods flow recorder on the Council's website (www.tdc.govt.nz) and will shortly be available via an automated phone service. Because of Cobb Hydro, the Takaka River is subject to rapid variations in flow as a result of generation and river flows will need to be checked daily and an assessment made as to whether there is sufficient flow for irrigation. Compliance will be monitored by appropriate metering.

1.11 Water Metering and Compliance

It is particularly disappointing that the applicant is unable to supply fully complying water usage data as required under Condition 5 NN020416. Condition 5 (which incidentally also applies to the Rosser consent RM030171) states:

The consent holder shall install and maintain an approved water meter (accurate to plus or minus 5%) with a pulse output, which shall be connected to an automated data-logger to provide a complete record of the water abstracted from the Takaka River. The consent holder shall provide confirmation to the consent authority that the meter has been installed to the manufacturer's specifications. The consent holder shall be responsible for ensuring that the water meter is accurately calibrated. If requested by the consent authority, the consent holder shall re-calibrate the water meter at their expense.

The abstraction data for the 12 month period ending 31 May shall be forwarded to the consent authority by each year or at any time upon request by the consent authority. The required abstraction data shall be forwarded to the consent authority within 20 working days from when required by this condition or if requested.

The actual (metered) usage data supplied in support of the application falls significantly short of what was envisaged under the above condition. The applicant advises that various reasons including two faulty meters are the cause, and I understand that (unmetered) irrigation continued during these times. The applicant advises ".Because of the earlier faulty meters we will never get correct historic data, but from here on it will be correct (as long as the meter runs correctly)..".

This situation is of concern. Council's records for Harwoods shows two events when Cobb shut down and flow fell to levels when Sowman's irrigation should have reduced or ceased all together in accordance with Condition 4 NN020416 which states:

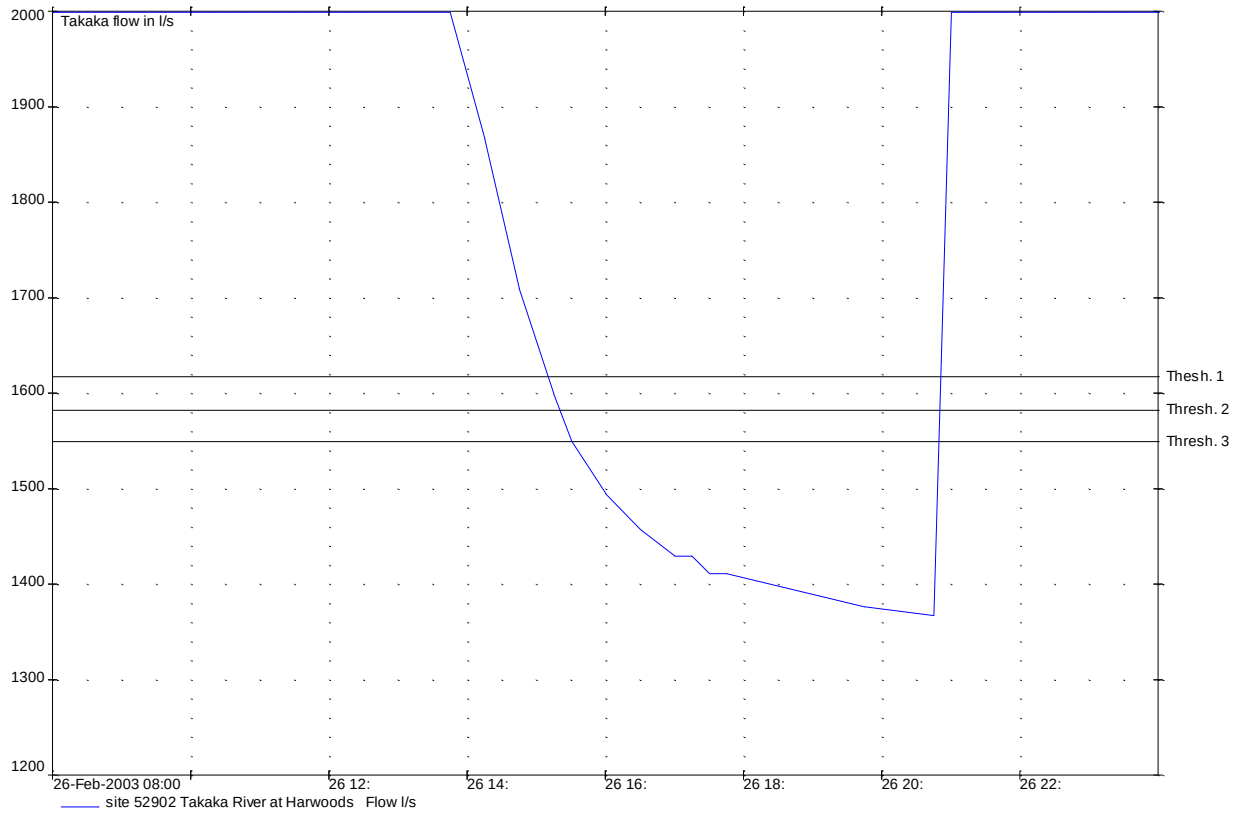
When flows in the Takaka River, as measured at the Harwoods flow recorder, fall below 1,653 litres/second the consent holder shall reduce the abstraction rates in accordance with the following steps:

