Planning report on the review of the environmental minimum flow and water allocation for the Conway River/Tūtae Putaputa Catchment

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Part 1: Context for this planning report

The Conway catchment has existing minimum flows set via individual consents. The Proposed Natural Resources Regional Plan, Policy WQN5, states that within five years of NRRP becoming operative, rivers such as those in the Conway, will have had the existing minimum flows reviewed and incorporated into Schedule WQN1. Environment Canterbury commenced community consultation in 2005 to review the environmental minimum flow regimes. Six meetings were held with the community to discuss flow regime requirements, including the needs of both instream values and those of irrigators.

This Planning Report, U07/69 contains the information provided to the Regional Planning Committee as part of the Committee's consideration of the review of the environmental flow regimes for the above mentioned rivers.

The Staff Report to the 19 September 2007 Regional Planning Committee, prepared by Luisa Magalhaes, sets out a summary of technical and other information relevant to the decision making process, and includes recommendations for minimum environmental flow and allocation regimes.

The Community Advisory Group Report is included as it records the discussions and recommendations of the Group. This report contributes to the Section 32 process.

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Part 2: Report to the Regional Planning Committee 19 September 2007

ITEM AGENDA NO: 7	**SUBJECT MATTER:** NRRP Variation Conway River Review of Environmental Flows and Allocation Regimes
REPORT TO: Regional Planning Committee	**DATE OF MEETING:** 19 September 2007
FILE REFERENCE:	**PORTFOLIO:** Water **PROJECT:** Review of Environmental Flow Regime **OUTPUT:** Variation to NRRP
REPORT BY: Ray Maw, Planning Team Leader – Environmental Flows Review	**ENDORSED BY:** John Glennie, Natural Resources Planning Manager, and John Talbot, Director Policy and Planning.

PURPOSE

In 2005, Environment Canterbury initiated investigations and commenced a community consultation programme to review existing minimum flows in the Conway/Tūtae Putaputa River catchment. The consultation process has been completed and this report recommends environmental flow regimes, including minimum flows and allocation limits, to be formalised through a variation to Chapter 5 of the proposed Natural Resources Regional Plan (NRRP).

ATTACHMENTS

Staff Report for the Conway River and handout from the powerpoint presentation made to the workshop.

The Community Advisory Group Report.

BACKGROUND

Environment Canterbury has initiated a rolling programme of reviews of the existing minimum flow regimes for over 150 rivers in Canterbury. The purpose of the review process is to assess the adequacy or otherwise of the existing flow regimes by testing them against the requirements of Objective WQN1 in Chapter 5 of the NRRP.

A Community Advisory Group (CAG), that was open to anyone to participate in, was established following a public meeting to discuss the process. Subsequently the flow requirements for each value in Objective WQN1 were assessed by NIWA for aquatic ecosystem values, and by a technical panel for other values in Objective WQN1. The panel comprised people with expertise in those values. The CAG provided local input, including the impact of any changes in flow regimes on existing users. Four CAG meetings were held, including discussions on drafts of the staff report and issues arising from them. Several informal meetings were held as well because of some specific matters raised regarding the proposed minimum flow for the Charwell River. Different options for flow reviews were discussed as part of the process.

Staff presented to a council workshop, and the powerpoint summary is attached. Members of the community made presentations at a workshop and, apart from the Charwell abstractors, all other participants support the recommendations set out in the attached report.

An issue has arisen with several consent holders who comprise the Charwell Water Users Group. They abstract water from the Charwell River. Although the staff recommendation for the minimum flow on the Charwell is the same as the existing minimum flow on their consents, they consider that it is unjustifiably high and seek a lower minimum flow. The Group engaged Henry Hudson, who made a presentation to a workshop on the 29 May in which he presented information for a different minimum flow. Subsequently there have been technical reviews of Dr Hudson's material, including by external scientists. Two meetings have taken place with Dr Hudson and representatives of the Charwell Water Users Group to try to resolve any outstanding differences in relation to scientific assessments and its interpretation, most recently on 11 September. At that meeting, it was agreed that some further calculations would be undertaken of the MALF, clarification of how downstream abstractions are affected and restricted, wording clarification to ensure A Blocks are capped, moving the minimum flow site once correlation has been assessed, and reconsidering the size of the B Block for the Charwell River. There are, however, fundamental disagreements over the science to assist determining the minimum flow for the Charwell River.

THE PROPOSAL

This report recommends environmental flow regimes, essentially the setting of minimum flows, plus allocation regimes comprising A, and where appropriate, B blocks for four reaches of the river. The surface water A allocation block limits for the October-April period are capped and incorporate all authorised takes of water in place as at 1 May 2007. No new entrants are permitted to access the block, and any water freed up through consents being relinquished or the stream depleting effects of groundwater takes being proven to be less than estimated will not be reallocated. Existing permit holders will be allowed to reapply for their permits but not to expand their permits. Transfers of permits are allowed. Where appropriate, provision is made for community drinking water requirements.

Where further abstraction from the A allocation block for the October-April period cannot be accommodated, provision is made via a B block. B block abstractors are required to cease abstractions at a higher level than the A block abstractors in order to protect the reliability of supply to the A block abstractors. There is also a gap between the A and the B blocks to allow the river to operate above the MALF and make use of the freshes and floods generated by higher flows.

With respect to the Charwell River, three options are available for Council:

Option 1: Proceed to notify the Conway River/Tūtae Putaputa flow regimes, including for the Charwell, and leave it to the submissions/hearing process for any issues to be resolved.

Option 2: Proceed to notify the Conway River/Tūtae Putaputa flow regimes, excluding for the Charwell River, if it is felt that there is a good chance that further investigation and/or discussion about the Charwell minimum flow might result in agreement being reached. The Charwell would then become a separate variation to NRRP, but in due course would catch up with the main variation for the Conway River/Tūtae Putaputa.

Option 3: Delay notifying any variation for the Conway River/Tūtae Putaputa if it is felt there is a good chance that further investigation and/or discussion about the Charwell minimum flow might result in agreement being reached. This would allow any adjustments Council might make for the Charwell to be considerd in the context of the flow regime for the whole catchment.

The environmental flow and allocation regime proposed in the staff report has been based on a whole of catchment approach. This means that the existing minimum flow of 350L/s for the Charwell is also part of the overall regime to ensure that sufficient water is delivered to the lower mainstem to help meet minimum flow requirements there, and maintain the reliability of supply for irrigators whose consents pre-date those for the Charwell River. If the Council resolves to go with Option 2 or 3, and subsequently determines that the Charwell River minimum flow should be less than 350L/s, then Council would need to enter into further consultation with other stakeholders making up the CAG for the whole river. Currently, these stakeholders, with the exception of those abstracting from the Charwell, are in agreement with the recommendations in the staff report.

If Option 2 is selected, and Council decides to reduce the Charwell minimum flow, then Council may need to withdraw the variation for the mainstem flow and allocation regime and review it in light of its Charwell decision. It would then notify a new variation for the whole catchment.

It is the staff view that Option 1 be adopted.

CONSISTENCY WITH EXISTING POLICY, PLANS OR LEGISLATION

The flow and allocation regimes being recommended are considered to be consistent with the requirements of the operative RPS and proposed NRRP.

VIEWS OF AFFECTED AND INTERESTED PARTIES

The views of the affected parties were obtained via the CAG process. The distribution list for minutes included parties who did not attend the meetings. All statutory consultation, as per Clause 3 of Schedule 1 of the RMA, has been undertaken.

Recommendation

That the Council adopt and publicly notify, in accordance with Schedule 1 of the Resource Management Act, as a Variation (to amend Schedule WQN1 of Chapter 5 of the Proposed NRRP) to incorporate into the proposed NRRP the minimum flow and allocation regimes recommended in the attached report for the Conway River/ Tūtae Putaputa catchment, and including the associated RMA Section 32 Report, and receipt of the attached CAG Report.

Part 3: Staff Report

Staff report on the Conway River/Tūtae Putaputa catchment, including regimes for the Charwell River, the Conway River above SH 70 Bridge, the Conway River between SH 70 and Conway Flat Road Bridge, the Conway River below Conway Flat Road Bridge.

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September 2007

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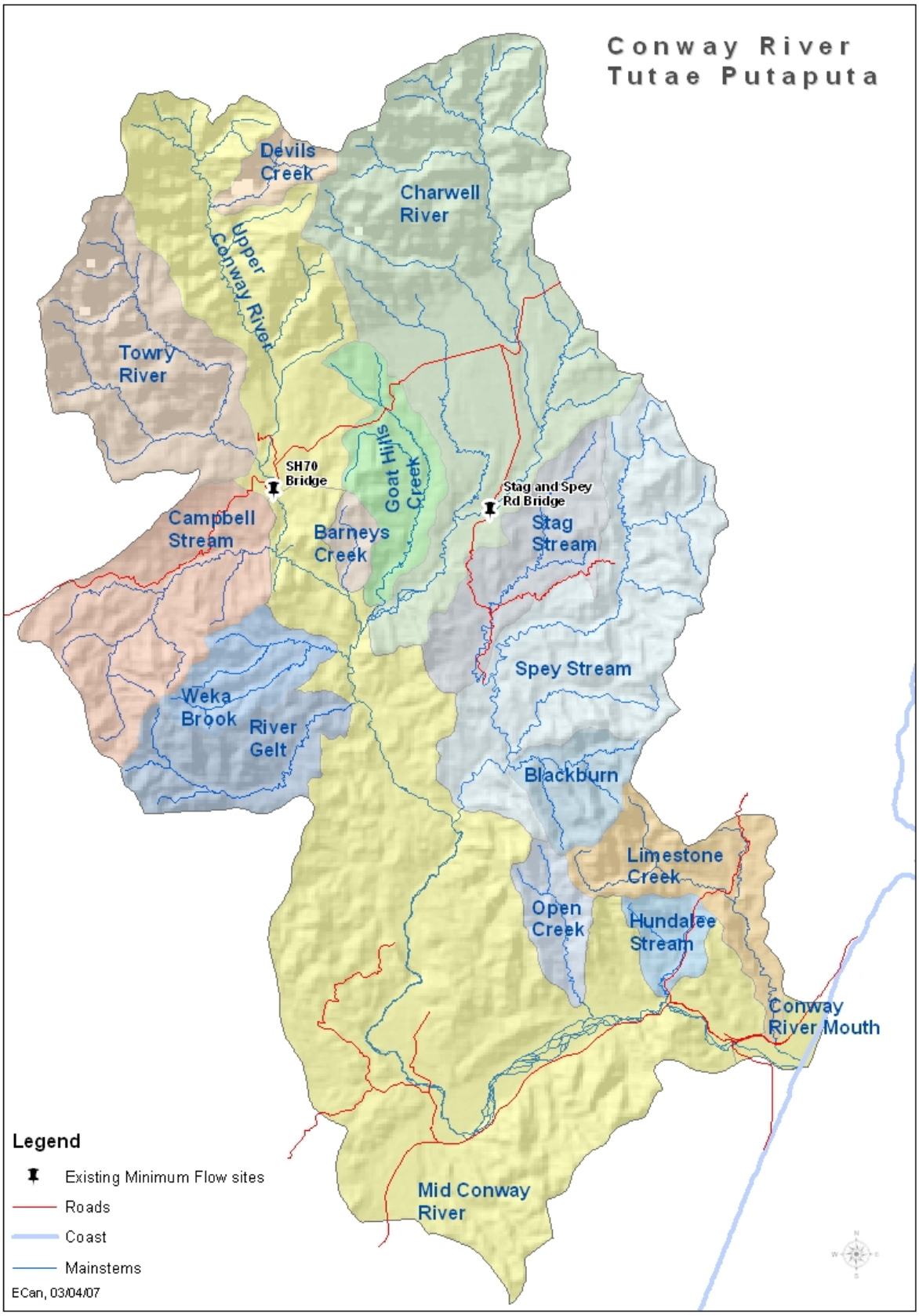

Figure 1 - The catchment of the Conway River/ Tūtae Putaputa

1 INTRODUCTION

As part of its statutory responsibilities, Environment Canterbury is engaged in a process of reviewing and setting environmental flow regimes for a number of streams and rivers throughout the region. Within the catchment of the Conway River/Tūtae Putaputa there are two sites with minimum flows set as conditions of resource consents, one on the Charwell River at Stag and Spey Road Bridge (Stag and Spey Bridge) and the other on the mainstem of the Conway River/Tūtae Putaputa at State Highway 70 Bridge (SH70 Bridge). Figure 1 shows the catchment of the Conway River/Tūtae Putaputa and these two current minimum flow sites. The Charwell River is the biggest tributary of the Conway River/Tūtae Putaputa. In June 2004 the minimum flow at Stag and Spey Bridge was set at 350 L/s on resource consent CRC042221. As of March 2007 there were a total of three resource consents to take water from the Charwell River, all with the minimum flow of 350 L/s as a condition of their consent. State Highway 70 (SH70) crosses the mainstem of the Conway River/ Tūtae Putaputa approximately two kilometres upstream of the confluence with the Charwell River. In December 2004 the minimum flow at SH70 Bridge, was set at 550 L/s on resource consent CRC051052. As of March 2007 there was one resource consent (CRC051052) to take water from the Conway River/Tūtae Putaputa with the minimum flow of 550 L/s as a condition of the consent. Further downstream, there are four more resource consents on the Conway River/Tūtae Putaputa but they do not have a minimum flow condition. There are also three applications to divert and take water currently in process.

When determining these environmental flow regimes, the proposed Natural Resource Regional Plan (NRRP) provides the relevant policy framework. An environmental flow regime always comprises an environmental minimum flow (hereafter referred to as the minimum flow) at which all but essential abstractions cease and can include flow sharing and caps on abstraction to protect freshes and floods.

1.1 Environmental Flow Regimes

Chapter 5 of the proposed NRRP provides further policy guidance for determining environmental flow regimes. Objective WQN1 states:

> *"Enable present and future generations to access the region's surface and groundwater resources to gain cultural, social, recreational, economic and other benefits, while:*
> *(a) safeguarding their existing value for efficiently providing sources of potable water for people and for stock;*
> *(b) safeguarding the life-supporting capacity of the water, including its associated aquatic habitats, significant habitats of indigenous fauna, and areas of significant indigenous vegetation;*
> *(c) safeguarding their mauri and existing value for providing mahinga kai for NgāiTahu;*
> *(d) protecting wāhi tapu and other wāhi taonga of value to Ngāi Tahu;*
> *(e) preserving the natural character of lakes and rivers and protecting them from inappropriate use and development;*
> *(f) protecting outstanding natural features and landscapes from inappropriate use and development;*
> *(g) protecting significant habitat of trout and salmon; and*
> *(h) maintaining, and, where appropriate, enhancing amenity values."*

The term "while" above means that the requirements of (a) to (h) need to be met in order to achieve the cultural, social, recreational, economic and other benefits set out in Objective WQN1. Environment Canterbury will progressively review and set flow regimes across the

region, by undertaking a weighting exercise that looks at the values listed in (a) to (h) and their significance for each waterway. The Conway River/Tūtae Putaputa does not provide significant habitat for salmon. To avoid confusion, salmon has been omitted from the evaluation of (g) in Objective WQN1. The indigenous vegetation factor (b) relates to flora that inhabits the bed and banks of waterways and is dependent on flow or level of water. Other indigenous vegetation, not dependent on being in or close to water, can play an important role in improving water quality and habitat by providing shade and filtering sediment but they are not part of this assessment.

1.2 Technical Panel Process

For the Conway River/Tūtae Putaputa, Environment Canterbury used a panel of five experts (representing the values (a) to (h) in Objective WQN1) to undertake visual assessments at selected sites and recommend flows that adequately protect those values. In accordance with Policy WQN3, the Technical Panel explicitly considered each value in Objective WQN1, ranked its significance/relevance (as low, medium and high) and recommended the minimum flow required to adequately provide for each value.

The following people and groups were used in the catchment of the Conway River/Tūtae Putaputa:

1) National Institute of Weather and Atmosphere (NIWA) to identify flow levels that adequately provide for aquatic fauna habitat requirements; and
2) A Technical Panel as follows:
    a) Raewyn Solomon, Owen Woods, and Dyana Jolly (Te Rūnanga o Kaikōura representatives);
    b) Trevor Partridge (indigenous vegetation);
    c) Mark Taylor (freshwater ecology for native fish and for trout);
    d) Maurice Duncan (aquatic habitats) ; and
    e) Yvonne Pfluger (landscape, natural character and amenity values)

The Technical Panel visits were scheduled to occur at a time of low flow. ECan staff, in consultation with the Advisory Group, selected five sites[1] as being representative of the Conway River/Tūtae Putaputa at different reaches. Figure 2 shows the catchment divided into four reaches. This method enabled a review of flows at a catchment level and although based on an incomplete flow record, staff linked flows in the upper reaches with those required at lower reaches.

[1] Charwell River at Stag and Spey Bridge; Conway River/ Tūtae Putaputa at SH70 Bridge, Ferniehurst, SH1 Bridge and the mouth.

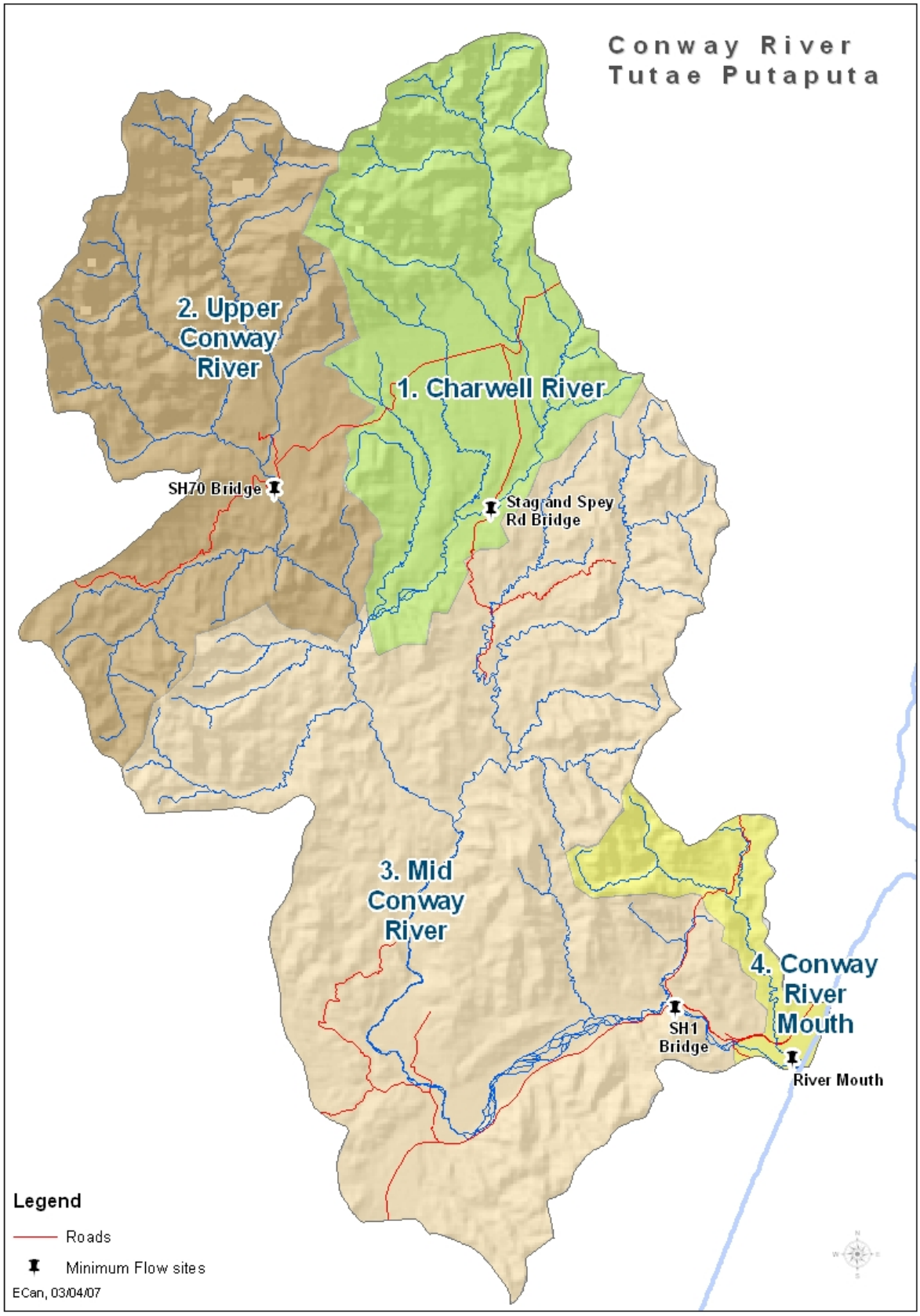

Figure 2 - The catchment of the Conway River/Tūtae Putaputa, divided into four reaches

On 15 March 2006 the Technical Panel, ECan staff and members of the Advisory Group visited five sites illustrated in Figure 2. At each site, the panellists made a visual assessment of the river associated with their area of expertise; ranked the importance of the value(s) they represented as low, medium or high; assessed the effects of low river flows on those values; and recommended a flow that will adequately protect them. For example, at each of the five sites visited, Pfluger ranked the importance of landscape and amenity values for that site, assessed the possible effects of low flows on those values and recommended a flow range that would protect landscape and amenity values. Partridge did the same for indigenous vegetation that inhabits the bed and banks of the river and are dependent on water flow or level. At times, the panellists found that the minimum flow did not influence the values associated with their area of expertise and did not make a recommendation. For example, in three of the five sites visited, Partridge found that native vegetation in the bed and banks of the river is well suited to a variable flow regime typical of a braided river system, where floods determine the vegetation and did not make flow recommendations for those sites. Representatives of Te Rūnanga o Kaikōura assessed the mauri of the river, ranked the importance of each site for mahinga kai and its status as wāhi taonga and wāhi tapu and recommended flows to adequately protect these values. Dyanna Jolly, the consultant supporting the representatives of the runanga, used a report by the Ministry for the Environment (June 2003) entitled "A cultural Health Index for Streams and Waterways" to help link Western scientific methods and Maori cultural knowledge about stream health. The report and accompanying workbook, prepared by Gail Tipa and Laurel Teirney combine these two distinct knowledge bases to develop a resource management tool to facilitate the input and participation of tangata whenua. Duncan's assessment informed all parties about the hydrology of the river and answered questions on aquatic habitat by members of the Technical Panel and the Advisory Group. Taylor ranked the importance of native fish and trout values at each site, assessed the possible effects of low flows on those values and recommended a minimum flow that will adequately protect them. Mark Taylor visited sites not visited by NIWA, like Ferniehurst and sites visited by NIWA, like SH1 Bridge but he did not visit the site at SH70 Bridge.

Environment Canterbury contracted NIWA to help determine flow regime requirements for aquatic habitats for a number of streams and small rivers in North Canterbury, including the Conway and the Charwell Rivers. The results of the study are contained in an Environment Canterbury unpublished report entitled "*Minimum Flows for selected North Canterbury streams*" (Report No U04/107).

1.3 Allocation Regimes

In this report, allocation refers to water above the minimum flow that is available for abstraction. Allocation blocks are set to avoid over allocation of the resource, protecting the reliability of supply to abstractors, and to protect instream values. These blocks set priorities of access for water over and above that set aside for protecting instream values. The primary allocation block, known as the A allocation block provides reasonable reliability of supply to abstractors. Policy WQN14 (4) in Chapter 5 of the proposed NRRP sets the level of reliability for an A allocation block. Policy WQN14 (4) states:

> *"For a surface water body, when establishing an allocation block for Schedule WQN1, unless an alternative catchment specific approach is more appropriate, the size of the A allocation block shall be set so that all takes from that block have a level of reliability that will provide, on average:*
> *(a) the full allocation rate 95% or more of the time during the period mid October to mid March in 6 years out of 10; and*
> (b) *the full allocation rate 75% or more of the time during the period mid October to mid March in 9 years out of 10. "*

The A (allocation) block is the most reliable quantity of water available for allocation above the minimum flow. Allocation within this block has to be limited to provide a reasonable

reliability of supply as set in Policy WQN14 (4). As an analogy, imagine the A block is like a cake. The more people who share the cake, the smaller the slice for each person. Once the A block is fully allocated, no more permits can be granted from that block. Additional water may be allocated from a B allocation block. This B (allocation) block has a lesser priority than the A block and water takes will have to cease at a higher cut off flow (see Figure 3 below).

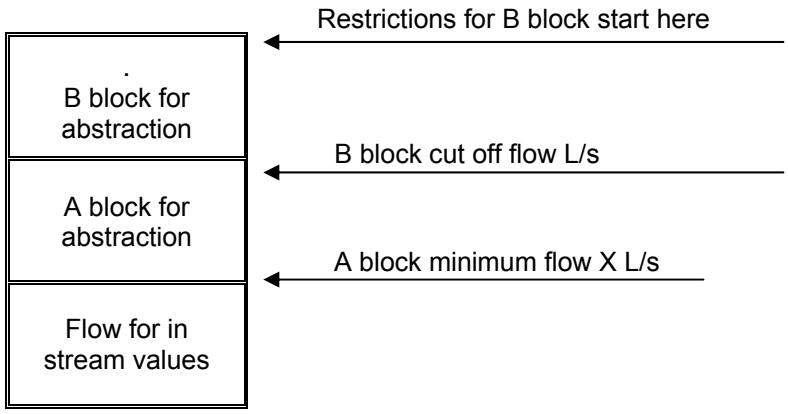

Figure 3 - Water Allocation, A and B blocks

The size of the A allocation block is determined by adding the maximum rate of take (max rate) of each surface water permit. Using max rate is preferable to averaging rates because some irrigation systems can only operate at their max rate. As an example consider two takes, one of 80 L/s and the other of 20 L/s, the average would be 50 L/s. If the A block was 50 L/s but the consent holder actually needed 80 L/s to make their system work, their rate of take would exceed the top of the A block. Bigger A blocks allow more people access to high priority water and that can be good for overall economic production and the community as a whole. The downside of a big A block with lots of permits (compared to a smaller A block with fewer permits) is that reliability of supply is reduced, meaning that on average, all takes will be restricted more often and get less water. A smaller A block has a higher reliability of supply. The downside of a small A block is that it only has a small number of permits in it so everyone else has to be in a B block with a lower reliability of supply.

ECan staff the Advisory Group consider that an allocation regime is a useful tool for managing water demands in the catchment of the Conway River/ Tūtae Putaputa because it helps provide certainty to abstractors within each allocation block. An unlimited A allocation block would lead to a decline in reliability of supply as additional permits are granted. Conversely, introducing an A block capped at a level equal to the sum of existing (current) takes means that new takes will be allocated in a B block with a higher cut off flow and therefore a lower reliability of supply. In the case of the Conway River/Tūtae Putaputa catchment, the Advisory Group chose to include in the A allocation block all resource consents existing when the Advisory Group has its final meeting ahead of the matter formally being considered by Council, plus the three applications currently being processed should they be granted.

1.4 Terms and Abbreviations

A number of terms and abbreviations are used in this report. They are:

Minimum flow means the flow at which abstractions from a water body must cease other than for an individual's reasonable domestic needs, the reasonable needs of individuals and animals for drinking water, and for fire fighting. Minimum flows are set in a plan that adequately provides for the values set out in Objective WQN1, Chapter 5 of the proposed Natural Resources Regional Plan.

Cut off flow means the flow at which abstractions cease from the B allocation block.

Environmental flow regime means rules that manage and maintain the range of flows in a river and can include the setting of minimum flows, and/or sharing and/or a cap on water able to be abstracted.

Allocation block is a given amount of water, set as a flow rate that is set aside for abstraction, where all users allocated a proportion of that water will be subject to the same management controls.

Allocation regime means the provisions relating to the quantities or rates of flow of water available for abstraction above the minimum flow. Policies in Chapter 5 set out how this water can be allocated.

Amenity values mean those natural or physical qualities and characteristics of an area that contribute to people's appreciation of its pleasantness, aesthetic coherence, and cultural and recreational attributes.

Seven day mean annual low flow (7-day MALF) is calculated as the lowest flow recorded over seven consecutive days in a year. Each of the annual values available is averaged, for the period of flow record to give the 7-day MALF. Where there is long-term river flow data, there is a high level of confidence in the accuracy of the 7-day MALF. Where there is only limited data for a stream, mathematical correlation is made against a long-term recorder from another stream. For each 7-day MALF there is a standard error shown by the symbol "±".

L/s L/s

Cumec (m^3/s) Cubic metre per second (or 1,000 L/s)

Ranking of objective criteria H means high, M means medium and L means low

River bed landforms Chapter 6 of the NRRP illustrates the relationships between bed, margin and bank of a lake or a river as shown in Figure 4

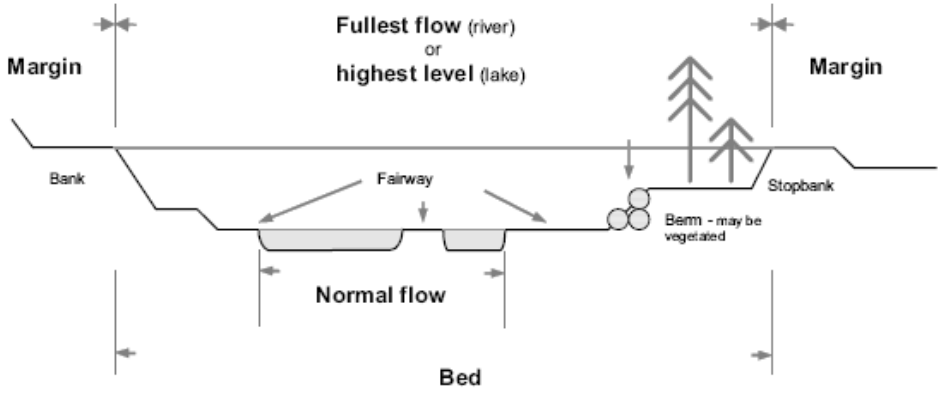

Figure 4 – River and Lake Landforms (Ch6, NRRP, 2002)

2 THE CONWAY RIVER /TŪTAE PUTAPUTA

2.1 Statutory Acknowledgement

The Conway River/Tūtae Putaputa is a Statutory Acknowledgement site, pursuant to Section 206 of the Ngāi Tahu Claims Settlement Act 1998 (schedule 65), to reflect the special cultural, spiritual and historical relationship that Ngāi Tahu has with this river. For the Conway River/Tūtae Putaputa, Statutory Acknowledgement has four practical outcomes: a) it must be noted on relevant plans and policy statements to raise awareness of the importance of this river to Ngāi Tahu; b) notice of all applications for resource consent must be sent to Te Rūnanga o Ngāi Tahu to enable Ngāi Tahu participation; c) when deciding who has speaking rights, Local and Regional Councils, the Environment Court and the Historic Places Trust must have regard to the Statutory Acknowledgement status of the Tūtae Putaputa; and d) Ngāi Tahu may use the Statutory Acknowledgement of the Tūtae Putaputa as evidence of their special relationship with the river.

2.2 Te Poha o Tohu Raumati

Te Rūnanga o Kaikōura has prepared an Environmental Management Plan for their area, as an Iwi Management Plan under the Resource Management Act 1991. The Runanga's area is centred on Takahanga Marae, extending from White Bluffs/Te Panui o Whiti to the Hurunui River and inland to the Southern Alps. The plan reflects tangata whenua values in terms of issues (ngā take) and policies (ngā kaupapa) in relation to environmental management. Two key tribal concepts, *ki uta ki Tai* (from the mountains to the sea) and *mō tātou, ā, mō kā uri ā muri ake nei* (for us and our children after us) are clearly expressed in this plan. These concepts acknowledge the interconnection between all living things and remind us of the continuity between the past, the present and the future. The plan is divided into seven sections, each covering specific activities and issues of importance to Te Rūnanga o Kaikōura. Although policies in each section are applicable to all other sections, issues and policies specific to the catchment of the Conway River/Tūtae Putaputa are found in section 3.5 Okarahia ki te Hurunui. Staff took into account and referred to these policies when recommending environmental flow regimes.

2.3 Catchment Description

The catchment area extends from the Seaward Kaikoura Range/Te Whatakai o Rakihouia in the north down to Hawkswood Range in the south, lodged between the catchment of the Waiau River on the west and south and the catchments of the Kaikoura Rivers to the north. The Conway River/Tūtae Putaputa has a narrow coastal strip from the settlement of Claverly on the north bank, to Te Mania Farm on the south bank. This catchment is part of a tectonically active area undergoing strong geological deformation along the southern end of the Hikurangi subduction zone (Warren, 1995). The Kaikoura ranges are a product of mountain building processes that raised these mountains to their current heights and developed the V-shaped canyons that characterise the middle and upper parts of this catchment. This dynamic process is still occurring and it is most visible in the upper reaches of the catchment (Moore, 1999).

2.3.1 Conway River/Tūtae Putaputa (mainstem)

The mainstem of the Conway River /Tūtae Putaputa has its headwaters in the Seaward Kaikoura Range/Te Whatakai o Rakihouia and it is mostly a rain fed river. The catchment, with an area of 19,408 hectares, is periodically subject to short intense easterly rainfall when a cyclonic system moves south off the east coast (Warren, 1995). Along the upper and

middle parts, the river has steep banks with occasional old river terraces high above the river bed level. Downstream of Ferniehurst the river has a wide bed typical of braided systems with lower and more undulating terraces on either side. In the lower reaches, the river bed and banks are often densely covered in exotic plants (mostly wattles, European broom, gorse and pasture grasses). At the river mouth there is a small lagoon sheltered behind a barrier beach that only occasionally opens to sea. The lagoon is considered one of the few true coastal lagoon systems in North Canterbury and provides important habitat for a wide range of species (Moore, 1999).

The Conway River /Tūtae Putaputa provides habitat for a variety of wetland and terrestrial birdlife with high numbers of paradise shelduck and black-billed gulls breeding on the riverbed. Native wetland species present include black shag, little shag, white-faced heron, grey duck, South Island pied oystercatcher, spur-winged plover, banded dotterel (threatened species) pied stilt, red-billed gull, black billed gull and black fronted tern (threatened species) (Moore, 1999).

The mainstem of the Conway River /Tūtae Putaputa includes minor contributing streams such as Ngaroma Stream, Waingaro Stream, Sebastopol Stream, Rutherford Stream, Boundary Stream, and others. There are a number of QEII covenants scattered within the catchment but most are small and isolated. The Ngaroma Scenic Reserve and the Waingaro QEII Covenant are examples of reserves where Black beech and mixed podocarp forest are the dominant cover, hosting South Island fantail and bellbird among other bird species.

The following major tributaries flow directly into the mainstem of the Conway River /Tūtae Putaputa:

- Devils Creek
- Towry River
- Campbell Stream
- Barney's Creek
- Charwell River
- Weka Brook
- Gelt River
- Spey Stream
- Open Creek
- Hundalee Stream
- Limestone Creek

Devils Creek and Barney's Creek are very small tributaries with catchment areas of 489 hectares and 315 hectares respectively and will not be described separately.

2.3.2 Towy River

With an area of 3,447 hectares this river is the third largest tributary of the Conway River /Tūtae Putaputa. Robson Stream, a significant tributary, flows into the Towy River approximately two kilometres upstream of the confluence with the mainstem of the Conway River/Tūtae Putaputa. These rivers, with their headwaters in the Seaward Kaikoura Range start with a single channel bed running along very steep banks and become semi-braided as they approach the confluence with the Conway River /Tūtae Putaputa. On the true left bank of the Towy River, downstream of the confluence with Robson Stream the steep banks give way to alluvial terraces high above river bed level.

2.3.3 Campbell Stream

The catchment of Campbell Stream has an area of 3,166 hectares and like the Towy River it runs through steep landscapes but with hardly any terraces. The Campbell Stream has a number of unnamed tributaries, all composed of steep-sided riparian zones covered in black beech forest with manuka and kanuka on some margins (Moore, 1999). This stream has its headwaters around Mount Peters, like the Weka Brook and the Gelt River.

2.3.4 Charwell River

The Charwell River is the biggest tributary of the Conway River /Tūtae Putaputa with a catchment of 8,626 hectares. The river has its headwaters on the Seaward Kaikoura Range and it has two branches separated my Mount Horrible Spur, the Right Branch and the Left Branch. These branches converge just upstream of SH70. Downstream the Charwell River is joined first by the Charwell Creek and then approximately 600 metres before the confluence with the Conway River /Tūtae Putaputa by Goat Hills Creek. Goat Hills Creek has a catchment area of 1,455 hectares.

2.3.5 Weka Brook

The Weka Brook drains directly into the true right of the Conway River /Tūtae Putaputa approximately one kilometre downstream of the confluence with the Charwell River. This catchment, with an area of 1,092 hectares has its headwaters on Mount Peter, an area of mountain beech forest with excellent biological diversity. The upper part of this catchment contains the highest altitude mountain beech forest in the area, excellent examples of short tussock grassland and montane shrub, and a community of mountain ribbonwood rare within the district (Moore, 1999).

2.3.6 Gelt River

The Gelt River has a catchment area of 1,650 hectares draining eastwards into the mainstem of the Conway River /Tūtae Putaputa. Like the Weka Brook and Campbell Stream the headwaters of the Gelt are sourced around Mount Peter with a deeply incised channel as the river negotiates its way through a landscape of steep spur and hill slopes. Mountain beech and black beech forest cover most of the riparian zone with small amounts of kanuka and manuka. There are common bush birds including large numbers of bellbirds (Moore, 1999).

2.3.7 Spey Stream

The catchment of this stream is 4,802 hectares but it also has two other contributing catchments, the Stag Stream with an area of 1,853 hectares and the Blackburn Stream with 939 hectares. The Stag Stream joins the Spey approximately 600 metres downstream of the last bridge on the Stag and Spey Road. Blackburn Stream joins the Spey 3.5 kilometres upstream of the confluence with the Conway River /Tūtae Putaputa. Birthday Creek is another, smaller tributary that joins the Spey Stream some 450 metres upstream of the confluence with Blackburn Stream. The dominant vegetation cover is black beech with minor matai, lowland totara, kahikatea, miro and pokaka. Kanuka low forest occurs in small strands on the edges of beech forest. Paradise shelduck, South Island fantail, bellbird and South Island robin are some of the bird species supported by this habitat (Moore, 1999). ECan staff have sighted Brown trout (*Salmo trutta*) in rock pools close to the confluence with the Conway River /Tūtae Putaputa.

2.3.8 Open Creek

Open Creek, with a catchment area of 708 hectares is a small but significant contributor to the Conway River /Tūtae Putaputa. Characterised by a steep V-shaped valley, this creek flows through native forest vegetation that sometimes extends from the bottom to the crest. Hill and spur crests and slopes host mixed pasture grassland. On steeper slopes, this catchment hosts black beech forests, minor red beech communities, and scattered strands of mahoe, manuka and kanuka. Black beech and red beech forests cover most of the riparian zone along this creek. Among many other bird species this catchment hosts the threatened New Zealand pigeon (Category B). The New Zealand Wildlife Service observed the carnivorous snail *Wainuia edwardii* and in 1997 W.G. Efford in a report for the Department of

Conservation recommended it should be treated as a threaten Category C species. Simon Moore described the catchment as “one of the most expansive areas of native forest remaining in the ecological district, extending from valley floor to ridge in most places” (Moore, 1999).

2.3.9 Hundalee Stream

This is a small but dramatic tributary of the Conway River /Tūtae Putaputa with an area of 567 hectares. Both the Hundalee Stream and SH1 follow the line of the Hundalee Fault across saddles and gentler slopes. The stream is deeply incised, with black beech and red beech covering most of the riparian zone along this stream. The Hundalee Stream joins the Conway River/Tūtae Putaputa immediately upstream of SH1 Bridge.

2.3.10 Limestone Creek

This catchment, with an area of 1,739 hectares is a significant tributary of the Conway River /Tūtae Putaputa. Limestone Creek, augmented by Derek Stream, flows into the mainstem of the Conway River less than on kilometre from the mouth. The creek bed is deeply incised and flows through remnants of beech forest and small areas of matai and kanuka mixed broadleaf. This catchment is currently under a separate study to determine the effects of afforestation on low flows.

2.4 River Flows

For catchments with a limited number of gaugings, flow information is derived from a nearby catchment for which there is good flow record. Flow correlations are done between the river being investigated (A) and a nearby river with a good flow record (B). Sufficient gaugings are done in river A over a range of flows and matched with flows in river B. If there is a reasonably good correlation, then the good flow record for river B can be used to help determine key flow statistics for river A.

For the Conway River/Tūtae Putaputa the nearby river with a good flow record is the Stanton River, a tributary of the Waiau River, where NIWA has a site with 36 years of data and only three short gaps in the record. The relationship between catchments is established using linear regression equations. This method recognises that catchments behave differently due to their specific physical characteristics (Facer, 2002) and the results are commonly shown as the calculated flow, followed by the standard error e.g. 546 L/s (±197 L/s) . The smaller the ± figure as a proportion of the calculated flow, the greater the confidence in the accuracy of that flow.

2.4.1 Charwell River at Stag and Spey Road Bridge

The Charwell River was gauged both at Dillondale and at Stag and Spey Bridge between 2003 and 2005 as a condition of resource consent CRC040164.1. This condition required measurement of river flow at both sites to determine if there is any loss or gain and to enable the calculation of the 7-day MALF. The consent set the interim minimum flow at 350 L/s. The site at Dillondale was gauged eight times and flows ranged between 412 L/s and 1,595 L/s. The site at Stag and Spey Road Bridge was gauged 11 times and flows ranged between 386 L/s and 1,931 L/s. Based on a comparison with the Stanton River, the 7-day MALF, at Stag and Spey Bridge was calculated by ECan at 402 L/s (± 250 L/s). The Charwell River has since been measured at Stag and Spey Bridge a further 7 times, with 5 gaugings below 400 L/s. However, at least 4 of these lower flows were gauged when abstraction was occurring above this site. The lowest gauged flow was 240 L/s recorded on the 15/3/06.

2.4.2 Upper Conway River at State Highway 70 Bridge

Environment Canterbury gauged the Conway River at SH70 Bridge as part of a short term water resource survey between 1998 and 2000. The flows ranged between 217 L/s and 4,076 L/s. In 2002 the 7-day MALF was estimated at 546 L/s (±197 L/s) based on a comparison with the Stanton River (Facer, 2002). In 2004, 550 L/s was adopted as the minimum flow at this site as a condition of consent CRC051052. Since 2000, this site has been measured a further 7 times, with only 2 gaugings below the minimum flow of 550 L/s.

2.4.3 Lower Conway River at State Highway 1 Bridge

The flow record at Hundalee dates back from 1955 but due to shifts in the riverbed there are gaps in the record spanning from 1955 to 1967. During this period, flows ranged between 673 L/s and 378,000 L/s (378 cumecs). The flow of 378 cumecs was recorded on 14th of May 1959. During this event the river bed was gauged both as the waters were rising and as they receded giving this reading a high level of confidence. At another occasion, on the 17th of July of 1963 the flows were estimated at 1,100, 000 L/s (1,100 cumecs). The river was not gauged at this time (or any time close to this date) and so this record is not reliable.

Another gauging set was completed for the years 1998 and 1999. Flows ranged between 428 L/s to 13,495 L/s (13.4 cumecs). Currently there is no minimum flow set at this site and the 7-day MALF was estimated (using a linear regression equation with the Stanton River) at 1,060 L/s (± 421 L/s). Since this time the Conway at SH1 Bridge has been gauged a further 5 times, with only 1 gauging less than 1,000 L/s.

The older data set from the Hundalee recorder shows, flows vary considerable during the year and from year to year. The two photos below illustrate the variability of flow of the Conway River/Tūtae Putaputa. Richard Wilding took the picture below in April 1994 from the Ferniehurst Bridge (Figure 5). The river was not gauged during this event so we do not know the flow with certainty, but knowing the span and height of the bridge and using a comparison with the Stanton River, ECan hydrologists have estimated the flow to be around 800,000 L/s, or 800 cumecs. Bruce MacFarlane rain fall records also show 14 days of intense rainfall in April 1994 (pers comms, 2006).

Figure 5 - Ferniehurst Bridge looking upstream, April 1994 (Wilding R, 1994).

The other photo below (Figure 6), taken in November 2006 from the same bridge, shows the same stretch of the river (with less camera zoom). The cliff face visible on the left of the photo (true right bank) can be used as a point of reference. Although the flow was not gauged at this time either, the dramatic difference highlights the need for a wide braided bed to accommodate the wild nature of the Conway River/Tūtae Putaputa. The flow in this picture is estimated to be just under 1,000 L/s.

Figure 6 - Ferniehurst Bridge looking upstream, November 2006.