Takaka River flow at Harwoods recorder is below:	***Maximum rate of take:***
1,618 L/s	*68 L/s*
1,583 L/s	*33 L/s*
1,550 L/s	*0 L/s*

Takaka River flows are as measured at the Harwoods flow recorder.

There shall be no taking of water when the flows in the Takaka River, as measured at the Harwoods flow recorder are below 1,550 litres/second.

One of the two events when Cobb Hydro shut down causing the river flow to fall to levels when irrigation restrictions are required is shown below.



In the above example, the effect of Cobb Hydro shutdown on 26 February 2003 resulted in the flow falling to below 1400 L/sec at Harwoods for a period lasting just 4.5 hours. But what is of concern is that the applicant appears to be unaware that the event occurred and there is no reference in their application to their having ceased taking. Given the current system, the Sowmans should be phoning and interrogating the Harwood's recorder at least daily when they are irrigating, and their consent should probably say so probably as a advice notice or notation.

The applicant has been non-complying in terms of their current conditions but they suggest no change of conditions and presumably considers they can comply. Non-compliance should not be repeated or tolerated and it is proposed that the consent conditions be amended to state that exercising of the consent shall cease unless compliance can be guaranteed and meter records can confirm that is the case. Some method of alerting the applicant to the shutdowns is required. In addition to the data-logger data, it is also proposed that the applicant supply weekly readings on a fortnightly basis, the same as required for fully metered zones. This will ensure regular contact with the applicant by Council staff and avoid a repeat.

1.12 Water Quality

Concern about adverse effects of the dairying landuse on the river's water quality have been assessed by Council Resource Scientist Trevor James.

Mr James advises that monitoring of the Takaka River's water quality is undertaken quarterly at two sites, one at Harwoods recorder in Upper Takaka and the other at Kotinga close to Takaka township. This monitoring forms part of the Council's State of the Environment Monitoring Program. In addition, the Cobb Hydro consents conditions require extensive monitoring of the river water quality, invertebrates and fish at seven sites on the river upstream of Harwood's recorder.

Mr James comments that data indicates that the Takaka River at base flow generally has very good water quality. Water clarity is generally very high at both sites (see Figure 1). Only one sample during base flows was found to be above guidelines for contact recreation (see Figure 2). The concentration of nitrate nitrogen which has been found to be regularly higher at the Kotinga site but within ANZECC guidelines (see Figure 3). Dissolved inorganic nitrogen was found to be occasionally above guidelines in the mid reaches near Paynes Ford. Macro-invertebrate samples on the Takaka River at Kotinga show low taxanomic richness but there appears no obvious explanation for this.

Nutrient concentrations in the Waikoropupu River are consistently relatively high over 10 years from 1990 to 1999 (nitrate range: 0.1-0.9 gm-3) (Tasman District Council springs monitoring programme, unpublished data). There appears to be little obvious trend in data for these rivers. Faecal bacteria concentrations are known to exceed guidelines for contact recreation during high rainfall events, which is a common feature of agricultural catchments.