3 RECOMMENDED ENVIRONMENTAL FLOW REGIME

Background

The Technical Panel visits took place on the 15th of March 2006. ECan staff selected five sites for these visits, four on the mainstem of the Conway River/Tūtae Putaputa and one on the Charwell River. The sites are shown in Figure 2 and the box below:

River	Site visited	Reach (see Fig 2)
Charwell River	Stag and Spey Bridge	Charwell River
Conway River (mainstem)	SH70 Bridge	Upper Conway
	Ferniehurst Gorge	Mid Conway
	SH1 Bridge	
	At the mouth	Conway Mouth

In ECan staff's opinion, these sites are representative of the reaches shown on Figure 2. The middle reach of the Conway River, between the confluence of the Charwell River and Conway Flat Bridge has two sites, one at Ferniehurst and the other at SH1 Bridge. The three other reaches, Charwell River, Upper Conway and Conway Mouth, have one representative site each. For each of the four reaches, this report shows the following information:

Summary - outlining the full extent of the reach being described and the number of resource consents included in it.
Aerial Photo - showing the site visited by the Technical Panel and surrounding area (1:10,000).
Description – a synthesis of the panellists' notes for the site (see appendix 4.1 for original notes).
Local knowledge - a synthesis of local information provided by the members of the Advisory Group (see appendix 4.1 for original notes).
Current abstractions – a summary of all current resource consents to take water within the reach, as well as applications for resource consent currently being processed by ECan.
Ranking of objective criteria – panellists' ranking of the values identified in Objective WQN1 (a) to (h) as being low (L), medium (M) or high (H).
Flow suggestions – flows suggested by each panellist to adequately provide for the value(s) they represented.
Staff recommendations - staff recommendations are separated into three subsections

> **Minimum Flow Site** – recommending the location of the minimum flow site and providing explanations and reasons for selection.
> **Minimum Flow** - recommending minimum flow that adequately provides for the values identified in Objective WQN1 (a) to (h) and providing explanations and reasons for selection. This section includes consideration of reliability of supply for abstractors. ECan staff considered the catchment as a whole and although based on an incomplete flow record, flow recommendations try to provide flows in the upper sites that will deliver the recommended flows to the lower reaches, i.e. SH1 Bridge.
> **Allocation** - outlining of allocation blocks.

NIWA visited the Charwell River at Dillondale and the Conway River at SH70 and at SH1 bridges in 2004. The results of the study are contained in a report entitled "*Minimum Flows for selected North Canterbury streams*" (ECan Report U04/107).

3.1 Charwell River at Stag and Spey Road Bridge

This section applies to the Charwell River, from its headwaters to the confluence with the Conway River/ Tūtae Putaputa (see Figure 2). Within this reach, there are three current resource consents to take water, with a minimum flow of 350 L/s set at Stag and Spey Bridge.

3.1.1 Description

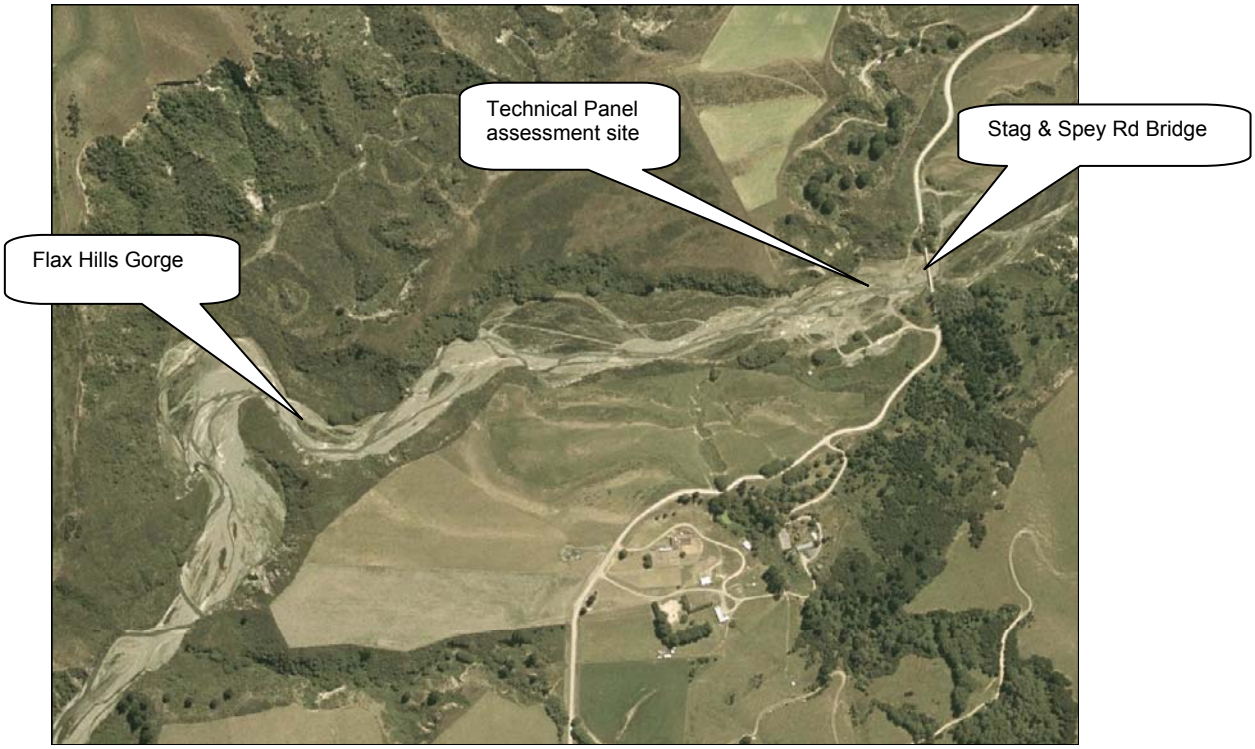

Figure 7 - River at Stag & Spey Bridge (ECan, 2005)

The Charwell River at this site functions as a braided system with gravel islands and channels but it has a steep bed. At the time of the visit, the river was confined to a single channel with riffles and runs but remnants of old braids were visible. The water was clear and ran with good velocity, movement and sound but all panellists noted that flows looked lower than normal[2]. The banks and dry bed have a few low growing native herbs like scabweed and epilobium, while the floodplain is mostly covered by broom, gorse and pasture grasses. The landscape context is natural with some built modifications (road and bridge). The adjacent land cover is dominantly green pasture on irrigated flats with scattered willows and poplars but generally quite open. The tangata whenua panellists observed that stock access to the riverbed, evident at the time of the visit, and the impact it was having on water quality, are issues of concern.

NIWA did not visit this site but they visited a nearby site at Dillondale (NZMS 260 O31:403-630) on 1 April 2004. Dillondale is about 3 Km upstream of the site visited by the Technical

[2] T. Partridge wrote "…with the present flow of 240 L/s, most (edge species) are clear of the stream flow (...)This indicates a narrow range of normal flows and a current flow that is lower than normal … ", Y. Pfluger wrote "Flow seems low ...", M Taylor wrote "Flow too low at present...", M Duncan wrote "... looks a little low" and Runanga wrote "…natural flow characteristics and natural features identified as below average". (see apendix 5.2 Technical Panel Notes, pg 44 to 51)

Panel. This reach of the Charwell River is described as a fast-flowing stream suitable for trout rearing. Electrically fishing the river, NIWA found the following species:

- Upland bully
- Canterbury galaxias

3.1.2 Current abstractions

At 20 March 2007, the consents database showed three current resource consents to take surface water for irrigation from the Charwell River, as detailed in Table 1. As of March 2007, there are no resource consent applications being processed by ECan.

Table 1 - Current resource consents to take surface water from the Charwell River

Consent number	Consent holder	Maximum rate of take (L/s)	Current minimum flow (L/s)
CRC040497	Stone Jug Farm Ltd	70	350
CRC040164.1	Dillondale Farm Ltd	70	350
CRC042221	MR & AA & KA Perkins	50	350
	Total rate:	**190 L/s**	

3.1.3 Ranking of objective criteria

Members of the Technical Panel have assessed the relative importance of the instream values identified in Objective WQN1 (a) – (h) as follows:

Table 2 - Ranking of objective criteria for the Charwell River

Panel	Ranking	Panellist
Trout	L	Mark Taylor
Native fish	H	Mark Taylor
Mahinga kai	H	Te Rūnanga o Kaikōura
Mauri	H	Te Rūnanga o Kaikōura
Wāhi tapu & Wāhi taonga	H	Te Rūnanga o Kaikōura
Aquatic Habitats	M-L	Maurice Duncan
Indigenous vegetation	L	Trevor Partridge
Landscape, Natural character	M-H	Yvonne Pfluger
General amenity	L	Yvonne Pfluger

The flows put forward by NIWA and the Technical Panellists are set out below.

Table 3 - Flow suggestions for the Charwell River

Site flow information (L/s)		Suggested minimum flows (L/s)						
Gauged	7-day MALF	NIWA Trout	Taylor Trout	Taylor Nat fish	Duncan	Partridge	Pfluger	Te Rūnanga o Kaikōura
240	347 (±158)	402	390	350	300	200	300	More than 350

3.1.4 Staff recommendations

a) Minimum flow site

Resource consent CRC040164 (now CRC040164.1) set the first minimum flow site for the Charwell River in November 2003. The site was set immediately downstream of the abstraction point at Dillondale (NZMS 260 O31:403-630). A condition of this resource consent required the study of river flows described in section 2.4.1 between Dillondale and Stag and Spey Bridge, approximately 3 kilometres downstream. In June 2004 a second resource consent, CRC042221 was granted. It maintained the minimum flow at 350 L/s but set the site at the Stag and Spey Road Bridge. Consent CRC040497, granted in September 2004 has a minimum flow of 350 L/s set at Stag and Spey Bridge. Environment Canterbury installed a staff gauge under the bridge in flowing water but over time the braids shifted across the riverbed and the staff gauge was left out of the water in dry gravel on the true left side. Late in 2006 the staff gauge was covered with gabion baskets following bridge maintenance work.

Both sites at Dillondale and Stag and Spey Bridge are considered unsatisfactory because the riverbed shifts often, leaving the staff gauge out of the active channel and both sites are located between current abstraction points. Tangata whenua identified the lack of flow monitoring at Stag and Spey Bridge as an issue of concern and recommended the selection of a reliable site, more suitable for long term gauging.

Less than 1,000 metres downstream of the Stag and Spey Road Bridge the river narrows into a gorge with rock bed and banks, offering a more stable site for the staff gauge. The gorge site (referred to as the Flax Hills Gorge), at or about NZMS 260 O32:378-593, fulfils a number of pertinent criteria for a minimum flow monitoring site because it is downstream of the current water permits and it meets the technical and physical attributes necessary for undertaking gauging operations.

Recent concurrent gaugings show a significant increase in flows between the Stag and Spey Bridge and Flax Hills Gorge. Due to insufficient flow gauging records ECan staff are not able to establish a flow relationship between these two sites. Staff's initial recommendation to set the site at Flax Hills Gorge has been reviewed and until there are sufficient gaugings, it is considered that the site should remain at Stag and Spey Bridge, where the Technical Panel conducted their assessments. Flax Hills Gorge may still be the ideal minimum flow site but only after a reliable flow relationship between the Stag and Spey Bridge and the gorge is established.

The Technical Panel assessment conducted at the Stag and Spey Road Bridge seemed applicable to the gorge area because both sites are near to each other and the character of river does not change significantly between these sites. The gauged flow increases seem to show otherwise and more flow data is required to gain an understanding of flow relationships between these two sites to will enable setting a minimum flow at the gorge that adequately protects the values identified at the bridge.

Recommendation:

That the minimum flow site for the Charwell River be maintained at Stag and Spey Road Bridge at or about NZMS 260 O31:391-600 for all abstractions on the Charwell River.

b) Minimum Flow

Wāhi tapu, wāhi taonga and mahinga kai values rank high and tangata whenua panellists suggested a flow of more than 350 L/s for their protection. Native fish ranked high and Taylor suggested a flow of 350 L/s. Natural character and aquatic habitat were ranked medium to high and a flow of 300 L/s was suggested for their protection.

The tangata whenua panellists observed that stock access to the riverbed and the impact on water quality are issues of concern. These panellists rated the river health at this site as low due to "general land use and management practices associated with the river, such as stock access to riverbed margins". From a cultural perspective it seemed that the waterway "is being used primarily to service farmers", i.e. irrigation and although "this isn't necessarily a bad thing (…)", the poor condition of the waterway is still of concern. This poor condition is reflected on the general amenity and naturalness of the site and detracts tangata whenua values such as mahinga kai and mauri. Tangata whenua panellists noted that due to current land use and management practices, these values are low or non existing but there is potential to improved them.

Mahinga kai, wāhi taonga, wāhi tapu and mauri were ranked as high for the purpose of establishing the values that the waterway should be managed for. Tangata whenua panellists noted that the mauri of the river should be the guiding value because everything else, including human use, relies on this.

NIWA electrically fished the river at Dillondale in 2004 and found upland bully and Canterbury galaxias but described it as suitable for trout rearing. Both Duncan and Taylor noted that the Charwell River at Stag and Spey Bridge is more suitable habitat for torrent fish, upland bullies and Canterbury galaxias. Taylor stated that the riverbed may be too unstable for trout spawning, and of minimal value for trout rearing. Duncan noted evidence of recent bed movement, as reflection of a steep slope, even at low flows. He also noted that the gauged flow of 240 L/s looked slower and lower than expected for good fish habitat. Pfluger wrote that the water ran clear with a pleasing sound and that there were no exotic weeds in the water but there were some algae along the slower side of the channel. She also stated that flows lower than the gauged flow of 240 L/s would decrease texture, surface, movement and sound. Partridge explained how the distribution of vegetation indicates the presence of a narrow range of normal flows and the gauged flow of 240 L/s is lower than normal but not so far as to stress the margin plants.

The flow of 350 L/s suggested for native fish would provide for the requirements of fast water species like torrent fish as well as edge dwelling species like upland bully and common galaxias. Given that mahinga kai plant species are well suited to the flow regime and not influenced by minimum flow, staff consider that protection of native fish values will also protect mahinga kai values. Rūnanga panellists consider that protecting the mauri of the river will protect all other values too. They noted that the mauri of the Charwell River is adversely affected by stock access and recommended raising the minimum flow to protect cultural values. This is not a flow related issue but prevention of stock access could improve the health of the river, especially if complemented by a comprehensive approach to riparian management. Staff consider that the mauri of the river, wāhi tapu and wāhi taonga will also be protected by a flow of 350 L/s.

The recommended minimum flow of 350 L/s is the same as the minimum flow set on all three current resource consents therefore there will be no change in the reliability of supply for the current permit holders.

Given the lack of understanding of the flow relationships at catchment level, caution is also required in recommending minimum flows in the headwaters of the catchment because of potential effects on flows further downstream. The 7 day MALF calculated for the Charwell River at Stag and Spey Bridge of 347 (±158) L/s, the Conway River/Tūtae Putaputa, upstream of the confluence with the Charwell River, at SH70 Bridge of 550 (±197) L/s, and closer to the coast at SH1 Bridge of 1060 (±421) L/s offer the most reliable flow relationship for this catchment (See 2.4 River Flows). All resource consent holders in the lower reaches (Mid Conway and Conway Mouth) were in existence at the 1st of July 2002 (Proposed NRRP, Policy WQN14) before any of the members of the Charwell Water Users Group with consents issued between November 2003 and September 2004. Staff consider that 350 L/s is the minimum required to deliver water to the lower catchment to maintain reliability of supply to consent holders that predate those at the Charwell.

Recommendation:

That a minimum flow of 350 L/s be maintained at Stag and Spey Road Bridge at or about NZMS 260 O31:391-600. This recommendation adequately provides for the values set out in Objective WQN1 of the proposed NRRP.

c) Allocation regime

There is insufficient flow data currently available for the Charwell River to determine an allocation regime based precisely upon NRRP allocation and reliability of supply policies or guidelines. Staff recommend a precautionary approach using the maximum rate of take to calculate the size of the A block. The total rate of take of existing resource consents for the Charwell River is 190 L/s. Given the limited flow data available, the A block for the period of October to April should be capped at 190 L/s, the sum of the existing authorised abstractions. Future abstractions will be included in a B block, for the period of October to April, with a higher minimum flow to protect the reliability of supply of water permits in the A block. It would also be prudent at this time to make some provision for the freshes that flush the river in the summer. This could be achieved by capping the B block at 100 L/s and allowing a gap between the A and B blocks. In the absence of a good flow record, a gap of 190 L/s is recommended to allow the river to operate above the MALF and make use of freshes and floods generated by higher flows.

It is recommended that an A Block of 190 L/s be created for the period of May to September with a minimum flow of 350 L/s, for takes to storage or frost fighting should horticultural land uses develop. In the future, increased flow data may allow allocation limits to be reviewed. Such consideration will be given when the review provisions of the NRRP take place.

The cut off flow for the B block, for the period of October to April, is calculated by adding the minimum flow for the A block (350 L/s), the existing A allocation block (190 L/s), and the gap between the blocks (190 L/s). For the Charwell River the suggested flow at which abstractions shall cease for the B block, for the period of October to April is 730 L/s.

Recommendation:

That an allocation regime for the Charwell River be set as follows:

- A allocation block of 190 L/s for the period of October to April with a minimum flow of 350 L/s; and

- No further consents should be granted for surface water takes or groundwater takes with stream depletion effects; and
- No new entrants within the 190 L/s, to protect reliability of supply to downstream users; and
- A allocation block of 190 L/s for the period of May to September with a minimum flow of 350 L/s; and
- B allocation block of 100 L/s for the period of October to April with abstractions ceasing at a flow of 730 L/s.

3.2 Conway River/Tūtae Putaputa at SH70 Bridge

This section applies to the upper reaches of the Conway River/ Tūtae Putaputa from its headwaters to the confluence with the Charwell River (see Figure 2). Within this reach, there is one resource consent to take water, with a minimum flow of 550 L/s set at SH70 Bridge.

3.2.1 Description

Figure 8 - Conway River/Tūtae Putaputa at SH70 (ECan, 2005)

The Conway River/Tūtae Putaputa at this reach has a wide fairway with fine riverbed sediment, sand, gravel and boulders. At the time of the visit there was a single channel, four to ten metres wide, running with good velocity but the water was slightly turbid. The gravels on the dry riverbed are mostly clear of vegetation with a few scattered low growing native herbs, while vegetation cover on the margins is poorly developed and ephemeral. All the native species are open gravel colonisers, well suited to a regime of flood events, typical of braided river systems, and not dependent on minimum flows. Freshes and floods play an important part in keeping the riverbed clear of weeds. This is a highly natural environment with high natural character where a clear gravel bed contrasts with the brown tussock colours on the banks. The landscape has high aesthetic value with hill and cliff terraces providing a dramatic backdrop. Tangata whenua panellists observed that they "could picture their tūpuna (ancestors) fishing here, and future generations as well" as an indication of river health and degree of naturalness. They also commented on the openness of the riverbed, with relatively few weeds.

NIWA visited this site on 1 April 2004. The Conway River/Tūtae Putaputa at SH70 Bridge is described as a very fast-flowing, shallow river providing suitable habitat for Canterbury galaxias. The river at this reach is too fast and shallow to offer measurable trout habitat. NIWA electrically fished the river at this point and found the following species:

- Upland bully
- Torrent fish
- Canterbury galaxias

3.2.2 Current abstractions

At 20 March 2007, the consents database showed one resource consent to take surface water for irrigation from the Upper Conway River/Tūtae Putaputa, as detailed in Table 4. As of March 2007, there are no resource consent applications being processed by ECan.

Table 4 - Current resource consents to take water from the Upper Conway River

Consent number	Consent holder	Maximum rate of take (L/s)	Current minimum flow (L/s)
CRC051052	SE & PJ Wood	60	550
	Total rate:	**60 L/s**	

3.2.3 Ranking of objective criteria

NIWA and members of the technical panel have assessed the relative importance of the instream values identified in Objective WQN1 (a) – (h) as follows:

Table 5 - Ranking of objective criteria for the Upper Conway River

Panel	Ranking	Panellist
Trout	L	NIWA
Native fish	M-L	NIWA
Mahinga kai	H	Te Rūnanga o Kaikōura
Mauri	H	Te Rūnanga o Kaikōura
Wāhi tapu & Wāhi taonga	H	Te Rūnanga o Kaikōura
Aquatic Habitats	M-L	Maurice Duncan
Indigenous vegetation	M-L	Trevor Partridge
Landscape, Natural character	H	Yvonne Pfluger
General amenity	L	Yvonne Pfluger

3.2.4 Flow suggestions

The flows put forward by NIWA and the technical panellists are set out below.

Table 6 - Flow suggestions for the Conway River at SH70 Bridge

Site flow information (L/s)		Suggested minimum flows (L/s)				
Gauged	7-day MALF	NIWA	Duncan	Partridge	Pfluger	Tangata Whenua
350	546 (±197)	150	450	No suggestion	400 - 500	550

3.2.5 Staff recommendations

a) Minimum flow site

Resource consent CRC051052 set the first minimum flow site for the Upper Conway River/Tūtae Putaputa in December 2004. This site is not ideal in terms of technical and physical attributes for gauging operations because it has a wide gravel bed and the river braids shift across the bed frequently. There are insufficient flow gauging records to categorically establish that the SH70 Bridge site will be indicative of the behaviour of flows in the upper reaches of the Conway River/Tūtae Putaputa upstream of the confluence with the Charwell River. Even so, staff consider that the SH70 Bridge site is still the best available for the upper reaches of the Conway River/Tūtae Putaputa.

Recommendation:

That the minimum flow site for the Upper Conway River/Tūtae Putaputa be located at SH70 Bridge at or about NZMS 260 O31:326-606 for all abstractions above the confluence with the Charwell River.

b) Minimum flow

Wāhi tapu, wāhi taonga and mahinga kai and mauri rank high and tangata whenua panellists suggested a flow of 550 L/s for their protection. Natural character also ranked high and a flow of 400 to 500 L/s was suggested for its protection. Both native fish and indigenous vegetation values ranked medium. The panellist for indigenous vegetation did not suggest a minimum flow, as the native species present are open gravel colonisers, well suited to braided river systems and not dependant on flows. General amenity and trout values ranked low at this site. Tangata whenua panellists observed that the current minimum flow may be sufficient to provide adequate protection of cultural values but recommend that if additional consents are granted, the minimum flow should be raised. This recommendation stems from a concern that more abstractors may 'flat line' the river and "impact on the ability of freshes to clear the riverbed of weeds and renew the river system". Policy 9 in part 3.5.9 Flow management of Te Rūnanga o Kaikōura Environmental Plan states that "flow management regimes must protect the natural seasonal variability of flow, including periodic flushing flows". The concern that an increasing number of water takes may 'flat line' the river flows is valid but this issue can best be addressed through the allocation process, by establishing allocation blocks with increasingly higher minimum flows.

From the perspective of the local rūnanga, mauri or the life supporting capacity of the river is the most important value to be protected. The tangata whenua panellists noted that "sustaining the mauri of a river will sustain healthy ecosystems, support a range of cultural uses (including mahinga kai), and reinforce the cultural identify of the people". In Schedule 65 of the Ngāi Tahu Claims Settlement Act 1998, the mauri of the Conway River/Tūtae Putaputa represents "the essence that binds the physical and spiritual elements of all things together, generating and upholding all life" and it is a "critical element of the spiritual relationship of Ngāi Tahu Whānui with the river".

Staff consider that a flow of 550 L/s will adequately protect the mauri of the river as well as its natural character.

The recommended minimum flow of 550 L/s is the same as the minimum flow set on the only current resource consent therefore there will be no change in the reliability of supply for the current permit holder.

Given the lack of understanding of the flow relationships at catchment level, caution is also required in recommending minimum flows in the headwaters of the catchment because of potential effects on flows further downstream. The 7 day MALF calculated for the Charwell River at Stag and Spey Bridge of 402 (±250) L/s, the Conway River/Tūtae Putaputa, upstream of the confluence with the Charwell River, at SH70 Bridge of 550 (±197) L/s, and closer to the coast at SH1 Bridge of 1060 (±421) L/s offer the most reliable flow relationship for this catchment (See 2.4 River Flows). The limited number of concurrent gaugings on record seem to indicate that flows at SH70 Bridge tend to be half of those at SH1 Bridge. All resource consent holders in the lower reaches (Mid Conway and Conway Mouth) were in existence at the 1st of July 2002 (Proposed NRRP, Policy WQN14) unlike resource consent CRC051052, issued in December 2004. Staff consider that 550 L/s is the minimum required to deliver water to the lower catchment to maintain reliability of supply to those consent holders.

Recommendation:

That a minimum flow of 550 L/s be maintained at SH70 Bridge at or about NZMS 260 O31:326-606. This recommendation adequately provides for the values set out in Objective WQN1 of the Proposed NRRP.

c) Allocation regime

There is insufficient flow data currently available for the Conway River to determine an allocation regime based precisely upon NRRP allocation and reliability of supply policies or guidelines. Staff recommend a precautionary approach using the maximum rate of take to calculate the size of the A block. The maximum rate of take of the existing resource consent for the Upper Conway River/Tūtae Putaputa is 60 L/s. Given the limited flow data available, as to the reliability of supply for providing 60 L/s for the period of October to April, the A block should be capped at 60 L/s. Future abstractions will be included in a B block, for the period of October to April, with a higher minimum flow to protect the reliability of supply of the water permit in the A block. To cater for the freshes that flush the river in the summer, the B block should be capped at 100 L/s. ECan staff also recommend a gap between the A and B blocks of 60 L/s to allow the river to operate above the MALF and make use of freshes and floods generated by higher flows.

It is recommended that an A Block, for the period of May to September of 60 L/s, with a minimum flow of 550 L/s, for takes to storage or frost fighting is provided should horticultural land uses develop. In the future, increased flow data may allow for more precise calculations of allocation limits. Such consideration will be given when the review provisions of the NRRP take place.

The cut off flow for the B block for the for the period of October to April is calculated by adding the minimum flow for the A block (550 L/s), the existing A allocation block (60 L/s), and the gap between the blocks (60 L/s). For the Upper Conway River/Tūtae Putaputa the suggested minimum flow for the B block, for the period of October to April is 670 L/s.

Recommendation:

That an allocation regime for the Upper Conway River/Tūtae Putaputa be set as follows:

- A allocation block of 60 L/s for the period of October to April with a minimum flow of 550 L/s; and
- No further consents should be granted for surface water takes or groundwater takes with stream depletion effects; and
- No new entrants within the 60 L/s, to protect reliability of supply to downstream users; and
- A allocation block of 60 L/s for the period of May to September with a minimum flow of 550 L/s; and
- B allocation block of 100 L/s for the period of October to April with abstractions ceasing at a flow of 670 L/s.

3.3 Conway River/Tūtae Putaputa at SH1 Bridge

This section applies to the middle reach of the Conway River/ Tūtae Putaputa from the confluence of the Charwell River to Conway Flat Bridge (see Figure 2). This reach is contains two different sites, Ferniehurst and SH1 Bridge. SH1 Bridge is the representative site for this reach. No flow was recommended for Ferniehurst as discussed in Appendix 5. Within this reach, there is only one resource consent to take water. This resource consent does not have a minimum flow condition.

3.3.1 Description

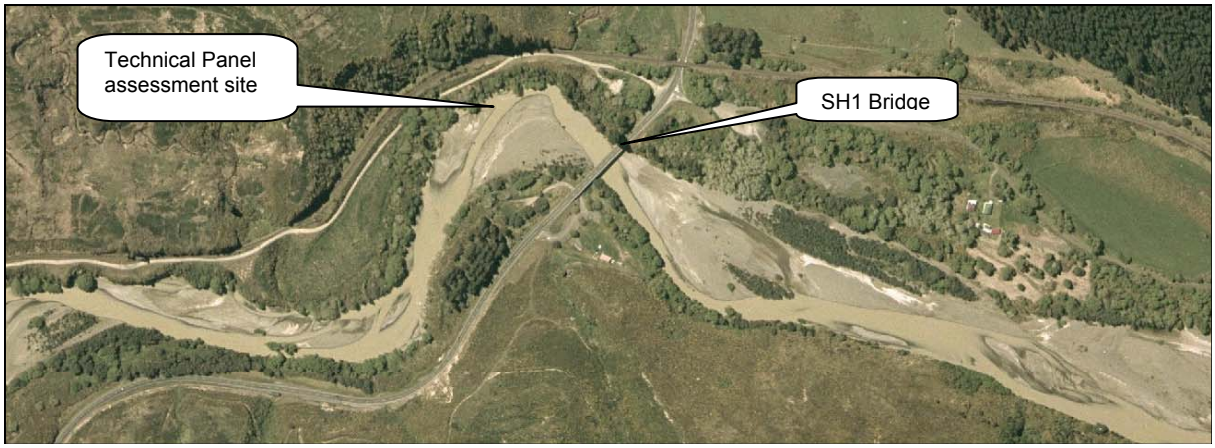

Figure 9 - Conway River/ Tutae Putaputa at SH1 Bridge (ECan, 2005)

At this site, the Conway flows as a braided river over a wide gravel bed. The bed narrows as it approaches SH1 Bridge before widening again further downstream. At the time of the visit the river exhibited a single channel approximately 10 metres wide with runs, riffles and pools. The water ran clear on a bed of gravel and small cobbles with plenty of caddis and a few small mayfly nymphs. The riverbed had many large wattles, broom, tree lucerne and other weeds as well as some native species but the margin vegetation is minimal because plant species are well suited to the flow regime and influenced more by floods and freshes than by minimum flows. This site has low natural character values, with plantation forest on the hill sides but it has considerable amenity value with a picnic area, and pools suitable for swimming and fishing.

NIWA visited this site on 31 March 2004 and described the river at SH1 as a large braided river with significant adult trout. NIWA electrically fished the river at this point and found the following species:

- Upland bully
- Longfin eel
- Shortfin eel
- Brown trout
- Torrent fish
- Canterbury galaxias

3.3.2 Local knowledge

On the day of the Technical Panel site visit, Mr. Tim Anderson provided specific local knowledge about the Conway River/Tūtae Putaputa. He said that the river has not changed much over the years except for the wattles that have increasingly invaded the bed, reducing the ability for the river to use the full width of the bed. He added that the river is low every year and it was hard to tell if it is lower this year than any other. He added that the flow visible at the surface represents but a small portion of what flows under the shingle. Mr Anderson thinks there are more trout in the river now than when he was a child. In addition

to this, the Advisory Group provided the following points about the river during the meetings held over December to March 2006:

- People swim in the river and drink its water;
- People use the river for picnics, camping, fishing and as access for pig hunting and horse tracking;
- In 2002 the flood waters were at the height of the Hundalee Culvert (approximately 2 metres above the riverbed) ;
- Many years ago helicopters were used to spray gorse and wattles; and
- The wattles need to be managed as large trees choke the bed and confine the river to a narrower channel.

3.3.3 Current abstractions and recent resource consent applications to take water

At 20 March 2007, the consents database showed one current resource consent to take surface water for irrigation from the Conway River/Tūtae Putaputa in Ferniehurst (downstream of Ferniehurst Bridge), as detailed in Table 7.

Table 7 - Current resource consent to take water from middle reach of the Conway River

Consent number	Consent holder	Maximum rate of take (L/s)	Current minimum flow (L/s)
CRC961301.1	Glen Colwyn Estates Ltd	22.8	None
	Total rate:	**22.8 L/s**	

In order to take water at the abstraction point Glen Colwyn diverts the Conway River into an excavated hollow located on the south bank, approximately 500 metres downstream of the railway bridge. After floods and freshes, Glen Colwyn Ltd carries out works in the river bed to divert water to their intake.

At 20 March 2007, the consents database showed one application for resource consent to take water from the middle reach of the Conway River/Tūtae Putaputa, as detailed in Table 8. This application is currently being processed by Environment Canterbury.

Table 8 - Resource consent application to take water from middle reach of the Conway River

Date lodged	Consent number	Applicant	Applied to take (L/s)
20/12/05	CRC062266	Glen Colwyn Estates Ltd	60

This application seeks consent to divert as well as take water from the Conway River. The proposed diversion channel is estimated[3] to flow at 200 L/s. The applicant proposes to have two intake points on the diversion channel. The diversion channel will intercept Glen Colwyn Stream and Hewsons Stream.

3.3.4 Ranking of objective criteria

NIWA and members of the Technical Panel have assessed the relative importance of the instream values identified in Objective WQN1 (a) – (h) as follows:

[3] Estimated by Bowden Environmental in the application for resource consent CRC062266.

Table 9 - Ranking of objective criteria for the Conway River at SH1 Bridge

Panel	Ranking	Panellist
Trout	H	NIWA & Mark Taylor
Native fish	M	NIWA & Mark Taylor
Mahinga kai	H	Te Rūnanga o Kaikōura
Mauri	H	Te Rūnanga o Kaikōura
Wāhi tapu & Wāhi taonga	H	Te Rūnanga o Kaikōura
Aquatic Habitats	M-L	Maurice Duncan
Indigenous vegetation	M-L	Trevor Partridge
Landscape, Natural character	M	Yvonne Pfluger
General amenity	M	Yvonne Pfluger

3.3.5 Flow suggestions

The flows put forward by NIWA and the Technical Panellists are set out below.

Table 10 - Flow suggestions for the Conway River at SH1 Bridge

Site flow information (L/s)		Suggested minimum flows (L/s)						
Gauged	7-day MALF	NIWA	Taylor Nat fish	Taylor Trout	Duncan	Partridge	Pfluger	Tangata Whenua
607	1070 (±421)	1060	No suggestion	900	900	800	750-1000	More than 607

3.3.6 Staff recommendations

a) Minimum flow site

Currently there is no minimum flow set at SH1 Bridge. This location is not ideal for gauging operations because the braids shift frequently across the gravel bed. Glen Colwyn's existing take and new application are located upstream of SH1 Bridge. Although not ideal, SH1 Bridge is the most appropriate at this time, given the flow information available (i.e. recorded flow gaugings and 7-day MALF calculations). Staff consider that SH1 Bridge should be the reference site for all takes on the middle reach of the Conway River/ Tutae Putaputa.

Recommendation:

That the minimum flow site for the middle reach of the Conway River/Tūtae Putaputa be located at SH1 Bridge at or about NZMS 260 O32:446-451 for all abstractions between the confluence of the Charwell River and Conway Flat Road Bridge.

b) Minimum Flow

The suggested minimum flows put forward by NIWA and the technical panel range from 750 to 1060 L/s. Trout, wāhi taonga and wāhi tapu values, mahinga kai, and mauri have all been ranked high. NIWA suggested a flow of 1060 L/s to protect adult trout habitat, while Mark Taylor suggested a flow of 900 L/s. Rūnanga panellists consider that protecting the mauri (or life force) of the river will protect all other values too and suggest a higher flow than the one gauged at the time of the visits (607 L/s). Native fish, general amenity and native plants have been ranked as moderately important. Mark Taylor did not suggest a flow for native fish because the flow required to protect adult trout will also protect native fish habitat. Pfluger

suggested a flow between 750 and 1,000 L/s to adequately protect general amenity, natural features and landscapes. Plant mahinga kai species are less dependent on flow levels and Partridge recommended a flow of 800 L/s.

Staff consider that the flow required to protect trout fishery will adequately protect the mauri of the river, wāhi taonga and wāhi tapu. Given that plant mahinga kai species well suited to a braided river system and are not influenced by minimum flow and that protecting adult trout habitat will also protect native fish habitat, staff consider that a flow of 1060 L/s will also protect mahinga kai values.

Regarding native birds, this reach (particularly upstream SH1 Bridge) is identified as a feeding, roosting and breeding habitat for deep and shallow water waders, gulls and terns, banded dotterel and black-fronted terns; feeding and roosting habitat for open water divers and waterfowl; and feeding habitat for riparian species (O'Donnell, 2000). This site is particularly important for breeding of two endangered species, black-billed gulls (high numbers) and black fronted terns (low numbers) (O'Donnell, 2000). Floods and freshes play an important role in clearing exotic vegetation from the river bed and a gravel riverbed clear of vegetation provides better habitat for native birds. Setting a minimum flow does not affect floods and freshes but the recommended flow regime must make some provision for the freshes that flush the river in the summer.

Glen Colwyn holds the only current resource consent to take water from this reach of the Conway River/Tūtae Putaputa. There is no minimum flow attached to this resource consent. Given the incomplete flow record, staff are unable to determine the reliability of supply for this abstractor once the minimum flow is set. Staff recommend capping the A block at a level equal to the existing take (22.8 L/s) plus the rate of take recently applied for (60 L/s) to protect their reliability of supply.

Recommendation:

That a minimum flow of 1060 L/s be set at SH1 Bridge at or about NZMS 260 O32:446-451. This recommendation adequately provides for the values set out in Objective WQN1 of the proposed NRRP.

c) Allocation regime

There is insufficient flow data currently available for the Conway River to determine an allocation regime based precisely upon NRRP allocation and reliability of supply policies. The maximum rate of take of the only existing resource consent in the middle reaches of the Conway River/Tūtae Putaputa is 22.8 L/s. The holder of this consent has also applied to take additional 60 L/s from this reach. Should this application be granted to take water at this rate abstraction from this reach would total 82.8 L/s. Given the limited flow data available, the A block for the period of October to April should be capped at 83 L/s. Future abstractions will be included in a B block, for the period of October to April, with a higher minimum flow to protect the reliability of supply of the water permit in the A block. To cater for the freshes that flush the river in the summer, the B block should be capped at 100 L/s. ECan staff also recommend a gap between the A and B blocks of 83 L/s to allow the river to operate above the MALF and make use of freshes and floods generated by higher flows.

It is recommended that an A Block, for the period of May to September of 83 L/s, with a minimum flow of 1060 L/s, for takes to storage or frost fighting is provided should land use change. In the future, increased flow data may allow for more precise calculations of allocation limits. Such consideration will be given when the review provisions of the NRRP take place.

The cut off flow for the B block, for the period of October to April, is calculated by adding the minimum flow for the A block (1060 L/s), the A allocation block (83 L/s), and the gap between the blocks (83 L/s). For the middle reach of the Conway River/Tūtae Putaputa the suggested cut off flow for the B block, for the period of October to April is 1226 L/s.

Recommendation:

That an allocation regime for the middle reach of the Conway River/Tūtae Putaputa be set as follows:

- A allocation block of 83 L/s for the period of October to April with a minimum flow of 1060 L/s; and
- No further consents should be granted for surface water takes or groundwater takes with stream depletion effects; and
- No new entrants within the 83 L/s, to protect reliability of supply to downstream users; and
- A allocation block of 83 L/s for the period of May to September with a minimum flow of 1060 L/s; and
- B allocation block of 100 L/s for the period of October to April with abstractions ceasing at a flow of 1226 L/s.

3.4 Conway River/Tūtae Putaputa at the mouth

This section applies to the lower reach of the Conway River/ Tūtae Putaputa from Conway Flat Bridge to the coast (see Figure 2). Within this reach, there are two current resource consents to take water without minimum flow conditions.

3.4.1 Description

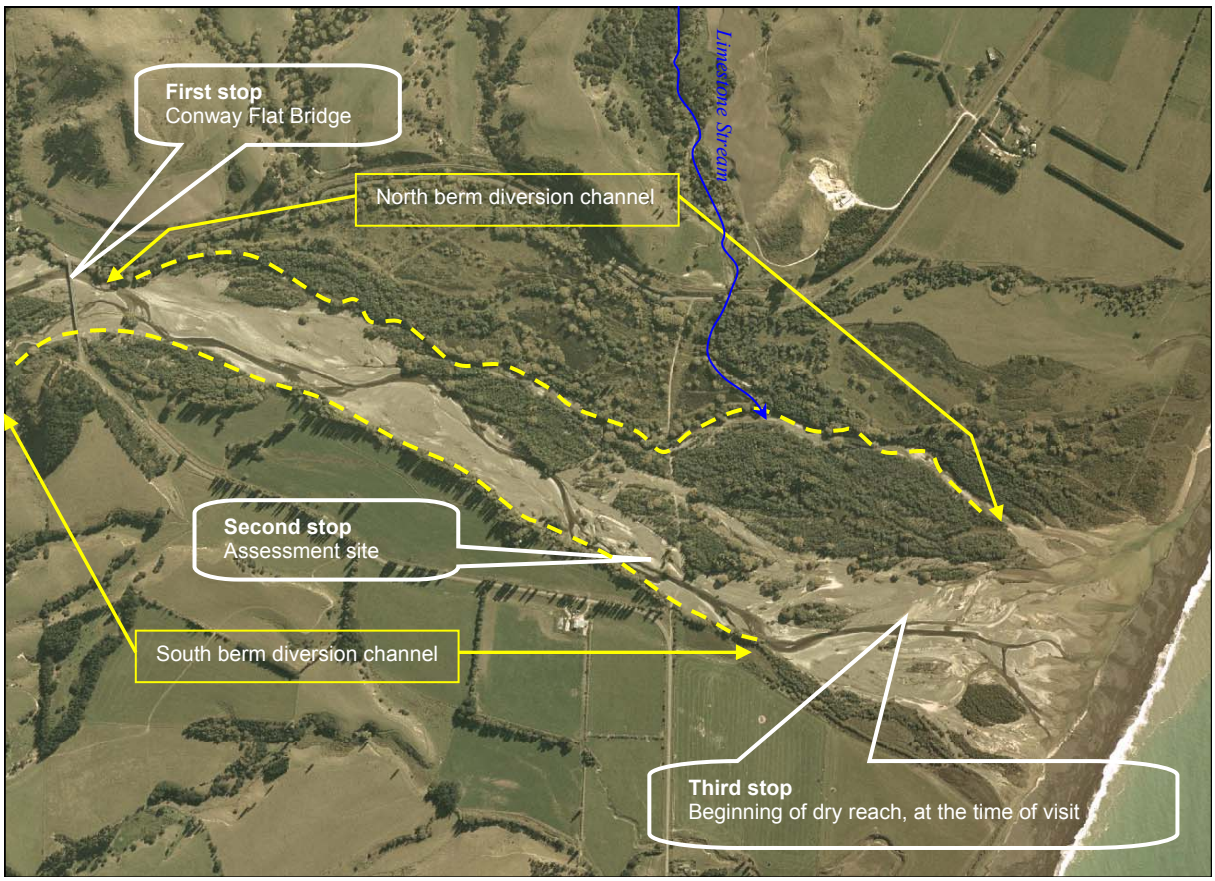

Figure 10 - Conway River/Tūtae Putaputa at the mouth

The technical panel travelled the entire length of this reach, stopping at three sites as illustrated in Figure 4. The first stop was at the Conway Flat Bridge where the technical panel met locals and members of the Advisory Group. The second stop was the site of the assessment described below. The third stop allowed the panellists to view the dry part of this reach.

At the location of the second stop the river flowed in several small channels, flowing over a fairway densely covered in exotic vegetation (i.e. large wattles). The water in these channels disappeared into the gravel, approximately one kilometre downstream, before reaching the beach barrier. The water was clear and there were small amounts of brown and green algae, especially where flows slowed near the edge of the channels. The area has low natural character value due to the large number and size of exotic vegetation on the fairway. NIWA did not visit this site.

3.4.2 Local knowledge

The technical panel met the Advisory Group at the Conway Flat Road Bridge, where Frank Wilding showed aerial photographs from 1950, 1975, 1993 and 2002 to illustrate changes in vegetation and channel morphology. He explained how the frequent movement of the braids

across the gravel bed presents a big challenge to irrigators, forcing them to divert part of the river towards the abstraction points.

Bruce MacFarlane talked about the spread of wattles and how they are choking the riverbed. In addition to this, the Advisory Group provided the following points about the river during the meetings held over December to March 2006:

- With spring tides and onshore winds the sea may spill over into the lagoon;
- If the lagoon gets really full then it breaks out to sea and it stays opened until the next heavy seas;
- Until 10 years ago there used to be colonies of seabirds (terns and blackbill gulls) but they do not seem to nest anymore at this site since the vegetation started to encroach the riverbed;
- Occasionally small freshes undercut the wattles and they fall; and
- River flows respond quickly to rainfall and the bed shifts frequently.

3.4.3 Current abstractions

At 20 March 2007, the consents database showed two current resource consents to take surface water for irrigation from the mouth of the Conway River/Tūtae Putaputa, as detailed in Table 13.

Table 11 - Current resource consents to take water from the mouth of the Conway River

Consent number	Consent holder	Maximum rate of take (L/s)	Current minimum flow (L/s)
CRC030564	W H Holdings Ltd & Jane Andrew Ltd	50	None
CRC991544	Timothy Wilding	40	None
	Total rate:	**90 L/s**	

In order to take water at the abstraction points shown in Figure 4, the river is diverted to both banks. These diversion channels have been estimated[4] to flow at 300 L/s each, far more than what is needed to supply the takes.

The diversion channel on the north berm starts immediately downstream of Conway Flat Bridge and ends approximately 800 metres from the coast and 500 metres north from where the active channel currently sits. This channel intercepts Limestone Creek, deflecting its waters away from the active channel of the Conway River. The diversion channel on the south berm starts approximately 600 metres upstream of Conway Flat Bridge and ends approximately one kilometre from the coast. The water in this diversion channel flows into the active channel of the Conway River. After floods and freshes, the abstractors carry out works in the river bed to excavate new openings for these two diversion channels. Both diversions were in place in 1990 and have continued since, without resource consent. Timothy Wilding and Jane Andrew Ltd have now applied for retrospective resource consents to divert water and to carry out works in the bed of the river.

At 20 March 2007, the consents database showed one current resource consent to take surface water from Limestone Stream, as detailed in Table 14

[4] Estimated by Bowden Environmental in the applications for resource consents CRC062213 and CRC063378 currently being processed.

Table 12 - Current resource consents to take water from Limestone Stream

Consent number	Consent holder	Maximum rate of take (L/s)	Current minimum flow (L/s)
CRC950897.2	Timothy Wilding	25	None

This resource consent would not be subject to a minimum flow on the Conway River/Tūtae Putaputa as the abstraction point is located on Limestone Stream.