Figure 1. Water Clarity for the Takaka River

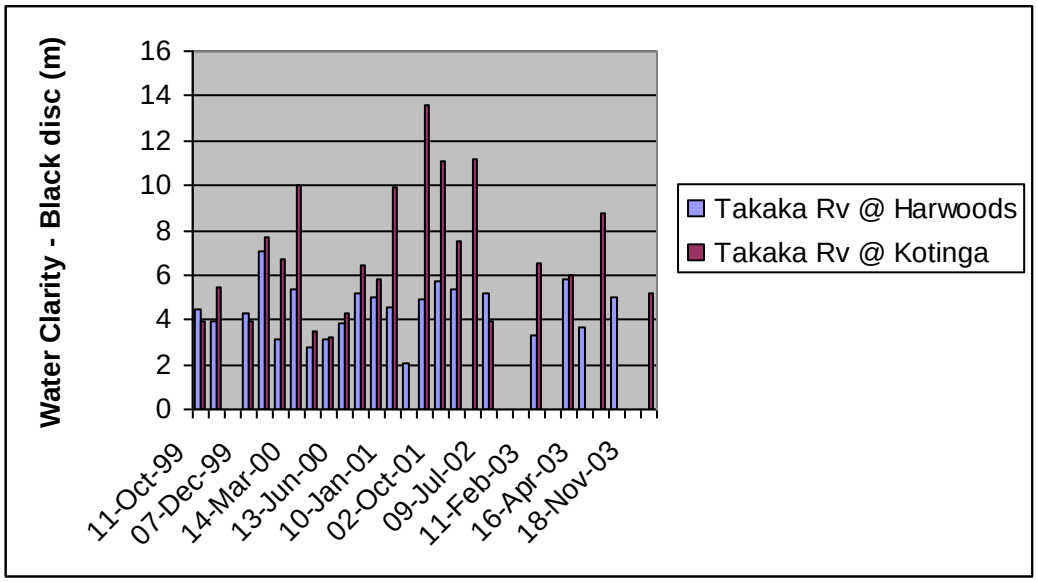


Figure 2. E.coli concentration for the Takaka River

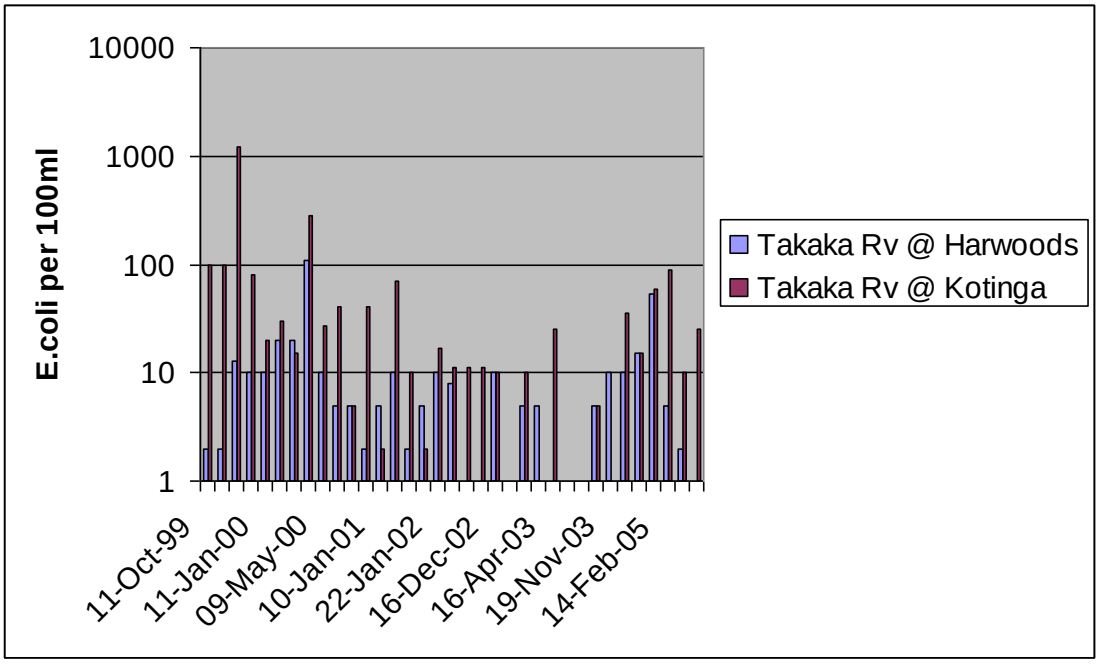
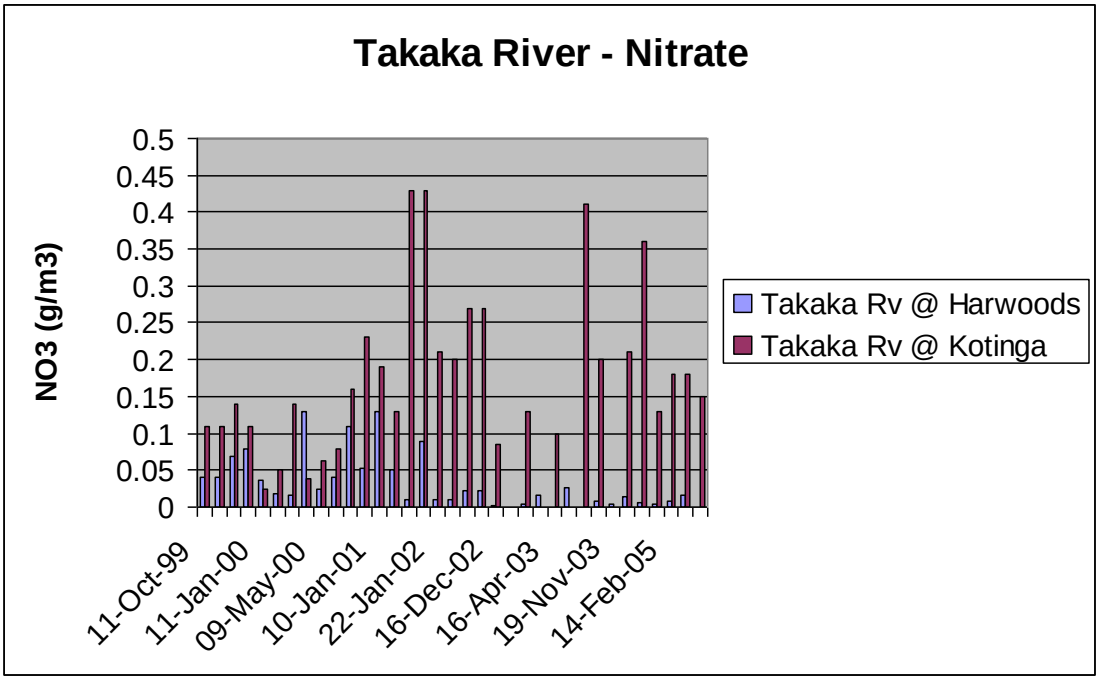


Figure 3. Nitrate concentration for the Takaka River



As a priority farmers in the Takaka catchment should focus on the following if water quality is to be maintained or improved particularly given intensification of dairying landuses in recent years:

- reduce the discharges of faecal matter during heavy rainfall. This requires having adequate contingency (eg effluent storage capacity) with respect to effluent discharges to land and routing effluent from standoff, feed pads and races to treatment facilities.

- fencing wetlands and preventing stock access to farm drains and small waterways (a significant source of effluent).
- complying with rules relating to effluent discharges to water, and to land.
- no discharge of effluent to sinkholes.

- bridging to remove stock crossings through waterways, including intermittent waterways.
- draw up whole-farm nutrient budgets and determine nutrient loss risk zones

Currently, the results of monitoring of river water quality immediately downstream of the Sowman abstraction site are limited, and a prolonged drought has yet to occur.

1.13 Proposed Plan Provisions

The TRPS and TRMP recognise that the Region's freshwater resources have a wide range of uses and values, both instream and for abstraction. Instream values include aesthetic and ecological values as well as intrinsic and amenity values.

The taking of water from the Takaka River will affect the intrinsic and amenity values to some extent. Such effects however, need to be viewed in the context of the environment as it currently exists. Submitters are concerned that the affects of the proposed and existing abstraction are not fully known including underground recharge affects and state that further allocation should wait until TDC has completed its investigations and adopted defendable water allocation limits for each zone.