3.4.4 Recent resource consent applications to take water

At 20 March 2007, the consents database showed two applications for resource consent to take water for irrigation from the mouth of the Conway River/Tūtae Putaputa, as detailed in Table 15. These applications are currently being processed by Environment Canterbury.

Table 13 – Resource consent application to take water from the mouth of the Conway River

Date lodged	Consent Number	Applicant	Applied to take (L/s)
16/12/05	CRC062213	Tim Wilding	60
27//03/06	CRC063378	Jane Andrew Ltd	55
		Total rate:	**115 L/s**

3.4.5 Ranking of objective criteria

Members of the technical panel have assessed the relative importance of the instream values identified in Objective WQN1 (a) – (h) as follows:

Table 14 - Ranking of objective criteria for the Conway River at the mouth

Panel	Ranking	Panellist
Trout	Not available	
Native fish	Not available	
Mahinga kai	H	Te Rūnanga o Kaikōura
Mauri	H	Te Rūnanga o Kaikōura
Wāhi tapu & wāhi taonga	H	Te Rūnanga o Kaikōura
Aquatic Habitats	M-L	Maurice Duncan
Indigenous vegetation	L	Trevor Partridge
Landscape, Natural character	M-L	Yvonne Pfluger
General amenity	L	Yvonne Pfluger

3.4.6 Flow suggestions

The technical panel did not make flow recommendations for this site. Duncan and Pfluger recommended setting no minimum flow at this site, given that the river disappeared into the gravels further downstream.

3.4.7 Staff recommendations

a) Minimum flow site

Currently there is no minimum flow set at the mouth, nor is the site suitable for gauging operations. The technical panel was asked to assess the river mouth environment to complete their understanding of the river in general and in particular the instream values between Conway Flat Bridge and the coast.

Staff consider more appropriate to set the minimum flow site at SH1 Bridge to monitor water takes between Conway Flat Bridge and the coast. As flows diminish over summer, the river tends to disappear into the gravel bed before it reaches the sea and more often than not the mouth area is completely dry. Due to insufficient flow gauging records it cannot be established with certainty that the SH1 Bridge site will be indicative of the behaviour of the river in this reach but staff consider that SH1 Bridge is still the best available site. Further study of the river mouth environment is required to provide sufficient guidance for future decision-making.

Recommendation:

That the minimum flow site for the lower reach of the Conway River/Tūtae Putaputa, between Conway Flat Bridge and the coast, be located at SH1 Bridge at or about NZMS 260 O32:446-451.

b) Minimum flow

Wāhi taonga and wāhi tapu values, mahinga kai, and mauri have all been ranked as highly important by the tangata whenua panellists, while aquatic habitats and natural character ranked medium to low. There are numerous cultural values associated with the mouth area such as the pa site at Pariwhakatau and registered archaeological sites (ovens, middens and pits). Historically this was a favoured spot for tangata whenua to seasonally gather mahinga kai. The tangata whenua panellists acknowledge the difficulty of monitoring flows at the mouth and suggested alternative methods[5] to monitor the effects of water abstraction on the river mouth environment. From the perspective of the local rūnanga, mauri or the life supporting capacity of the river is the most important value to be protected. The tangata whenua panellists noted that “sustaining the mauri of a river will sustain healthy ecosystems, support a range of cultural uses (including mahinga kai), and reinforce the cultural identify of the people”. Staff agree with the tangata whenua panellists and consider that the flow required to protect the mauri of the river will adequately protect mahinga kai, wāhi taonga and wāhi tapu, as well as aquatic habitats and natural character values.

Although the area upstream of SH1 is considered to be the preferred area for native birds, the mouth has also been identified as a feeding, roosting and breeding habitat for deep and shallow water waders, gulls and terns, banded dotterel and black-fronted terns; feeding and roosting habitat for open water divers and waterfowl; and feeding habitat for riparian species (O’Donnell, 2000). Tangata whenua panellists also observed that non native vegetation choking the riverbed is a concern and in accordance with the runanga environmental management plan, recommended a flow regime that ensures sufficient water flows from the mountains to the sea (ki uta ki tai), to sustain the river mouth environment. Floods and freshes play an important role in clearing exotic vegetation from the river bed but setting a minimum flow does not affect these floods and freshes.

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[5] Tangata whenua panellists suggested using alternatives such as those in the report “A Cultural Health Index for streams and waterways.”

The bed of the river has a steep gradient between SH1 Bridge and the mouth and for that reason, ECan staff consider that the abstractions at the mouth do not influence flows at SH1 Bridge. The bed level at SH1 Bridge is approximately 25 metres above sea level, while 3.5 kilometres downstream the bed level is 5 metres above sea level. Under these circumstances and given the incomplete flow record, setting a minimum flow for these consents is fraught with uncertainty.

Staff suggested three options for setting a minimum flow for the reach, from Conway Flat Bridge to the coast:

A. A minimum flow of 1060 L/s be set at SH1 Bridge (all year); or

B. A minimum flow of 1060 L/s from May to September and no minimum flow from October to April.

    From May to September a flow of 1060 L/s measured at SH1 Bridge is required to protect trout fishery and to insure fish passage. During the period from October to April no minimum flow is required because the takes do not affect the flows at SH1 Bridge and the mouth area tends to go dry naturally during this period.

C. An minimum flow of 1060 L/s from May to September measured at SH1 Bridge (see 3.5.7 (a) above); a residual flow greater than or equal to the rate of take measured immediately below the intake points (a maximum of 105 L/s in the north bank and a maximum of 100 L/s in the south bank) from October to December; no minimum flow in January and February; and again a residual flow greater than or equal to the rate of take measured immediately below the intake points in March and April.

    As for option B, from May to September a flow of 1060 L/s measured at SH1 Bridge is required to protect trout fishery and to insure fish passage. During the period of October to April, when exercising their consents, abstractors are required to maintain a residual flow greater than or equal to their rate of take, except during the months of January and February when no restrictions apply to their takes.

Options B and C came about for three reasons: a) that the mouth only opens to sea sporadically and during the summer the area is dry; b) the proximity of the takes to the coast; and c) the slope of the riverbed between SH1 Bridge and the coast. Given the gradient of the bed of the Conway River/Tūtae Putaputa, staff are of the opinion that the water takes (current and proposed) by the mouth do not adversely affect the flow at SH1.

Each option has advantages and disadvantages. These are summarised below as a starting point for discussion.

Table 15 - Comparison of options for the Conway River at the mouth

Option A	**May to September: 1060 L/s** **October to April: 1060 L/s**
Advantage	Disadvantages
This option offers a precautionary approach to protect instream values by maintaining a minimum flow of 1060 L/s at SH1 Bridge, all season, for all abstractions between Conway Flat Bridge and the coast. It does not increase the extent of the dry reach. It is more effective and less costly to maintain than monitoring individual consents. The site is located upstream of all abstraction points.	There is no evidence of instream values at the mouth requiring protection at this level of flow from October to April. This option lowers reliability of supply for the abstractors without necessarily affording better protection to the instream values identified.

Option B	**May to September: 1060 L/s** **October to April: 0 L/s**
Advantages	Disadvantages
This option recognises that during the dry period, the river dries naturally as it approaches the coast. It bears some relationship with natural flows. It maintains reliability of supply for the abstractors located closer to the mouth without adversely affecting the instream values identified at SH1 Bridge. The site is located upstream of all abstraction points	Given the lack of flow data this option could adversely affect the river mouth environment in unforeseen ways. It could increase the spatial and temporal extent of the dry reach in a manner contrary to Policy WQN3(c). It assumes the values at the mouth would be unaffected over a period of six months.

Option C	**May to September: 1060 L/s** **October to December: a residual flow greater than or equal to the rate of take** **January and February: 0 L/s** **March and April: a residual flow greater than or equal to the rate of take**
Advantages	Disadvantages
This option also recognises that the river dries naturally as it approaches the coast but adds caution by requiring that a residual flow be maintained during the shoulder months of the irrigation season. It is likely to maintain the natural spatial and temporal extent of the dry reach. It offers a higher reliability of supply for the abstractors located closer to the mouth than option A, without adversely affecting the instream values identified at SH1 Bridge.	More expensive for consent holders due to greater monitoring requirements. Requires multiple measuring points. Some reduction in reliability of supply for the abstractors.

The Advisory Group selected option C as in their opinion it represents a more balanced approach. In the future, increased flow data may allow for more precise calculations. Such consideration will be given when the review provisions of the NRRP take place.

The two current resource consents to take water from this reach of the Conway River/Tūtae Putaputa have no minimum flow attached. Given the incomplete flow record, staff are unable to determine the reliability of supply for these abstractors once a minimum flow is set. Staff recommend capping the A block at 250 L/s in order to protect their reliability of supply of existing abstractors. The 250 L/s represent a level equal to the existing takes (90 L/s), plus the rate of take recently applied for (115 L/s), plus 45 L/s for community drinking water.

Recommendation:

That a variable minimum flow be set as follows:

a) May to September: 1060 L/s at SH1 Bridge at or about NZMS 260 O32:446-451.
b) October to December: a residual flow greater than or equal to the rate of take measured immediately downstream of the point of take.
c) January and February: 0 L/s
d) March and April: a residual flow greater than or equal to the rate of take measured immediately downstream of the point of take.

c) Allocation regime

There is insufficient flow data currently available for the Conway River to determine an allocation regime based precisely upon NRRP allocation and reliability of supply policies. The sum of the rate of take for current consents listed on Table 13 is 90 L/s. The sum of the rate of take for the applications in process listed in Table 15 (should they be granted) is 115 L/s. Given that the settlement of Claverly is likely to expand in the future, it would be prudent to allocate 45 L/s for community water supply. Given the limited flow data available, staff consider that the A block should be capped at 250 L/s. Future abstractions will be included in a B block, for the period of October to April, with a higher minimum flow to protect the reliability of supply of water permits in the A block. It would also be prudent at this time to make some provision for the freshes that flush the river by allowing a gap of 250 L/s between the A and B blocks and capping the B block at 100 L/s.

The A Block, for the period of May to September of 250 L/s, with a minimum flow of 1060 L/s, for takes to storage or frost fighting is provided should horticultural land uses develop. In the future, increased flow data may allow for more precise calculations of allocation limits. Such consideration will be given when the review provisions of the NRRP take place.

The minimum flow for the B block for the period of October to April is calculated by adding the minimum flow for the A block (1060 L/s), the gap between the blocks (250 L/s) and the existing A allocation block (250 L/s). For this reach of the Conway River the suggested minimum flow for the B block, for the period of October to April, is 1560 L/s.

Recommendation:

That an allocation regime for the lower reach of the Conway River/Tūtae Putaputa, from Conway Flat Bridge to the coast, be set as follows:

- A allocation block of 250 L/s for the period of October to April with a variable minimum flow set as follows:
  a) October to December: a residual flow greater than or equal to the rate of take immediately downstream of the point of take.
  b) January and February: 0 L/s (no minimum flow)
  c) March and April: a residual flow greater than or equal to the rate of take immediately downstream of the point of take; and
- No further consents should be granted for surface water takes or groundwater takes with stream depletion effects; and

- A allocation block of 250 L/s for the period of May to September with a minimum flow of 1060 L/s; and
- B allocation block of 100 L/s for the period of October to April with abstractions ceasing at a flow of 1560 L/s.

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5 APPENDICES

5.1 Statutory Acknowledgement

The Deed of Recognition for Conway River /Tūtae Putaputa (Clause 12.3) state:

1. This river, and the mahinga kai which it provided, fell under the mana of the Ngāti Wairaki chief Rakatuarua until Ngāi Tahu gained manawhenua (tribal authority over the area) by way of the Ngāti Kurī hapū.

2. The tūpuna had considerable knowledge of whakapapa, traditional trails and tauranga waka, places for gathering kai and other taonga, ways in which to use the resources of the river, the relationship of people with the river and their dependence on it and tikanga for the proper and sustainable utilisation of resources. All of these values remain important to Ngāi Tahu today.

3. The resources of the river once supported a nearby pā built by the Ngāti Māmoe leader, Tukiaua.

4. There are numerous urupā and wāhi tapu associated with the river, particularly in the vicinity of the pā, Pariwhakatau. Urupā are the resting places of Ngāi Tahu tūpuna and, as such, are the focus for whānau traditions. Urupā and wāhi tapu are places holding the memories, traditions, victories and defeats of Ngāi Tahu tūpuna, and are frequently protected by secret locations.

The mauri of Tūtae Putaputa represents the essence that binds the physical and spiritual elements of all things together, generating and upholding all life. All elements of the natural environment possess a life force, and all forms of life are related. Mauri is a critical element of the spiritual relationship of Ngāi Tahu Whānui with the river. (Deed of Recognition, www.govt.nz)

5.2 Technical Panel Notes

Site: Stag & Spey Road

Recording Form Layout

Date:	15 March 2006	**Name: Trevor Partridge**
Name of River:	Charwell R	
Gauged Flow:	240 L/s	
7-day MALF	402 L/s	Min Flow 350 L/s

NOTES
*(For the use of the panellists, their observations etc.) * = native*

Semi-braided system – clear bank structure with gravel islands and channels.
Aquatics – algae only
Edge – monkey musk, soft rush, creeping bent, buttercup, Myosotis
Banks/Gravels – mullein, scabweed*, Pseudognaphalium*, catsear, bugloss, Sonchus and many pasture weeds, Epilobium*, Oxalis exilis*
Floodplain – broom, gorse, bugloss, trefoil clover, pasture grasses, hawkweed.

Values associated with stream/river

(What we will use to put into the report on which the recommendations will be made)

The site is intermediate between a braided river system, where floods determine the vegetation, and a channelled system, where minimum flows determine the vegetation. There is a marginal vegetation along the water's edge, but it is not strongly developed. The distinctive edge species are patchy but form a clear band in places. With the present flow of 240 l/s, most are clear of the stream flow, but none of the edge species is well above the water level and none are in the zone of the gravel species where dryland plants like scabweed are present. This indicates a narrow range of normal flows and a current flow that is lower than normal but not so far as to stress the margin plants.

The only native species are low-growing herbs of the gravels (scabweed, Epilobium etc) and none are of special note.

The minimum flow for the margin species to be stressed is estimated to be approximately 200 L/s.

Conditions or effects that the panellist sees (other than minimum flow) that might affect the values they are considering

The extensive floodplain stands of broom and gorse are maturing, suggesting that it has been a long time since they have been cleared by floods. They are holding the sites so well that the stream is gaining a more permanent channel.

Ranking of Objective WQN1 Criteria:

Criteria	Importance	Potential
Salmon		
Trout		
Native Fish		
Mauri		
Mahinga kai		
Wahi Tapu & Wahi Taonga		
Indigenous Vegetation	L	L
Natural features and landscapes		
General amenity angling boating swimming passive		
Natural flow characteristics		
Ecosystem functioning	M	M

Key:
H=High
H-M= High to Medium
M=Medium
M-L=Medium to Low
L=Low
P=potential (new category: if the site is degraded, what is the potential for improvement if minimum flows are set? For example: P = H)

Recording Form Layout

Date: 15 March 06 **Name: YP**
Name of River: Charwell
Site: Stag and Spey Bridge
Gauged Flow: 240 – Below minimum flow (350)
7-day MALF

NOTES
(For the use of the panellists, their observations etc.)

Where cows cross stream brown algae slime on cobbles– high nutrients.

Values associated with stream/river
(What we will use to put into the report on which the recommendations will be made)

Landscape context potentially natural, some built modification with bridge, road, and farm buildings

Green pasture on irrigated flats.

Riverbed weed infested.

Single thread channel– natural channel that seems to move.

Clear water – gurgling sound, no weeds in water, some algae along slower side of stream.

Flow seems low but size of river appropriate, increase in flow would not change course of channel – would need flood to clear riverbed from weeds and change channel.

Minimum flow could be a bit lower, since difference in terms of landscape values to 350L/s flow will not be significant. Flow should be slightly higher than now.

If flow was lower than current flow texture, surface, movement and sound would decrease.

Recommended minimum flow around 300L/s

Conditions or effects that the panellist sees (other than minimum flow) that might affect the values they are considering

Ranking of Objective WQN1 Criteria:

Criteria	Importance	Potential
Salmon		
Trout		
Native Fish		
Mauri		
Mahinga kai		
Wahi Tapu & Wahi Taonga		
Indigenous Vegetation		
Natural features and landscapes	H-M	H-M
General amenity angling boating swimming passive	L	L
Natural flow characteristics	M	M

Key:
H=High
H-M= High to Medium
M=Medium
M-L=Medium to Low
L=Low
P=potential (new category: if the site is degraded, what is the potential for improvement if minimum flows are set? For example: P = H)

River Descriptions

The Watercourse and river channel

Please specify river, reach, specific location, date, time, weather and recorder.
Please note the representativeness of this location to the wider watercourse.
In some instances, e.g. a minor water flow in an expansive river channel, it may be necessary to distinguish between the watercourse and the channel for assessment.

River attribute	Technical description	Adjective descriptors (use additional descriptors as necessary)
size/scale	stream creek	*Size* minor *Scale* insignificant
shape	Confined to single thread channel at moment. Was braided in places (old braids visible) or channel moves	*Cross section* open, Terraces varied. Incised downstream and terraces. Varied banks, some steep on true left upstream bridge. varied
channel bed materials	gravel shingle	fine exposed uniform
flow movement	velocity movement – varies between curves and surface.	gentle, steady
surface texture	Riffle and run	ruffled (riffle) smooth (run)
sound	Significant	whispering, gurgling
appearance	No rubbish or contaminants. Cows in stream Some algae Weeds in riverbed (gorse/broom) Flood needed to clear bed.	clear clean, fresh

Riparian edges

Riparian Landforms	Terrace downstream varied height Escarpment upstream bridge.	Eroding, steep, varied
Landcover Varied on terraces and flat grass on steep slopes native bush on riverbed gorses.	trees bush scrub	exotic, sparse, farmed, pastoral. Some exotics (willows, poplars, in riverbed, generally quite open.
Built modifications No buildings nearby Medium natural character–	bridge road	appropriate blends colours – green pasture on flats and brown tussock on hills.

farming but no fencing		

Landscape context

Landforms	terraces hill – in background foothill	Rolling Gentle – varied terrain – terraces riverbed wide-incised varies.
Landcover	paddocks grass tussock scrub plantation	indigenous exotic sparse farmed pastoral Indigenous on steep slopes, exotic trees riparian edge (sparse). Tussock on hills Grass on irrigated terrace flats.
Built modifications No high modification	bridge road	

Recording Form Layout

Date:	16 March 06	**Name: Mark Taylor**
Name of River:	Charwell	
Gauged Flow:	240 L/s	
7-day MALF	402 L/s	

NOTES
(For the use of the panellists, their observations etc.)

Riffle/run alluvial river, but
flow too low at present for native fish, especially resident torrent fish. OK for other species (Galaxias vulgaris, Gobiomorphus breviceps)
Evident stock access
Brown trout not recorded here.

Values associated with stream/river
(What we will use to put into the report on which the recommendations will be made)

Recorded habitat for three native fish species with one (the torrentfish) preferring fast flows and moderately deep water (>= 0.3m). None of these fishes are rare, either regionally or nationally.
The reach represents spawning and rearing habitat for upland bully and Canterbury galaxias.
Other species (not recorded) may include longfin eel, and trout. Channel may be too unstable (flow/substrate) for salmonids spawning, and of minimal value for trout rearing or angling. At observed flow, some pools are sufficiently deep (> 0.4m) for large eels, but most of channel probably too shallow even at median flows.
Recommended flow for native fish 350 L/s
Recommended flow if salmonids considered 390 L/s.

Conditions or effects that the panellist sees (other than minimum flow) that might affect the values they are considering

Some stock access, but bank erosion not a problem at this site, due to low stock density and hard gravel subsoil.

Ranking of Objective WQN1 Criteria:

Criteria	Importance	Potential
Salmon	L	L
Trout	L	L
Native Fish	H	H
Mauri		
Mahinga kai		
Wahi Tapu & Wahi Taonga		
Indigenous Vegetation		
Natural features and landscapes		
General amenity angling boating swimming passive	L	L
Natural flow characteristics	H	H

Key:
H=High
H-M= High to Medium
M=Medium
M-L=Medium to Low
L=Low
P=potential (new category: if the site is degraded, what is the potential for improvement if minimum flows are set? For example: P = H)

Recording Form Layout

Date: 15 March 2006 **Name: Maurice Duncan**
Name of River: Charwell
Gauged Flow: 240 L/s
7-day MALF 402

NOTES
(For the use of the panellists, their observations etc.)

Straight channel 3-8m wide up to 250 mm deep.

Bed material greywacke from large cobbles to fine gravel. Bed loose. Channel does move.

Some brown algae on cobbles. Plenty of caddis and some mayfly larvae.

Riffles and runs, long slope steep.

Good velocity in the river.

Some bedrock outcrops with pool up to 1 m deep.

Evidence of recent bed improvement even at low flows – reflects steep slope and fine sediment.

Values associated with stream/river
(What we will use to put into the report on which the recommendations will be made)

Fairly non descript stream without any particular outstanding values in a very modified environment based towards exotic vegetation except on very steep valley sides adjacent to the river.

At the site the stream was quite vigorous but looks a little low.
Habitat for bullies and torrent fish, but flows a bit slow and low for good torrent fish habitat/
Recommended minimum 300 L/s.

Conditions or effects that the panellist sees (other than minimum flow) that might affect the values they are considering

Remote location out of the public eye, so we need to look after it.

Ranking of Objective WQN1 Criteria:

Criteria	Importance	Potential
Salmon	Nil	Nil
Trout	Low	Low
Native Fish	Medium	Medium
Mauri		
Mahinga kai		
Wahi Tapu & Wahi Taonga		
Indigenous Vegetation	Low	Low at site
Natural features and landscapes		
General amenity angling boating swimming passive	 L L L M-L	 L L L M-L
Natural flow characteristics		

Key:
H=High
H-M= High to Medium
M=Medium
M-L=Medium to Low
L=Low
P=potential (new category: if the site is degraded, what is the potential for improvement if minimum flows are set? For example: P = H)

Site 1: Charwell (Stag & Spey)

Values:

- All rivers are wāhi taonga – treasures of the people to be sustained for future generations.
- Need to manage for mauri or life force of the river. Everything else, including human use, relies on this.
- Native fish (Mahinga kai); wāhi taonga, indigenous vegetation, natural features and landscapes, natural flow characteristics all need to be ranked "*high*" for the purposes of establishing those values that the waterway should be managed for. They have to be ranked "high" as they are the baseline; they are what the river once was, and this is what we should be looking to achieve alongside abstractive use of water.
- Naturalness of this waterway, including natural flow characteristics and natural features identified as below average, with potential to be improved.
- General amenity values identified as low or non-existent, given the condition of the waterway.