In this report, Council staff have acknowledged that defined zones and individual allocation limits are still not proposed under the TRMP but staff acknowledge they need to be. These applications highlight that action must be taken on various matters.

This report also acknowledges that the Takaka River dries naturally below Lindsays Bridge and that Cobb Hydro is a significant factor concerning river flow. While the existing and proposed abstraction upstream of the drying zone will lead to increased rates and duration of drying and will adversely affect the swimming holes, the extent is considered minor relative to Cobb. Observations by locals that the upper drying zone boundary has shifted upstream cannot be confirmed, but it is considered likely but to a lesser extent than submitters fear.

1.14 Mitigation

Submitters suggested various conditions to avoid, remedy or mitigate the adverse effects of the proposed taking of water. It is relevant that the Cobb Hydro decision involved an off-site "Mitigation Fund" which would be used for general environmental enhancement in Golden Bay. This was agreed between Department of Conservation, the Nelson Marlborough Fish and Game Council, Ngati Rarua Iwi Trust , Ngati Tama Manawhenua Ki Te Ihu Trust and Te Atiawa Manawhenua Ki Te Ihu Trust. They signed a Memorandum of Understanding regarding the establishment and operation of the fund which is independent of the Council. A Mitigation Fund Administration Deed has also been developed with the Tasman Environmental Trust and the MOU parties. In that case, the "Mitigation Package" was not included as a condition of the consent.

It is noted that no mitigation such as riparian planting and fencing has been offered and the Council can only require such measures where provided for under an operative plan. As the TRMP is not yet operative such mitigation measures can only be included as condition of consent with the agreement of the applicant. The implementation of such measures may satisfy some of the submitters concerns. Mitigation by way of a financial contributions would otherwise be an option available to the Committee pursuant to the TRMP and Section 108 of the Act.

1.15 Intrinsic, Amenity and Recreational Values

The Takaka River downstream of Lindsay's Bridge is typified by summer low flows and a drying zone where river flows cease altogether. Complicating this is that the operation of the Cobb Power Station, which results in a significant impact on river flows and consequently the extent and duration of the drying zone.

It is considered that the proposed takes will have no more than a minor effect on the intrinsic and amenity values of the Takaka River above what may occur naturally and as authorised by the Cobb Power Station resource consents.

1.16 Duration of Consent

It is recommended that if granted, this resource consent have an expiry date of 31 May 2019, which is in line with common expiry date for the Takaka Water Management Zone listed in Schedule 31.1A of the TRMP and is the same as NN020416.

It is recommended that if granted, this resource consent be amalgamated and combined with NN020416 and that the common expiry date of 31 May 2019 shall apply. A draft consent is appended for this purpose and the written surrender of NN020416 will be required once any appeal period was past..

2. CONCLUSION

The proposed abstraction of water from the Takaka River for irrigation is consistent with the policies and objectives of the TRPS and TRMP. It is considered that the effects of the take are no more than minor when assessed against the naturally occurring drying of the Takaka River below Lindsay's Bridge and the affects from the exercise of the resource consents for the operation of the of the Cobb Power Station.

The operation of the Cobb Power Station will have a significant affect on the ability to exercise this resource consent subject to the proposed consent conditions and it may be necessary to review the appropriateness of this consent should changes to the operating regime of the Cobb Power Station occur.

Whilst the recommending this application, it is considered that Council must now undertake and complete the necessary investigations and promote, through a variation of the TRMP, appropriate zone boundaries and allocations limits that protect the available resource. This is both in terms of the Takaka River and the Waikoropupu-Arthur Marble aquifer system (and hence flows from Pupu Springs).

It is noted that no mitigation such as riparian planting and fencing has been offered. It is understood that the Council can only require such measures where provided for under an operative plan unless volunteered by the applicant and included as condition of consent.

Neil Tyson
Consent Planner (Water)

Joseph Thomas
Resource Scientist (Water)

Appendix 1
Draft Template

RM050340
Valuation No. 1870027800

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of the application lodged by **G and B SOWMAN**

For a resource consent required under the Tasman Resource Management Plan (TRMP) and Section 14 of the aforesaid Act and a decision under the provisions of Sections 104 of the same aforesaid Act

DECISION

THAT pursuant to Section 104 of the Resource Management Act 1991, the Consent Planner (Water) under authority delegated by the Council GRANTS consent for a change of conditions *to take and use* water for irrigation subject to the following conditions and for an unchanged period expiring on *31 May 2019*.