Observations and Issues:

- Stock access in river bed
- Lack of riparian area
- Little/no indigenous vegetation
- High densities of weeds
- Impact of stock access on water quality
- Need to recognise relationship between water quantity and water quality
- Lack of flow data upon which to base decisions
- 35 year consents for water abstractions
- Potential for increased demand for water with future land use in the area (e.g. subdivision)
- Lack of flow monitoring of Stag and Spey creeks
- Need to determine the best location for flow recorders

Flow Observations/Recommendations:

On a scale from 1 to 10, this site is considered a 2 – 3 in terms of river health. The low rating is attributed to general land use and management practices associated with the river, such as stock access to riverbed and margins. Water abstractions may also have adverse effects on river health.

From a cultural values perspective, there is the feeling that this waterway "is being used primarily to service farmers". This comment was further clarified, that: "this isn't necessary a bad thing, but at the moment it is", given the condition of the waterway.

Cultural values could be improved by raising the minimum flow at this site (from 350 l/s), and promoting better management overall.

In addition, the Stag and Spey streams are believed to be important in considerations of minimum flows for Tūtae Putaputa and its catchment, due to their locations, size and any water abstractions that are, or will be, associated with them. It is recommended that a recording station be located at the confluence of the Stag and Spey streams and Tūtaeputaputa.

Site: SH70 Bridge

Recording Form Layout

Date:	15 March 2006	**Name: Trevor Partridge**
Name of River:	Conway River	
Gauged Flow:	350 L/s	
7-day MALF	546 min 550L/s	

NOTES

*(For the use of the panellists, their observations etc.) *=native*

Wide braided system here – river channel with minimum of marginal vegetation.

Aquatic – algae only.

Margin – creeping bent, Myosotis Juncus sp. & young plants of adjacent gravel floodplain indicating low flows for a while.

Gravels – very open – scattered scabweed*, bugloss, broom, many pasture weeds, mullein, epilobium*, Reseda, Raoulia subsenicea* Older floodplains – not much here – broom, grasses, bugloss, Muehlenbeckia axillaries*, hawkweed.

Values associated with stream/river

(What we will use to put into the report on which the recommendations will be made)

The margin is poorly developed and very ephemeral. The open floodplain/gravels are determined by flood flows.

There is therefore no part of the vegetation that is dependent on minimum flows which is typical of braided river systems so no minimum recommended here for vegetation and ecosystem values.

All native species are open gravel colonisers that are there because of flood events.

Conditions or effects that the panellist sees (other than minimum flow) that might affect the values they are considering

Native components are open ground gravel species the result of flood flows.

Ranking of Objective WQN1 Criteria:

Criteria	Importance	Potential
Salmon		
Trout		
Native Fish		
Mauri		
Mahinga kai		
Wahi Tapu & Wahi Taonga		
Indigenous Vegetation	L	L
Natural features and landscapes		

General amenity angling boating swimming passive		
Natural flow characteristics		
Ecosystem functioning	M	M

Key:
H=High
H-M= High to Medium
M=Medium
M-L=Medium to Low
L=Low
P=potential (new category: if the site is degraded, what is the potential for improvement if minimum flows are set? For example: P = H)

Recording Form Layout

Date: 15 March 06 **Name: YP**
Name of River: Upper Conway
Gauged Flow: 350 L/s – below minimum flow (=550L/s)
7-day MALF

NOTES
(For the use of the panellists, their observations etc.)

Recent channels and higher level still visible in riverbed.

Values associated with stream/river
(What we will use to put into the report on which the recommendations will be made)

Current flow lower than minimum flow (550L/s), which would probably be quite similar in terms of landscape values. The minimum flow should be slightly higher than current flow.

Since difference for landscape values in this range will not be very significant, the minimum flow could be reduced to 400 - 500L/s (would be max 1m wider and 10cm deeper than at current flow).

Freshes important to maintain landscape values, such as clear riverbed.

Varied landscape – natural, aesthetic values high; dramatic backdrop with hills and cliffs and terraces – wide riverbed.

Conditions or effects that the panellist sees (other than minimum flow) that might affect the values they are considering

Highly natural environment and high natural character with backdrop of hills.

Braided riverbed appears natural – no weeds.

Water clear, not many aquatic weeds.

No intensive farming (irrigation and green pastures) – brown tussock colours.

Ranking of Objective WQN1 Criteria:

Criteria	Importance	Potential
Salmon		
Trout		
Native Fish		
Mauri		
Mahinga kai		

Wahi Tapu & Wahi Taonga		
Indigenous Vegetation		
Natural features and landscapes	H	H
General amenity angling boating swimming passive	M	M
Natural flow characteristics	H-M	H-M

Key:
H=High
H-M= High to Medium
M=Medium
M-L=Medium to Low
L=Low
P=potential (new category: if the site is degraded, what is the potential for improvement if minimum flows are set? For example: P = H)

River Descriptions

The Watercourse and river channel

Please specify river, reach, specific location, date, time, weather and recorder.
Please note the representativeness of this location to the wider watercourse.
In some instances, e.g. a minor water flow in an expansive river channel, it may be necessary to distinguish between the watercourse and the channel for assessment.

River attribute	Technical description	Adjective descriptors (use additional descriptors as necessary)
size/scale	stream	*Size* modest *Scale* Potentially expansive
shape	braided Wide braid plain, currently one confined channel.	*Cross section* wide, open upstream gorge incised varied *Long section* winding
channel bed materials	gravel shingle silt, some	fine exposed uniform
flow movement	velocity movement water movement visible in ripples	gentle, steady, lively
surface texture	ripple	Surface broken some larger stones.
sound	Significant gurgling	gurgling
appearance	Water Some algae along sides with silt. Some brown slime on rocks.	clear clean, fresh

Riparian edges

Riparian Landforms	Downstream gorge Terrace upstream Cliffs upstream and downstream	Eroding Some extreme erosion features upstream wide riverbed – clear from vegetation.
Landcover	trees scrub on steep slopes	Exotic Very few willows. Shrub on steeper slopes. Riverbed clear of vegetation. Cliffs downstream bridge. Clear of vegetation. Few pines in gully on side downstream.
Built modifications	bridge road	Contrasting Bridge contrast to gorge and terraces.

Landscape context

Landforms	hill	rolling, steep Varied hills, some steep with tussock.
Landcover	Tussock on hills Plantation – top of terrace true right. Natives in gullies - shrubs	
Built modifications	bridge road	

Recording Form Layout

Date: 15 March 2006 **Name: Maurice Duncan**
Name of River: Conway
Gauged Flow: 350 L/s
7-day MALF

NOTES
(For the use of the panellists, their observations etc.)

Single thread channel 4-10 m wide in 2-300 m wide braid plain. Bed sediment fine gravel to boulders, and sand. Bed movement at low flows.
Some brown algae. Caddis fly on larger cobbles, no mayfly larvae

Very steep stream with relatively high velocity.
Up to 200mm deep
Some green filamentous algae
Bullies present.

The river looks a little low and lifeless for such a step stream, so needs greater flow.

Values associated with stream/river
(What we will use to put into the report on which the recommendations will be made)

The wide, poorly vegetated (a good thing), braid plain is unusual for such a small river and low flows but is a reflection of the sediment supply, flood regime and steep slope, not the low flows.
Unexciting stream, but the high steep banks add some interest

Habitat for bullies.

Recommended minimum flow of 450 l/s.

Conditions or effects that the panellist sees (other than minimum flow) that might affect the values they are considering

The un-vegetated braid plan.

Ranking of Objective WQN1 Criteria:

Criteria	Importance	Potential
Salmon	L	L
Trout	L	L
Native Fish	M-L	M-L
Mauri	L	L
Mahinga kai	L	L
Wahi Tapu & Wahi Taonga	?	?
Indigenous Vegetation	L	L
Natural features and landscapes	M	M
General amenity angling boating swimming passive	 L L L M	 L L L M
Natural flow characteristics		

Key:
H=High
H-M= High to Medium
M=Medium
M-L=Medium to Low
L=Low
P=potential (new category: if the site is degraded, what is the potential for improvement if minimum flows are set? For example: P = H)

Site 2: Conway SH 70

Values:

- All rivers are wāhi taonga – treasures of the people to be sustained for future generations.
- Need to manage for mauri or life force of the river. Everything else, including human use, relies on this.
- Good degree of "naturalness" to be experienced at this site: water clarity and "openness" of the riverbed.
- Natural flow characteristics identified as "could be improved"; and indigenous vegetation ranked as "low".
- Native fish (Mahinga kai); wāhi taonga, indigenous vegetation, natural features and landscapes, natural flow characteristics all need to be ranked "*high*" for the purposes of establishing those values that the waterway should be managed for. They have to be ranked "high" as they are the baseline; they are what the river once was, and this is what we should be looking to achieve alongside abstractive use of water.

Observations and Issues:

- Lack of indigenous vegetation
- Potential for increased demand for water with future land use in the area (e.g. subdivision)
- The relationship between the amount of water in the river and the land use patterns adjacent to the river. Impacts of tree plantations on water yield of catchment.
- Could picture our tūpuna fishing here, and future generations as well (indicator of river health and degree of naturalness).

Flow Observations/Recommendations:

The existing minimum flow may be appropriate to protect and provide for tangata whenua values if there is only one water abstraction consent. If additional consents are granted, the minimum flow should be raised.

Site: SH1 Bridge

Recording Form Layout

Date:	15 March 2006	**Name: Trevor Partridge**
Name of River:	Conway	
Gauged Flow:	607 L/s	
7-day MALF	1072 L/s	

NOTES

*(For the use of the panellists, their observations etc.) * = native*

Aquatics – algae only.

Margin – very sparse – few recently established creeping bent.
Upper margins – pasture weeds, scabweed *, Psendographalium* mullein
Reseda, Teline
Floodplain gravels – Telike, bugloss, wattle broom, pasture weeds, Senecio quadridemtotio*, Haloragis erecta*

Values associated with stream/river
(What we will use to put into the report on which the recommendations will be made)

The margin vegetation is minimal because of braided nature of river – however with wattle invasion, things may change. River level appears too low for natural marginal vegetation. It seems that 800 L/s would be a minimum for the little marginal vegetation, even though the native species recorded are not influenced by these flows.

Conditions or effects that the panellist sees (other than minimum flow) that might affect the values they are considering

Ranking of Objective WQN1 Criteria:

Criteria	Importance	Potential
Salmon		
Trout		
Native Fish		
Mauri		
Mahinga kai		
Wahi Tapu & Wahi Taonga		
Indigenous Vegetation	L	L
Natural features and landscapes		
General amenity angling boating swimming passive		
Natural flow characteristics		
Ecosystem functioning	M	M

Key:
H=High
H-M= High to Medium
M=Medium
M-L=Medium to Low
L=Low
P=potential (new category: if the site is degraded, what is the potential for improvement if minimum flows are set? For example: P = H)

Recording Form Layout

Date: 15 March 06 **Name: YP**
Name of River: Lower Conway (SH1)
Gauged Flow: 607l (10 days dropped 400 from 1070)
7-day MALF

NOTES
(For the use of the panellists, their observations etc.)

Flood flows needed to remove large vegetation.

Trout is affected by flow now.

Values associated with stream/river
(What we will use to put into the report on which the recommendations will be made)

Relatively low natural character values. Forest plantation on hills (true right)

Picnic and lunch spot from SH1 – swimming pool, fishing. Considerable amenity values

River looks low at the moment

Loss of approximately 20% wetted area compared to 1000l flow (exposed rocks with dried up algae)

Recommended flow between 750 and 1000L

Conditions or effects that the panellist sees (other than minimum flow) that might affect the values they are considering

Altered bank and road access (picnic) – SH1 Bridge and outfall with armouring.

Noise, cars are more dominant than river (very silent).

Ranking of Objective WQN1 Criteria:

Criteria	Importance	Potential
Salmon		
Trout		
Native Fish		
Mauri		
Mahinga kai		
Wahi Tapu & Wahi Taonga		
Indigenous Vegetation		
Natural features and landscapes	M	M
General amenity angling boating swimming passive	M	M
Natural flow characteristics	L	M-L

Key:
H=High
H-M= High to Medium
M=Medium
M-L=Medium to Low
L=Low
P=potential (new category: if the site is degraded, what is the potential for improvement if minimum flows are set? For example: P = H)

River Descriptions
The Watercourse and river channel
Please specify river, reach, specific location, date, time, weather and recorder.
Please note the representativeness of this location to the wider watercourse.
In some instances, e.g. a minor water flow in an expansive river channel, it may be necessary to distinguish between the watercourse and the channel for assessment.

River attribute	Technical description	Adjective descriptors (use additional descriptors as necessary)
size/scale	stream	*Size*

		modest *Scale* significant
shape	Single thread - becoming channellised river with large trees (Wattles)	*Cross section* shelving, Banks higher channel entrenched varied Near bridge outfall armoured. *Long section* curving Long curves.
channel bed materials	gravel	Varied from fine to coarse Some minor gravel banks - riverbed choked up with Wattles. exposed varied
flow movement	Velocity - slower Movement – less surface structure.	constant, gentle
surface texture	run	calm, smooth Relatively wide channel.
sound	Very silent,	lapping
appearance	Rubbish - no weed - Riverbed infested algae (green, muddy brown).	luminous whisky slimy stones covered.

Riparian edges

Riparian Landforms	flood plain slope shelf	Wider riverbed starts to become floodplain.
Landcover	trees tussock scrub	exotic dense Very dense vegetation in riverbed – river doesn't have energy to take large vegetation out.
Built modifications	Road along river true right upstream. Buildings outfall picnic area.	artificial man-made changed

Landscape context

Landforms	hill	gentle
Landcover	trees plantation forest on true right hills	exotic planted modified
Built modifications	railway road structures outfall	prominent

Recording Form Layout

Date:	15 March 2006	**Name: Mark Taylor**
Name of River:	Conway	
Gauged Flow:	609 L/s	
7-day MALF	(cal) 1054 L/s	900 L/s re min

NOTES
(For the use of the panellists, their observations etc.)

Present at site (NZFFDB) upland bully, common river galaxias
Below bridge, torrentfish, inanga, common river galaxias, common bully
Trout reported (by farmer) as possibly more now than ever.

Values associated with stream/river
(What we will use to put into the report on which the recommendations will be made)

Riffle/run gravel-based river.
Some deep pools at course inflection suitable for angling.
Current riffle flow (at gauged flow) presents sharply restricted weighted usable area (WUA) for Galaxias Vulgaris – torrent fish, trout.

Conditions or effects that the panellist sees (other than minimum flow) that might affect the values they are considering

Further channelisation will change longitudinal structure of riffle/run/pools, which could change fish and invertebrate community structure.

Ranking of Objective WQN1 Criteria:

Criteria	Importance	Potential
Salmon	L	L
Trout	H	L
Native Fish	M	
Mauri		
Mahinga kai		
Wahi Tapu & Wahi Taonga		
Indigenous Vegetation		
Natural features and landscapes		
General amenity angling boating swimming passive	M	M
Natural flow characteristics		

Key:
H=High
H-M= High to Medium
M=Medium
M-L=Medium to Low
L=Low
P=potential (new category: if the site is degraded, what is the potential for improvement if minimum flows are set? For example: P = H)

Recording Form Layout

Date:	15 March 2006	**Name: Maurice Duncan**
Name of River:	Conway	
Gauged Flow:	607 L/s	
7-day MALF	1071 L/s	

NOTES
(For the use of the panellists, their observations etc.)

10m wide run/ruffle 200mm deep

0.3 m/s

Mainly gravel with some small cobbles

Bed covered bank to bank with brown algae

Plenty of caddis and a few small mayfly nymphs

The river bed is becoming narrow as it is invaded by wattles and scrub. They need to be killed.

Values associated with stream/river

(What we will use to put into the report on which the recommendations will be made)

Swimming, fishing, landscape values

River looks low, recommended minimum 900 l/s.

Trout and bullies

The area gets lots of use as it is picnic ground adjacent to busy state highway 1

River looks low, recommended minimum 900 l/s.

Conditions or effects that the panellist sees (other than minimum flow) that might affect the values they are considering

Exotic weed infested braid plain lined by willows and wattles.

Proximity to SH1

Ranking of Objective WQN1 Criteria:

Criteria	Importance	Potential
Salmon	L	L
Trout	M-L	M-L
Native Fish	M	M
Mauri		
Mahinga kai		
Wahi Tapu & Wahi Taonga		
Indigenous Vegetation	L	L
Natural features and landscapes	M-L	M-L
General amenity angling boating swimming passive	 L L M-L M-L	 L L M-L M-L
Natural flow characteristics		

Key:
H=High
H-M= High to Medium
M=Medium
M-L=Medium to Low
L=Low
P=potential (new category: if the site is degraded, what is the potential for improvement if minimum flows are set? For example: P = H)

Site 4: Conway Bridge SH 1

Values:

- All rivers are wāhi taonga – treasures of the people to be sustained for future generations.
- Need to manage for mauri or life force of the river. Everything else, including human use, relies on this.
- Native fish (Mahinga kai); wāhi taonga, indigenous vegetation, natural features and landscapes, natural flow characteristics all need to be ranked "*high*" for the purposes of establishing those values that the waterway should be managed for. They have to be ranked "high" as they are the baseline; they are what the river once was, and this is what we should be looking to achieve alongside abstractive use of water.
- This area was a favourite recreational place for families, e.g. swimming and fishing.

Observations and Issues:

- Lack of flow from stream coming out of tunnel: "when we were kids you could barely walk through the tunnel the water was so swift".
- We need to know what is coming out of other catchments (e.g. the stream flowing into Tūtaeputaputa through the tunnel)
- Vegetation choking the river in places – the river "needs a good flood"
- Lack of acknowledgement of the relationship between native vegetation, appropriate flow and native fish/mahinga kai values
- Impacts of vegetation on natural character and flow of the river (e.g. may see changes from braided river to channel)
- Impacts of upper catchment activities on this area of the river (e.g. impacts of forestry on catchment water yields)
- Impacts of adjacent land use on water quantity (e.g. forestry plantations)
- The kind of flow at this site is as important as level, in terms of mahinga kai values.

Flow Observations/Recommendations:

There should be more water in the river at this site. In terms of protecting and providing for tangata whenua values, we should be looking at the potential to improve the river at this site, as opposed to considering how much or how far we can lessen the flow.

Flow at this river (and thus available water) may be improved with an active programme of vegetation control.

Minimum flows for Tūtaeputaputa must take into account the forestry activities occurring the catchment, and the effect of such activities on water yield (numerous new young plantations with high water intake). We need to *future proof* the minimum flows.

Site: Conway River Mouth
Recording Form Layout

Date: 15 March 2006 **Name: Trevor Partridge**
Name of River: Conway
Gauged Flow:
7-day MALF

NOTES
*(For the use of the panellists, their observations etc.) * = native*

Semi-braided system confined to channels by growth of trees on river bank.
Aquatics – algae only.
Margin – musk, polygonum, cress
Upper margin – Lotus, tree lucerne, carrot, mullein
Floodplain gravels – crack willow, bugloss, tree lucerne, scabweed *, buddleia, tree lupin, trefoil, pasture weeds
Stable floodplain – willow, buddleia, wattle.

Values associated with stream/river
(What we will use to put into the report on which the recommendations will be made)

The lowermost margin vegetation is stranded well above the present water level. Below the vegetation there are surface-coated stones from algae and silt. The plants however show no stress from drying indicating that the fall is recent and probably not likely to be long term.

Conditions or effects that the panellist sees (other than minimum flow) that might affect the values they are considering

Ranking of Objective WQN1 Criteria:

Criteria	Importance	Potential
Salmon		
Trout		
Native Fish		
Mauri		
Mahinga kai		
Wahi Tapu & Wahi Taonga		
Indigenous Vegetation	L	L
Natural features and landscapes		
General amenity angling boating swimming passive		
Natural flow characteristics		
Ecosystem functioning	M	M

Key:
H=High
H-M= High to Medium
M=Medium
M-L=Medium to Low
L=Low

P=potential (new category: if the site is degraded, what is the potential for improvement if minimum flows are set? For example: P = H)

Recording Form Layout

Date: 15 March 2006 **Name: Maurice Duncan**
Name of River: Conway
Gauged Flow:
7-day MALF

NOTES
(For the use of the panellists, their observations etc.)

Single thread, lower gradient, slower flowing stream in a vegetation covered braid plain.

Mainly runs with connecting riffles.

Fine to coarse gravel.

Small amounts of brown and green algae especially on the slower margins of the runs

5-15m wide up to 20 cm deep. 0.2m/s velocity in runs. Healthy stream with caddis and mayfly but algae covers the gravel at the margin.

Bullies present.

Values associated with stream/river
(What we will use to put into the report on which the recommendations will be made)

The flow looks a bit low today but given that the stream dries up 1km downstream of site one has to question the need for a minimum flow.

Recommendation: that no minimum be set

Conditions or effects that the panellist sees (other than minimum flow) that might affect the values they are considering

Typical small lowland river with exotic weeds and willows – no special redeeming features.

Ranking of Objective WQN1 Criteria:

Criteria	Importance	Potential
Salmon	L	L
Trout	L	L
Native Fish	M	M
Mauri	M-L	M-L
Mahinga kai		
Wahi Tapu & Wahi Taonga		
Indigenous Vegetation	L	L
Natural features and landscapes	L	L
General amenity		
angling	L	L
boating	L	L
swimming	L	L
passive	L	L

Natural flow characteristics		

Key:
H=High
H-M= High to Medium
M=Medium
M-L=Medium to Low
L=Low
P=potential (new category: if the site is degraded, what is the potential for improvement if minimum flows are set? For example: P = H)

Recording Form Layout

Date: 15 March 06 **Name: YP**
Name of River: Conway
Gauged Flow: Measured at bridge
7-day MALF

NOTES
(For the use of the panellists, their observations etc.)

Riverbed heavily infested with large exotic trees.

Flow in several threads within wider riverbed, but very confined to separate channels due to dense vegetation.

Gravel with dried up slime (algae)

Water clear, but rich in nutrients

Vegetation has increased, now forest close to site - different character, but channels still cut through. Water is not flowing into lagoon –riverbed chokes up (big flood takes Wattles out), gravel builds up unless flushes. Mean annual rainfall 800mm.

Values associated with stream/river
(What we will use to put into the report on which the recommendations will be made)

No visual connection between single threads.

Dry riverbed with weeds low natural value. No usual connection to sea (gravel bar)

Landscape wide with hills as backdrop, but not very visible from riverbed due to vegetation.

River dries up further upstream, so no proposed minimum flow. Flow to change landscape appearance would have to be significantly higher.

Conditions or effects that the panellist sees (other than minimum flow) that might affect the values they are considering

Weeds appear to have a more adverse effect on landscape values than flow

Ranking of Objective WQN1 Criteria:

Criteria	Importance	Potential
Salmon		
Trout		
Native Fish		
Mauri		
Mahinga kai		
Wahi Tapu & Wahi Taonga		
Indigenous Vegetation		
Natural features and landscapes	M-L	M-L
General amenity angling	L	L

boating swimming passive		
Natural flow characteristics	L	L

Key:
H=High
H-M= High to Medium
M=Medium
M-L=Medium to Low
L=Low
P=potential (new category: if the site is degraded, what is the potential for improvement if minimum flows are set? For example: P = H)

River Descriptions

The Watercourse and river channel

Please specify river, reach, specific location, date, time, weather and recorder.
Please note the representativeness of this location to the wider watercourse.
In some instances, eg. a minor water flow in an expansive river channel, it may be necessary to distinguish between the watercourse and the channel for assessment.

River attribute	Technical description	Adjective descriptors (use additional descriptors as necessary)
size/scale	stream	*Size* Modest little *Scale*
shape	Single thread Several narrow channels separated by vegetation. Lagoon forms big lake when spills over bar.	*Cross section* broad *Long section* curving
channel bed materials	gravel silt	uniform
flow movement	velocity movement	slack slow
surface texture	riffle - narrower run - wider and slow	Runs calm, ruffled (riffles)
sound	Insignificant sound from riffles	whispering
appearance	water weed Riverbed infested with exotic trees. Watercourse – green and brown algae.	translucent slimy

Riparian edges

Riparian Landforms	flood plain	Flat Wide riverbed with dense vegetation.
Landcover	trees	Exotic Large trees in riverbed.
Built modifications	road	appropriate

Landscape context

Landforms	hill	rolling Hills form spectacular backdrop. Lagoon formed behind bars.
Landcover	paddocks weeds	exotic, dense - along river in riverbed pastoral - extensive farmland

	grass some shelterbelts	surrounding river
Built modifications	road	small Medium natural farmed, exotic vegetation. Start to overgrow.

Site 3: Tūtaeputaputa River Mouth to SH 1

Values:

- All rivers are wāhi taonga – treasures of the people to be sustained for future generations.
- Need to manage for mauri or life force of the river. Everything else, including human use, relies on this.
- Numerous cultural values associated with lower catchment area (see section on general values), including the pa sites Pariwhakatau and registered archaeological sites (ovens, middens, pits)
- Historical mahinga kai area
- Mahinga kai associations: "my father used to spend a lot of time fishing for kōura just off the river mouth".
- Families spent time fishing at the river mouth: "as kids we would walk down from the main road to the lagoon at the river mouth, to swim and fish".
- Native fish (Mahinga kai); wāhi taonga, indigenous vegetation, natural features and landscapes, natural flow characteristics all need to be ranked "*high*" for the purposes of establishing those values that the waterway should be managed for. They have to be ranked "high" as they are the baseline; they are what the river once was, and this is what we should be looking to achieve alongside abstractive use of water.

Observations and Issues:

- Vegetation (non-native) choking the riverbed
- From 1950's to today, the most noticeable change is the amount of vegetation in the riverbed.
- Is the increase in vegetation linked to less water/less floods and freshes?
- Can't remember the lagoon at the river mouth being this low
- Adjacent land use and demand for water for irrigation

Flow Observations/Recommendations:

The flow regime for Tūtaeputaputa, as a catchment, needs to ensure that sufficient water flows *ki uta ki tai* (from mountains to sea), to sustain the river mouth environment.

While recognising operational/practical difficulties, it would be beneficial to monitor flow downstream of SH1. While monitoring flow at the river mouth may not be feasible, it would be beneficial to consider alternative methods to monitor the effects of water abstractions between SH1 and the River mouth on the river mouth environment (e.g. Cultural Health Index).

5.3 Summary of NIWA Report

Thirty four sites were selected to assess instream flow requirements for 27 streams in North Canterbury. These sites were typically downstream of single or multiple water-takes, and were surveyed between January and April 2004. The study combines a 'snap-shot' of biodiversity (fish, invertebrates and periphyton) with flow and habitat characterisation, enabling predictions of what effect a change in flow will have on aquatic habitat.

The streams were electric-fished to find out what fish were present and their relative abundance. Quick assessment methods were used to identify what stream invertebrates were present as well as an assessment of periphyton cover on the streambed. This information was analysed, using multivariate statistics, to group streams that supported similar ecological communities.

Four groups of stream were identified;

A. low-velocity soft-bottomed streams;
B. moderate-velocity gravel-bed streams;
C. high-velocity cobble-bed streams; and
D. larger rivers (cobble, high velocity).

Appropriate flow management criteria were developed for each group. These management criteria were in the form of habitat preference parameters, plus a habitat retention level selected to provide adequate protection for the stream community.

The WAIORA method was used to measure stream habitat at each site, and the software package RHYHABSIM modelled the predicted effect of reduced flow on habitat. This approach relates hydraulic parameters such as water depth and velocity, and the way these change with flow, to known preferences of various aquatic species. Management criteria established for each stream group were then used to define a minimum flow from these habitat-modelling results.

The habitat-flow response curves provide a measure of how habitat changes with flow for each species. These curves provide a good basis for flow management decisions. The process involved selecting appropriate aquatic species, determining an appropriate level of habitat retention, and the flow that provided that protection level. What is an appropriate level of habitat retention will depend, for example, on the importance of safeguarding a population from extinction, or its importance as a fishery. Significance criteria were established accordingly, and habitat retention values were scaled according to the significance of the species or ecosystem.

	Significance Criteria	Habitat retention level (percentage of optimum habitat)
1	Short-jawed kokopu; giant kokopu (DoC priority A & B species)	100%
2	DoC priority C species & regionally threatened species. Banded kokopu; koaro; Canterbury mudfish; alpine Galaxias spp.	95%
3	Locally or Regionally significant Brown Trout fisheries plus habitat on which these fisheries depend for spawning and rearing.	90%
4	Diverse and abundant native fish communities. Fish community featuring a significantly high number of native species, or with importance to recreational (whitebaiting) or cultural (Mahinga kai) values. Species are individually given this protection level, unless afforded higher protection by Crit. 1-3.	85%
5	Non-diadromous species of native fish.	80%
6	Sparse and unfished trout populations. Fish that are often stunted.	60%
7	Streams with few fish or aquatic fauna present.	50%
8	Other fish communities.	70%

Determining flow requirements of stream ecosystems also requires consideration of the competing requirements of various species and life stages. To address the requirements of different species, a sentinel species was chosen that best represented the various habitat requirements of the stream community. There were several steps in selecting an appropriate sentinel species. North Canterbury streams support a range of biological communities, so no single species will be appropriate throughout the region. Instead the biological data was classified to identify what stream communities are present, in order to allow an appropriate sentinel species to be chosen for each. Rather than looking for a species found at every site, a species was chosen with habitat preferences that meet the requirements of that community type. Applying the appropriate habitat retention level to the chosen sentinel species produces a minimum flow for each site.

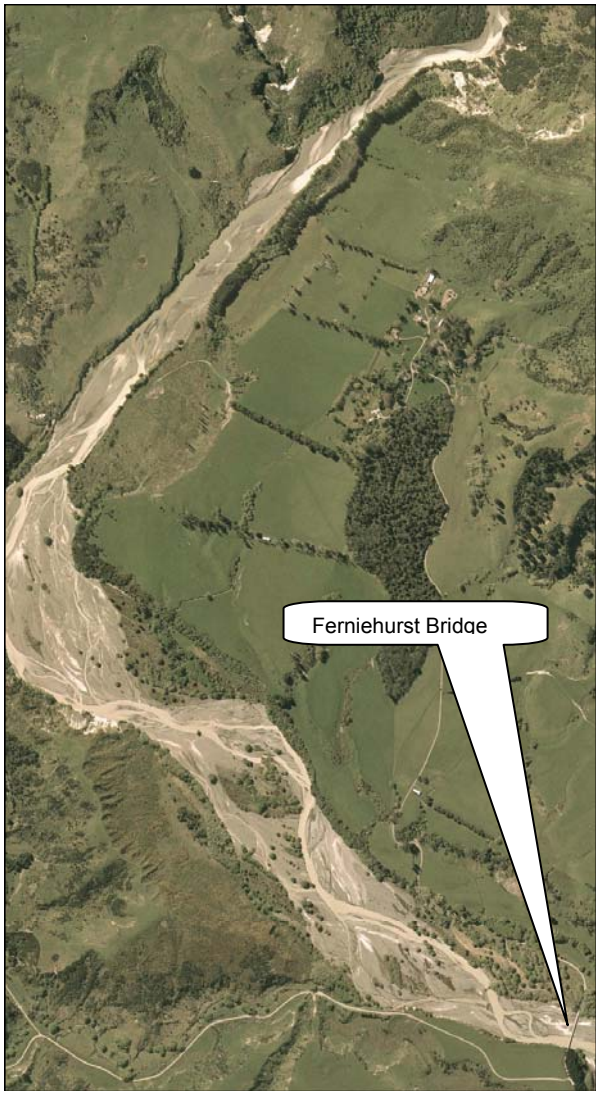
In some cases, the flow that provides maximum habitat (optimum flow) was high relative to normal stream flows. In such cases, the fish population is likely to be limited by low flows that occur naturally during dry seasons. Where the optimum flow was more than 1.5 times the 7 day MALF, an upper limit of the minimum flow was set at the 7-day MALF. In many cases this meant the minimum flow defaulted to the 7-day MALF.

5.4 Conway River/Tūtae Putaputa at Ferniehurst Gorge

This section applies to the middle reach of the Conway River/ Tūtae Putaputa from the confluence of the Charwell River to Conway Flat Bridge (see Figure 2). This reach is represented by two different sites, Ferniehurst and SH1 Bridge. Within this reach, there is only one resource consent to take water. This resource consent does not have a minimum flow condition.

5.4.1 Description

The river at this reach is confined by limestone hills and high cliffs on both sides. The width of the bed varies but the river is still braided with many riffles, runs and pools. At the time of the visit, the water was clear, flowing gently in two separate braids. The fairway is sparsely vegetated possibly due to floods and freshes. Frequent freshes play an important part keeping the riverbed clear of weeds. This reach of the river is a highly natural environment and it has high natural character, with a wide and clear gravel bed confined by steep limestone banks. The banks have massive manuka trees and Marlborough rock daisy on the cliffs. The landscape has high aesthetic value with the hills and cliffs terraces providing a dramatic backdrop. NIWA did not visit this site.



Conway River/Tūtae Putaputa at Ferniehurst Gorge

5.4.2 Local knowledge

Richard Wilding, farming a property bounded by the Conway River on three sides, provided specific local knowledge about the Conway River/Tūtae Putaputa at Ferniehurst. Richard found the river to be a bit low at the time of the visit and said that it could well stay low until June if the autumn is dry. There are flounder and trout, visible all the way up to the confluence with the Spey Stream. Richard has never seen juvenile trout but he has seen adult ones. There has been an increase in plant pests over the last 20 years.

5.4.3 Current abstractions

At 20 March 2007, the consents database showed one current resource consent to take surface water for irrigation from the Conway River/Tūtae Putaputa in Ferniehurst (downstream of Ferniehurst Bridge), as detailed in the Table below.

Current resource consent to take water from middle reach of the Conway River

Consent number	Consent holder	Maximum rate of take (L/s)	Current minimum flow (L/s)
CRC961301.1	Glen Colwyn Estates Ltd	22.8	None
	Total rate:	**22.8 L/s**	

In order to take water at the abstraction point Glen Colwyn diverts the Conway River into an excavated hollow located on the south bank, approximately 500 metres downstream of the railway bridge. After floods and freshes, the Glen Colwyn carries out works in the river bed to divert water to his intake.

At 20 March 2007, the consents database showed one application for resource consent to take water from the middle reach of the Conway River/Tūtae Putaputa, as detailed in the Table below. This application is currently being processed by Environment Canterbury.

Resource consent application to take water from middle reach of the Conway River

Date lodged	Consent number	Applicant	Applied to take (L/s)
20/12/05	CRC062266	Glen Colwyn Estates Ltd	60

This application seeks consent to divert as well as take water from the Conway River. The proposed diversion channel is estimated[6] to flow at 200 L/s. The applicant proposes to have two intake points on the diversion channel. The diversion channel will intercept Glen Colwyn Stream and Hewsons Stream.

5.4.4 Ranking of objective criteria

Members of the Technical Panel have assessed the relative importance of the instream values identified in Objective WQN1 (a) – (h) as follows:

Ranking of objective criteria for the Conway River at Ferniehurst Gorge

Panel	Ranking	Panellist
Trout	L	Mark Taylor
Native fish	M	Mark Taylor
Mahinga kai	H	Te Rūnanga o Kaikōura
Mauri	H	Te Rūnanga o Kaikōura
Wāhi tapu & wāhi taonga	H	Te Rūnanga o Kaikōura
Aquatic Habitats	M-L	Maurice Duncan
Indigenous vegetation	M	Trevor Partridge
Landscape, Natural character	H	Yvonne Pfluger
General amenity	H	Yvonne Pfluger

5.4.5 Flow suggestions

The flows put forward by Technical Panellists are set out below.

[6] Estimated by Bowden Environmental in the application for resource consent CRC062266.

Flow suggestions for the Conway River at Ferniehurst Gorge

Site flow information (L/s)		Suggested minimum flows (L/s)					
Gauged	7-day MALF	Taylor Nat fish	Taylor Trout	Duncan	Partridge	Pfluger	Tangata Whenua
556	Not available	650	No suggestion	750	No suggestion	600-700	No suggestion

5.4.6 Staff recommendations

a) Minimum flow site

Ferniehurst Gorge was selected as a potential site for a water level recorder because the river narrows into a gorge with rock bed and banks, offering a more stable site. Staff has started a catchment wide hydrological investigation to measure the flows at various points on the mainstem of the Conway River/Tūtae Putaputa and selected tributaries. The aim of the investigation is to gain knowledge of the flow at each site, the flow relationships between sites, and to gain an understanding of flows at a catchment level.

Due to insufficient flow gauging records it cannot be established with certainty what the flow should be at Ferniehurst Gorge, to deliver the minimum flow suggested for SH1. Staff recommend waiting for the results of the catchment wide investigations to establish a reliable relationship between these sites. For this reason staff recommends the SH1 Bridge as a more suitable site.

Recommendation:

That the minimum flow site for the middle reach of the Conway River/Tūtae Putaputa be located at SH1 Bridge at or about NZMS 260 O32:446-451 for all abstractions between the confluence with the Charwell River and Conway Flat Road Bridge.

b) Minimum flow

Staff consider that there is insufficient information about the relationship between this site and the site at SH1, to set an minimum flow at Ferniehurst that would deliver the desired flow at SH1 Bridge. Until there is a better understanding, at a catchment level of the relationships between Ferniehurst Gorge and SH1 Bridge, staff recommend that the minimum flow be set at SH1 Bridge.

Recommendation:

That the minimum flow for the middle reach of the Conway River/Tūtae Putaputa be set at SH1 Bridge at or about NZMS 260 O32:446-451 for all abstractions between the confluence with the Charwell River and Conway Flat Road Bridge.

5.5 Site Photographs

Figure 11 - Charwell River at Stag and Spey Rd Bridge

Figure 12 - Charwell River downstream of Stag and Spey Rd Bridge

Figure 13 - Conway River/Tūtae Putaputa upstream of SH70 Bridge

Figure 14 -Conway River/Tūtae Putaputa downstream of SH70 Bridge

Figure 15 - Conway River/Tūtae Putaputa at Ferniehurst in Winter

Figure 16 - Conway River/Tūtae Putaputa at Ferniehurst in Summer

Figure 17 - Conway River/Tūtae Putaputa immediately downstream of Glen Colwyn's diversion

Figure 18 - Conway River/Tūtae Putaputa Glen Colwyn's immediately upstream of Glen Colwyn's diversion

Figure 19 - Conway River/Tūtae Putaputa immediately downstream of SH1 Bridge

Figure 20 - Conway River/Tūtae Putaputa immediately upstream of SH1 Bridge

Figure 21 - Conway River/Tūtae Putaputa immediately downstream of Conway flat Rd Bridge

Figure 22 - Conway River/Tūtae Putaputa downstream of Conway flat Rd Bridge

Figure 23 - Conway River/Tūtae Putaputa at the mouth, looking Northwest

Figure 24 - Conway River/Tūtae Putaputa at the mouth, looking West

Figure 25 - Conway River/Tūtae Putaputa at the mouth, looking North

Figure 26 - Conway River/Tūtae Putaputa at the mouth, looking Southwest

Figure 27 - Conway River/Tūtae Putaputa at the mouth, looking East at the beach barrier

Part 4

COMMUNITY
ADVISORY GROUP
REPORT

for

Environmental Flow Review Process
Conway River/Tūtae Putaputa

September 2007

1 Purpose of this report

Environment Canterbury (ECan), as part of its statutory responsibilities has engaged in a process to review environmental flow regimes for many rivers in Canterbury. The process for the Conway River/Tūtae Putaputa in North Canterbury started in the second part of 2005. Consultation with potentially affected parties is an important part of this review.

ECan facilitated the establishment of an Advisory Group to provide a forum for discussion about the flow regime for this river involving a wide range of interested parties. This report outlines the consultation process, the formation of the Advisory Group, and the information collated during the process.

2 The consultation Process

2.1 General

A key aspect of ECan's approach involves consultation with the local communities and the consideration of their knowledge and information gathered from many years of observing, living and working with the river.

The first public meeting was held in December 2005 in Kaikoura where participants were invited to identify the values they held for individual tributaries or reaches as well as the overall values for the catchment.

The public consultation process timeframe was initially determined by the 'optimal time' for the technical panel to complete their field assessment and the value of the panel receiving feedback from the Advisory Group prior to their field visit.

To achieve this, an initial public meeting was called to explain the process and establish the Advisory Group. During the Advisory Group meetings the group identified areas in which they required further information and these areas were addressed at future meetings. The group also identified the values they held for each of the rivers, streams and creeks and the general overall values of these waterways.

Please refer to the Appendix for copies of the minutes including the list of attendees at the Advisory Group meetings

2.2 Initial Public Meeting

The first meeting called in the consultation process was a public meeting. Invitations were mailed to all the residents within the catchment, DoC, Fish and Game, Te Runanga o Kaikoura, Te Runanga o Ngai Tahu, and Kaikoura District Council. The meeting was also advertised in the local paper inviting interested parties to attend.

The purpose of the first meeting was to introduce and explain the:

- Big picture Overview (non-statutory process, regional planning process, consents process, acknowledgement of other issues e.g. water quality, storage etc but focus on main modules at this point)
- Environmental flows process

- Technical panel process, and to
- Explore local issues

The final agenda topic of the public meeting was to identify interested parties to become part of the ongoing Advisory Group (noting that anyone interested could come to any of the Advisory Group meetings).

2.3 Advisory Group Meetings

Following on from the public meeting, five Advisory Group meetings were held in Kaikoura to discuss issues and information on the Conway River/Tūtae Putaputa.

Notification (and subsequent minutes) of each meeting was mailed to a combination list made up of the public meeting invitees and attendees at the public meeting and/or subsequent meetings.

The key purpose of the Advisory Group meetings was for ECan to listen to and gather information from the local community members on the Conway River/Tūtae Putaputa. Part of this process included working with the group to share information and answer questions relating to environmental flows and local issues.

Meeting Schedule:

Date	Meeting	General focus
12 December 2005	Public meeting	Overview and introduction of minimum flow process
28 February 2006	1st Advisory group meeting	Role of advisory group / technical panel process. Focus on identifying the local values of each river/tributary. Identify information needs.
14 March 2006	2nd Advisory group meeting	Meeting with technical panel members. Discussion on local issues
15 March 2006	3rd Advisory group meeting	**Technical panel site visits**
31 January 2007	4th Advisory group meeting	1st Draft of staff moderation report (recommended minimum flows)
23 April 2007	5th Advisory group meeting	2nd Draft of staff moderation report (recommended environmental flow regime, including allocation)

2.4 Advisory Group Meeting with the Technical Panel.

The evening prior to the Technical Panel site visits, a meeting was convened at Stone Jug Farm (Jeremy Johnson's farm) with the Advisory Group (14 March 2006). The Technical Panel members explained to the group how they conducted their site visit and what they were considering in their assessment. Members of the Advisory Group then summarised and discussed local knowledge on each of the tributaries involved in the review with the Technical Panel members.

In addition to the Advisory Group meeting with the Technical Panel, locals were invited to take on the role as "stream champion" and meet with the Technical Panel on site to discuss specific issues or pass on specific information. Their contribution is included in the staff moderation report for each reach of the river. The information for the Charwell River has been removed at the request of the Charwell Water Users Group.

2.5 Advisory Group response to the Staff Moderation Report/Flow Regime Recommendations

2.5.1 Advisory Group meeting attendees response

Charwell River

- Disagree with recommended flow regime and will present their separate views to Council.

Upper Conway River/Tūtae Putaputa

- Only one consent issued within this reach but not yet being exercised
- No representatives were at the meeting to provide comments on the recommended minimum flows.

Middle Reach of the Conway River/Tūtae Putaputa

- All members (including all water users/consent holders) support staff recommendations

Mouth of the Conway River/Tūtae Putaputa

- All members (including all water users/consent holders) support staff recommendations

2.6 Steps followed in resolving difference between Charwell Water Users Group views and staff recommendations.

Following the last Advisory Group meeting

- Staff presented their recommendations at Council workshop on 29 May 2007. The Charwell Water Users Group presented their separate views, supported by Dr Henry Hudson.

- At second workshop on 17 July 2007 all other members of the Advisory Group attended or were represented to express their support of staff report. The Charwell Water Users Group expressed their disagreement again.

- ECan commissioned independent consultants to review the work underpinning staff recommendations. Subsequently ECan staff and the Charwell Water Users Group embarked on discussions regarding aquatic ecosystems requirements in the Charwell River. No agreement was reached

- Wednesday 19 September 2007 the Regional Planning Committee considered staff recommended flow regime for the Conway River/Tūtae Putaputa. The Charwell Water Users Group, supported by Dr Henry Hudson presented their separate views.

3 Appendix - Minutes of meetings

3.1 Kaikoura, 12 December 2007

Conway Environmental Minimum Flows Meeting

Memorial Hall, Kaikoura 7:30 pm, Monday 12 December 2005.

Present: Tim Wilding, Mike MacFarlane, Bruce MacFarlane, Heather MacFarlane, Tim Anderson, Nick Anderson, David Handyside and Sally Handyside, Stu Wood, Pip Wood, Murray Urquhart, Percy Acton Adams, Paul McGahan, Steve Cranwell, David Wilding, Russell Burnett, Peter Hurst, Vaughan Lynn, Richard Watherston, John Meuli, Karl Perkins, Geoff Kennedy, Neville Zuppicich, Snip Prentice, Richard Wilding, Malcolm Perkins.

Cr Ross Little, Cr Robert Johnston, Tina von Pein (Facilitator), Anna Page (ECan), Ray Maw (ECan), Luisa Magalhães (ECan).