Condition 1 – Location, Take and Use Details:

Location:	*Takaka River, Uruwhenua*
Legal Description (at take point):	*Pt Sec 4 SQ 8*
Category of Water Source:	*Surface water*
Tributary:	*Takaka River*
Catchment:	*Takaka*
Zone:	*Takaka Surface*
Map reference:	*NZMS 260 N26:9520-2520*
Maximum rate of take:	*120 litres/second* *10,369 cubic metres/day* *72,583 cubic metres/week*
Area irrigated:	*241 hectares*

Legal Description of areas irrigated:

xvii. Lot 1 DP 17733
xviii. Pt Sec 1 SQ 8
xix. Pt Sec 10 SQ 11
xx. Pt Sec 12 SQ 11
xxi. Pt Sec 12 SQ 11
xxii. Pt Sec 13 SQ 11
xxiii. Pt Sec 141 SQ 11

xxiv. Pt Sec 4 SQ 8
xxv. Pt Sec 5 SQ 8
xxvi. Pt Sec 6 SQ 8
xxvii. Pt Sec 7 SQ 11
xxviii. Pt Sec 9 SQ 11
xxix. Sec 1 SO 14649
xxx. Pt Sec 2 SQ 8 Valuation 1870028800 (Sparrow property)
xxxi. Pt Sec 8 SQ 8 Valuation 1870028400 (Lenz property)
xxxii. Sec 9 Sq 8 being part of Valuation 1870029100

2. The taking of water shall be undertaken in accordance with the information supplied with application RM050340 except where otherwise required by the conditions of this resource consent or approved under a change of conditions.

3. The maximum rates of take shall not exceed those stated in Condition 1.

4. When flows in the Takaka River, as measured at the Harwoods flow recorder, fall below 1,670 litres/second the consent holder shall reduce the abstraction rates in accordance with the following steps:

Takaka River flow at Harwoods recorder is below:	**Averaged maximum instantaneous rate of take:**	**Maximum weekly rate of take (cubic metres):**
1,630 L/s	80L/s	48,400
1,590 L/s	40L/s	24,400
1,550 L/s	0 L/s	0

Takaka River flows are as measured at the Harwoods flow recorder.

There shall be no taking of water when the flows in the Takaka River, as measured at the Harwoods flow recorder are below 1,550 litres/second.

Advice Notice: The permit holder shall phone and interrogate the Harwoods recorder daily when they are irrigating to avoid non-compliance.

Water Meter Specifications, Maintenance and Readings:

5. The permit holder or their agent shall, at their own expense, install, operate and maintain a water meter that complies with the Council's *Water Meter Specifications* as stated in the Tasman Resource Management Plan

The water meter required under this condition shall be installed in accordance with the water meter manufacturer's specifications and a copy of this same specification shall be provided to Council's Co-ordinator Compliance Monitoring if requested.

6. Following installation of a water meter, the permit holder shall thereafter record their meter reading on the same day each week throughout every November to April inclusive and shall return their (two) meter readings to the Council's Co-ordinator Compliance Monitoring at the end of each two week period and by the date(s) specified each year (by Council), provided that Council reserves the right to require returns on a weekly basis during periods of water rationing in the zone.

   The permit holder is also required to supply a complete record of their weekly water usage during the months of November to April inclusive and this includes recording any nil usage.

   Advice Notice:
   Regular (preferably Monday) meter readings are required to ensure consistent data as Council may monitor weekly use by consent holders.

7. In addition to Condition 5 and 6, the permit holder shall install and maintain a water meter with a pulse output, which shall be connected to an automated data-logger to provide a complete, time and date stamped, record of the water abstracted from the Takaka River.

   The time series abstraction data required pursuant to this condition shall be forwarded to the consent authority each year no later than 31 May each year or at any time if requested by the consent authority. The required abstraction data shall be forwarded to the consent authority within 20 working days from when requested.

8. The permit holder shall pay the reasonable costs associated with the monitoring of this permit including, if and when requested by Council, the full costs associated with water meter calibration to confirm their meter's accuracy is within the range of plus or minus five percent provided that meter calibration is not more frequent than five yearly and the full cost of monitoring compliance with the conditions of this consent including the reasonable costs associated with maintaining a water meter-usage database.

9. The maximum irrigation application rate per rotation shall not exceed 50 millimetres.

10. This resource consent may be cancelled upon not less than three months notice in writing by the consent authority if the resource consent remains unexercised without good reason for any continuous period exceeding two years, but without prejudice to the right of the consent holder to apply for a further resource consent in respect of the same matter.

11. Council may, for the duration of this consent and within the three month period following the anniversary of its granting each year, review the conditions of the consent pursuant to Section 128 of the Resource Management Act 1991 for the purposes of:

    a) dealing with any adverse effect on the environment which may arise from the exercise of the consent and which is appropriate to deal with at a later stage (including, but not limited to, changes in the flow regime of the Takaka River either as a result of natural climate variation or changes in the operating regime of the Cobb Power Station);

b) to reduce the quantities and rates of water authorised to be taken if the permit is not fully exercised;

c) when relevant national environmental standards have been made under Section 43 of the Resource Management Act 1991;

d) requiring the adoption of the best practical option to remove or reduce any adverse effects on the environment; or

e) complying with the requirements of a relevant operative rule in the Tasman Resource Management Plan or its successor relating to, but not limited to, the maximum or minimum levels or flows or rates of use of water, irrigation application rates, water metering requirements, or minimum standards of water quality.

Advice Notice:
Monitoring of this resource consent is required under Section 35 of the Resource Management Act 1991, and a deposit fee is payable at this time. Should monitoring costs exceed this initial fee, the Council will recover the additional amount from the resource consent holder. Monitoring costs are able to be minimised by consistently complying with the resource consent conditions.

Appendix:
Pupu Springs Recharge Zone Consent Holders

Consent	Applicant	Source	Weekly
30044	A R Wenzel	Rameka Creek	140
30051	Craigeburn Stream Water Scheme	Craigieburn Stream	520
30073	Gunsboro Ltd	WAINGARO	10550
30134	B and J Graham	AARON CREEK	805
30143	Ironstone Creek Water Scheme	IRONSTONE CREEK	280
30163	Motupipi Farm Water Supply	Rameka Creek tributary	2,016.00
30171	Rosser Holdings Ltd	Takaka River	32,000.00
30172	R D and J R Lindsay	Waingaro River	10416
31060	Hamama Water Supply Committee	UNNAMED STREAM	3500
40264	Tasman District Council	Whiskey Creek	161
40340	Golden Bay Enterprises	Craigieburn stream	245
50340	*Brian J and Glenda M Sowman*		
NN010112	T Rea	Takaka River	9100
NN010157	T Rea	Waingaro River	9100
NN010335	P A and A E Alexander	Storage	2160
NN020416	Brian J and Glenda M Sowman	Takaka River	62,300.00
NN020267	MacLean	Waingaro River	2117
NN940083	G BALL	CLEAR CREEK - PUPU SPRINGS	539
		Subtotal (m3/week)	**143832**
	Surface Takes within Pupu	**Recharge Zone**	**241 L/Sec**

Consent	Applicant	Source	Weekly
30080	R B and J M Muntwyler	TAKAKA GRAVELS	1680
30234	S A H Petterson		6300
31204	P L Byrne		7,200.00
40388	M A and L M Winter		3,600.00
40395	S J and E J Faulkner		2,400.00
40758	Inglis Packers	Takaka River Gravels unconfined Aq	7,950.00
40789	C and J Langford		4,200.00
41119	I J and H V Rhodes	Takaka River Gravels Unconfined Aqu	8,750.00
41133	Klaus Thoma	Groundwater	1,680
50079	Kahurangi Virgin Waters Ltd	Takaka Gravel Aquifers	4,032
30123	Central Takaka Water Board		1,134.00
	Pupu Recharge Zone	**(Groundwater)**	**48926**
			80 L/Sec
		TOTAL (241 + 80)	**321 l/Sec**