Apologies: Mike Hide, John Glennie

****** Note – sentences in italics are the responses to questions. ******

1. **Councillor Robert Johnston** opened the meeting, outlined the format of the meeting and welcomed everyone.

2. **Ray Maw (ECan)** – Acknowledged the existing groups within the catchment (Coastal Conway Care Group and Water Users Group on Inland Kaikoura Road), and outlined the purpose of the meeting, the Regional Planning process and the Natural Resources Regional Plan (NRRP) (see attached presentation).
   Ray also outlined the Flow Regime process and the Surface Water Resources (see attached presentation)

   Key questions / comments:

   - There was a comment about gauging water takes and gauging the river at the very top and at the mouth to manage water volumes and flow in the river.
   - The Conway River has many tributaries, how can their contribution be measured?

     Vaughan Lynn (Fish and Game) responded - Flows can be correlated to help understand the contributions (and losses) from the top right to the mouth.
   - We need to start gauging the river straight away. We should not waste time and let another irrigation season pass.

3. **Luisa Magalhães (ECan)** – Described the Technical Panel approach (see attached presentation)

   Key questions / comments:

- Any future Advisory Group Meetings must be productive and focused. An agenda should be circulated in advance, and the meetings must be time limited but productive.
- Will ECan be installing recorder(s) straight away so we can all know what the flow is?

  Ray Maw responded – We have to go back and consult with ECan's hydrology section. We may be able to bring someone from that section to talk to us at an advisory group meeting.

4. **Tina von Pein (Facilitator)** –
Three groups worked through a process of brainstorming values, visions and issues as baseline material for the Conway catchment which will assist with the process of setting the Environmental flow(s) for the Conway Catchment.

Each group was asked to identify:
1. What they valued about the Conway catchment,
2. What their 30 year vision was for the catchment, and
3. Any issues, questions and information needs they had that would help them through the process.

The following values were reported back:

Values

- In stream values
- Native bush
- Water quality
- Breeding ground for birds
- Land to be able to shed water without damaging neighbours.
- Access for driving up/down riverbed
- Access for recreational use (camping, horse trekking and so on)
- Surplus water made available for irrigation.
- Maintain sufficient flows for trout.
- Maintain sufficient flows to keep the mouth open.
- Economic use (e.g. Irrigation)
- Shingle

The group identified the following 30 year visions were reported back:

30 Year Vision

- Retain the 'wild' nature of the river
- To not allow diversion works on the river
- Limit stock access to the river
- Maintain/enhance the present in stream values and water quality.
- Maintain/enhance bird habitat
- Maintain access to the river bed but keeping an eye out for the effects of having more visitors and associated risks such as fire and litter
- Out of stream storage for irrigators to use in times of low flows
- Have a dam erected to store water and release for maintaining minimum flows and irrigation.
- Changes to land cover should enhance the river.

- Well documented records of the river flows.
- Decisions made today do not adversely affect values in the future.
- Weeds and broom controlled to maintain flood-carrying capacity and to encourage native regeneration.

The following issues were reported back:

Issues

- Works in bed of river such as bulldozing etc
- We need a recorder so we know the flow (the lower Conway Water Users Group offered to contribute towards installing the recorder)
- Pests – plant and animal (e.g. Canada Geese, pigs, rabbits, ferrets, possums)
- Four wheel driving in riverbed
- Climate change and its impact on the catchment
- Land development on banks
- Erosion
- Marginal strips and their use by visitors may be an issue

The following information needs were reported back:

Information Needs

- Difference in flow between top and bottom of river
- Future irrigation needs
- Water harvesting as an option – how to and how feasible
- When will we have a water recorder at SH1?
- NIWA study – how much based on monitoring vs. models (comparing to other streams)
- Accurate flow information, obtained by gauging rather than modelling
- Impact of irrigation
- Impact of forestry
- Impact of Climate Change
- Good flow data required or precaution taken in decisions if data is not available
- Good facts and science – to establish benchmarks
- Baseline recording of plants and other pests to gauge the good and bad
- Process for dealing with new consents
- Information about importance of birds
- Effect of lack of burning on sediment movement

<u>Key questions / comments:</u>

- It was explained that Tina von Pein is self employed and has been contracted by ECan to facilitate the meetings and to provide assistance to the Advisory Group.
- It was proposed that a map of the catchment is made available for marking areas likely to be irrigated.

5. **Councillor Ross Little** closed the meeting, thanking all for attending and reinforcing the need for communities to avail themselves of these opportunities to participate.

3.2 1st Advisory Group Meeting Kaikoura, 28 February 2007

Conway and Charwell Rivers Environmental Flows Meeting

Memorial Hall, Kaikoura 7:30 pm, Tuesday 28 February 2006.

Present: Richard Wilding, Jeremy Johnston, Mike MacFarlane, Bruce MacFarlane, Tim Anderson, , David Handyside and Sally Handyside, David Wilding, Vaughan Lynn, Richard Watherston, Karl Perkins, Malcolm Perkins, Cr Ross Little (ECan), Suzanne Gabites (ECan), Ray Maw (ECan), Luisa Magalhães (ECan).

Apologies: Nick Anderson, Peter Hurst, Snip Prentice, J Scanlon, Nick Anderson, Tina von Pein, John Glennie (ECan), Dr Brian Jenkins (ECan).

1. **Councillor Ross Little** opened the meeting, welcomed everyone and outlined the agenda.

2. **Matters rising from previous minutes**

Vaughan Lynn felt that the three tier approach favoured by Fish and Game was not recorded appropriately in the minutes. Mr. Lynn explained the three tier approach as being a) setting a minimum flow, b) sharing above the minimum flow level, and c) to have a maximum cap on total abstractions for the catchment.

Richard Watherston reminded us that he had enquired about flow records from the Catchment Board. Suzanne Gabites told the group that her presentation included some discussion on these records.

3. **Suzanne Gabites (ECan) – Surface Water Resources**

See attached presentation

Questions and answers:

Jeremy Johnston - MALF seems to be an important factor but due to lack of actual data we have to guess it. How important is MALF?
R. Maw – MALF is one of many mechanisms that inform the environmental flows review process. We will have to balance all the information we will have in order to come up with a recommended environmental flow.

R. Wilding - How is the flow measured?
Suzanne Gabites– We measure the width of the river and divide it into at 20 sections. We measure the depth of each section and using a current meter we measure the velocity for each section. Combining the depth and width of each section with the mean velocity for that section, a total flow can be calculated.

T. Wilding - Can we talk more about where to place the recorder?
Suzanne Gabites – We prefer stable banks that will minimise the risk of the recorder being washed out in a flood event and a stable bed (i.e. on a gorge). The recorder, if ran on solar energy, needs to receive at least 2 hrs of sunlight in order to work efficiently. Security and protection from vandalism is also an important consideration.

R. Maw – We could prepare a table listing all the potential sites and for each site list the pros and cons? We could then meet again and discuss the options on this matrix.

Action:
The Advisory Group agreed to meet, look at this matrix of sites and discuss a 'best fit' for everyone.

V. Lynn - Do all recent consents to take water include a condition requiring data meters?
Luisa Magalhães – Yes they do

Richard Watherston - Can we actually get the data for all the readings both in table and graph format?
L. Magalhães – We will include this information in the minutes

4. Ray Maw (ECan) – Advisory Group role
Ray outlined the set up and role of the Advisory Group. The Advisory Group will consist of those people who have indicated a willingness to be part of it. However, the meetings are open to all who wish to attend. The Advisory Group will consider the flow recommendation of the technical panel and ECan staff. Should the Advisory Group agree to disagree the Group will have the opportunity to draft their own report to go to Council. After that, the proposed variation will have to be publicly notified and go through the submission process.
Tina von Pein was not able to attend today's meeting but she remains available to assist the Advisory Group. Correspondence and minutes will continue to be distributed to all.

R. Watherston - Wouldn't it be better to have the same people attending all the meetings and keeping up with the process? Large committees can become unyielding.
R. Maw - Although that may be true we prefer to keep an open door policy to foster participation

Vaughan Lynn - When will we start the review process?
R. Maw - We are here now preparing for the Technical Panel visits who will recommend different flow levels.

V. Lynn - Why consult then? Why don't you just choose a minimum flow for the river, write the report and just publicly notify it?
R. Maw - We consult with the community so that we can incorporate local knowledge and hopefully reach consensus before public notification. It may avoid litigation later on.

V. Lynn - Are the minimum flow levels set according to the Advisory Group suggestion?
Cc Little – Generally speaking yes. Some rivers involve larger numbers of interested parties and take longer than others.

V. Lynn - So what do you do in the mean time?
Cc Little – the existing minimum flow remains in place

V. Lynn - But consents are generally granted on a case by case basis.
R. Maw – When we receive an application in a catchment that is under review we consult with the applicant. There are several options such as an interim minimum flow, to be reviewed at the end of the process.

V. Lynn - Do we have a deadline for this process to be completed?

Cr Little – We have decided to bring the community along without hurrying the process or being heavy handed.
R. Maw – We would like to say 6 to 12 months is a possible time frame but we must not compromise consultation for the sake of speed alone.

Some Advisory Group members were of the opinion that given the lack of data for this catchment we need to work through the issues and not be rushed by a deadline.

5. Ray Maw (ECan) –The Technical Panel approach

In order to set environmental flow and level regimes in accordance with the objectives and policies of the Regional Policy Statement (RPS) and the Proposed Natural Resources Regional Plan (NRRP), ECan has commissioned a technical panel to assess instream values. Each panel member possesses expertise in one or more of the instream values as set out in Objective WQN1 of the Proposed NRRP. They will give a flow recommendation that adequately protects the value/s particular to their expertise and independent of other values.

We can meet the night before for the panel to introduce themselves to the Advisory Group. On the day of the visits the panel will briefly explain what they do and a demo gauging will be done for all to see

T. Wilding - We would like the panel to visit the mouth of the Conway River so they gain a complete picture of the river.
R. Maw – We will visit the mouth with the Technical Panel.

R. Wilding - Can we gauge the Conway River at the gorge by Ferniehurst as well as at SH1 Bridge?
R. Maw – We can.

T. Wilding - The Lower Conway Water Users Group would like to have a telemetered recorded and we're willing to contribute financial.
R. Maw – The offer has been recorded and we can work together towards having a recorder installed.

T. Wilding - Regarding A and B blocks, what is your the experience with other rivers?
R. Maw – It will be up to the community to decide to have or not to have A and B blocks. In bigger rivers we can end up with more than two blocks. Do not forget that domestic and stock water takes have high priority and often they are allowed to continue to take water in low flow times.

V. Lynn - Can we select a minimum flow site on the Conway River below all the takes?
S. Gabites – Ideally we should have one at the top of the catchment and another by the mouth but in this case it may not be possible.

T. Wilding - It would be impossible to measure flow at the mouth because the river has multiple braids running and disappearing into the gravel and sand.
R. Maw – We need to work together to find the ideal solution for this catchment. It is possible to place the recorder upstream of the lower catchment water takes and correlate it to the flow at SH1.

There was some discussion regarding the selection of sites for the panel to visit and how to best organise the day of the visits.
Action:

It was decided that the Technical Panel will visit the following sites:

Lower Conway River
The mouth of the Conway River, at SH1 Bridge and at Ferniehurst Gorge

Upper Conway River:
SH70 Bridge

Charwell River
Stag and Spey Bridge

R. Watherston - it would be good for all Advisory Group members to visit all the sites with the panel in order to have an overall view and to gain an understanding of the whole catchment.

T. Wilding - Can we gauge the river before the technical panel visits? We would like to know how much water is in the river now.
R. Maw – We will try and get that done.

Action:
The Advisory Group requested that a reminder be sent to the community to complete and return the questionnaire, marking the areas likely to be irrigated on the maps provided.

6. **Cr Ross Little** closed the meeting at 9:45 pm, thanking all for attending.

3.3 2nd and 3rd Advisory Group Meeting Kaikoura, 14 and 15 March 2007

Conway River Advisory Group of notes
Technical panel visit and local discussions
Tues 14 and Wed 15 March 2006

1. Meeting with locals at STONEJUG HOMESTEAD Tuesday 14 March 06.

Present:
Malcolm Perkins – Flax Hills
Carl Perkins– Flax Hills
Jeremy – Stone Jug

Maurice (Technical Panel)
Trevor (Technical Panel)
Yvonne (Technical Panel)
Jo (Environment Canterbury)
Luisa (Environment Canterbury)
Ray (Environment Canterbury)
Tina (Independent – Advisory Group facilitator)

Comments, questions and discussion:
Is the Charwell a braided river system?

There are three irrigation takes on the Charwell:
1. Stone Jug - 70 l/s – first year of irrigation
2. Perkins – 55l/s – taking 32 l/s – first year of irrigating
3. Dillondale – 70 l/s not taking any and are currently not set up to take.

Nature of farming:
Stone Jug predominantly deer, some sheep and cattle
Perkins sheep and cattle and some deer

Flax Hills sheep and cattle

Stone Jug – only irrigates a small portion – irrigating 200 of the 500 hectares of flats.

Impact of irrigation takes on the River.

- Stone Jug takes water from the right branch of the Charwell, taking 1/3rd to ½ of the water in that branch. The branch is fed by run-off, with lots of small springs along the Hope Fault.
- Impact of 1/3rd reduction?
  Have not seen any impact. It remains steep, rocky and fast moving.
- If the third consent was activated – what would be the impact below all three takes?
- There would be a reduction in water and you would see a reduction in the ground flow underneath the river bed.
- About 3 meters down is a papa shelf. You strike water across the whole bed when you get to the papa pan.
- The river goes underground then resurfaces in many places along the river – interflowing back and forth.
- The surface water reduces due to the huge width of the shingle bed.
- If all consents were taken the river wouldn't go dry – never seen it dry.
- There is a significant increase in water level for a small amount of rainfall – 4mm of rainfall just about doubled the right branch flow.
- The river rises and falls very quickly. The country is steep and bluffly and thus there is a very short retention time for water on the land.
- The river is not fed by the nor' west.
- Over the last 10 years we have seen a lot more gorse and broom in the riverbed. Floods are not cleaning this out and we don't get bank to bank floods. The riverbed from the edge of the hill is dominated by broom and gorse.
- LYNZ are spraying some areas bank to bank.
- The Charwell River is much nicer above the irrigation take region – can't be spoiled by irrigation by virtue of the nature of the land.
- Canadian geese are an issue.
- Pig hunters and deer shooters use the bed as access to DOC land and Stone Jug.
- One woman wanted to use it to go up and listen to moreporks.
- 4 Wheelers use it form Stag and Spey Bridge along the Charwell and the confluence of the Conway to SH 70 inland road.
- Goat and pig shooters use it for access.
- There are no fish (trout or eels) in the Charwell.
- There are fish in the Conway up to Spey Stream. It is too gorgy etc above that, the shingles move too much and thus there is no weed to feed on so the fish don't come up.
- The River gets dirty with an obvious rise in flow but there are not really many big floods. Last big one was January 2003 when there were big floods in many areas of Canterbury.
- The river is too warm and there is not enough flow for trout.
- No substantial rain has fallen since Oct 05 when we got two inches.
- There is not much top dressed ground on either side of the Charwell (less than 1% is fertilised) and there is not topdressing on the right branch of the Charwell.
- Department of Conservation owns much of the high country and it is covered in native bush. DoC now owns the tops of the Seaward Kaikoura Range.
- The right branch of the Charwell is un-walkable – it is steep and bluffly and there is an impassable waterfall not far up.
- Charwell used to go to Goat Hill stream – tectonic plates are moving (1.5m every 100 years).

- There are about 12 property owners in the whole Charwell area.
- How did trout get such high status when it is an introduced species?
  Through advocacy e.g. By Fish and Game who are the voice of the fishing people. There are a huge number of fishing days in NZ and a huge number of fishing people.
- Is there any point where the use of 4WD's in the riverbed becomes an issue with ECan?
  Yes – where the use threatens bird and plant life.
- Why have trout been included in Charwell River in the report but there are no trout?
  Ray explained about "sentinel species" being a habitat of a species that is representative of species that may be there.
- Are you looking just purely at the water or also looking at farms / irrigation etc?
  Assessment is done on the waterways.
- Are you happy that you will be seeing a representative sample of the river?
  Yes and meeting with the Advisory group along the river will help inform the technical panel.

2. Stag and Spey – Wednesday 15 March 2006

Present:

Malcolm – Flax Hills
John Meuli - Dillondale
Carl – Flax Hills
Jeremy – Stone Jug

Maurice (Technical Panel)
Trevor (Technical Panel)
Yvonne (Technical Panel)
Doug McMillan (Water gauging)

Dyanna Jolly (Runanga)
Raewyn Solomon (Runanga)
Owen (Runanga)
Mark Taylor (Technical Panel)
Jo (Environment Canterbury)
Luisa (Environment Canterbury)
Ray (Environment Canterbury)
Tina (Independent – Advisory Group facilitator)

FLOW – 240 l/s (gauged by Doug while on site)

Comments, questions and discussion:

- Cattle have access to the river
- Flow increases substantially through this part of the river.
- Monitoring downstream of the takes – now measures what's going into the Conway.
- Minimum flow set with Richard Acton-Adams as he was selling his farm (although the group were unaware of this at the time)
- What is the Runanga looking for?
  "The way it was and the way it should be"
  Looking at the:
  - general health
  - water in the river
  - access of animals
  - plant life and riparian areas
  - catchment in general eg. Wilding pines
  - cultural issues
  - life supporting capacity of the river
  - what it provides for land use in the area

- "If the water is available then there is no problem using it".
- "It is a balancing Act".
- Historically was there anything of specific value in this river?

Nothing specific – was a mahinga kai source.
- There is a Statutory Acknowledgement on the River.

3. Conway at SH 70

FLOW 350 l/s (gauged by Doug while on site)
Flow is higher than normal for this time of year in comparison with the right branch of the Charwell.

Comments, questions and discussion:
- Flows are usually about even at the confluence.
- Discussion about the process for starting and stopping irrigation and the links between the website and telemetering.

4. Mouth of the Conway River

Present:
Malcolm – Flax Hills
John Meuli - Dillondale
Carl Perkins – Flax Hills
Jeremy Johnson – Stone Jug
Frank Wilding
Richard Watherston
Richard Wilding
Tim Anderson
Nick Anderson
Bruce MacFarlane
David Handyside
Edward Anderson
Nui
Sally Handyside
Grant Mills
Maurice (Technical Panel)
Trevor (Technical Panel)
Yvonne (Technical Panel)
Doug McMillan (Water gauging)
Dyanna Jolly (Runanga)
Raewyn Solomon (Runanga)
Owen (Runanga)
Mark Taylor (Technical Panel)
Jo (Environment Canterbury)
Luisa (Environment Canterbury)
Ray (Environment Canterbury)
Tina (Independent – Advisory Group facilitator

Comments, questions and discussion:
- Gauging upstream is pretty close to the minimum flow –what effect would stopping irrigation now have?
  We need to be irrigating now as it is very dry – driest all summer. Without irrigation we would have to sell half our livestock.
- River visually appears to have been at this level for a few months.
- The river has dropped a third in the past 10 days.
- This is a critical time for irrigation - we can irrigate longer than on the inland road as we don't get the frosts.
- When irrigating it autumn it depends on the rainfall. Three out of five autumns we would need to irrigate.
- Aerial maps from 1950, 1975, 1993, and 2002 show the changes in vegetation and the course of the river.
- Change of course has a huge impact on our ability to irrigate related to the side of the river you take water from. The changes in the channel move the water from one side of the river to the other and water has to be diverted to the pump site.
- There has been a huge increase in the growth of vegetation in the river bed eg. Wattles.
- Has the character of the river changed since the growth of the trees?

- Braids still cut through and there is a channel behind the trees.
- Yesterday there was no water running into the lagoon – it was just seeping into the gravel (middle channel)
- There was plenty of water at the two intakes and there is quite a bit of water in the limestone country.
- The lagoon is tidal.
- How often does it stop flowing into the lagoon?
  Every year unless we get heavy January / February rains.
- With spring tides and onshore winds really big seas will spill over into the lagoon (brackish water). If the lagoon gets really full then it will break out and stay open until the next heavy sea.
- The shingle doesn't build up it gets flushed out to sea.
- The riverbed is choking up badly with wattles. Often the small freshes undercut the wattles and the fall into the river.
- Rainfall – Bruce has records since 1954 – taken 2km down the road.
- The rainfall is totally random – no real pattern. There is a greater rainfall gradient closer to the hills.
- Rainfall is 20% higher between the house and NIWA gauge.
- In 1975 during Cyclone Alison the road closed for 2 weeks due to the flood.
- In 1974 7 inches of rain was recorded at Bruce's house.
- Average annual rainfall is 830 mm.
- Range is between 20mm and 450mm.
- River mouth – river goes underground – empty lagoon.
- Until 10 years ago there used to be a colony of seabirds – Terns and Blackbill gulls. They don't appear to be nesting here now all the vegetation has started growing.
- There is a Coastal Care group working in the Lower Conway.

5. State Highway 1 Bridge

FLOW 607 l/s
Dropped 400l/s in 10 days.
Consistent with the Charwell.

Comments, questions and discussion:

- People swim in river and drink the water.
- River is used for camping, lunch spot and swimming pool.
- Upstream it is used for fishing, access by pig hunters and horse trekking.
- Hasn't changed greatly except for the growth of vegetation (wattles).
- There are a lot more trout in it than when I (Tim A) was a child.
- River is low every year at this time. Don't know if it is lower this year than any other.
- The braidedness appears to be choking up with vegetation.
- The flow you see is a small proportion of what is flowing under the shingle.
- Some of the willows have been removed, but not enough of them.
- Thirty years ago helicopters used to fly in to kill the gorse and wattle.
- The management of the wattles is an issue that needs addressing.
- What should happen to the wattles?
  Need to keep them back like the broom and gorse.
- Can not get anyone to control the willows at Ferniehurst.
- The vegetation may be causing channelling as wattle stands are protecting the shingle and redirecting the water.
- The river may then start acting like a channelled river – narrower and deeper. With the channels formed becoming more established.

- During the 2002 flood the water was at the height of the Hundalee culvert.
- Is today to do with the allocations of water?
  No we are looking at the bottom-line. Once we know the bottom-line then we will look at allocation.
- Don't put metering equipment here as it will get washed out.
- If the flow was lower than it is now – how would it impact on the river?
  It won't affect the mouth as it is dry already. The river is lower than MALF now. Cockabullies will be under more stress.
- There is very little data to be coming up with a MALF?
  ECan has some data.
  Native fish (trout and torrent fish which live in the rapids) will be affected by very low flow.
- What is the impact of exotic vegetation in the river bed on the fish?
  Has different impacts on different invertebrates.
- Which would have the greater impact on invertebrates – trout or indigenous vegetation?
  Trout.
- What information is available from 'lighthouse'?
  Runanga has been sent a copy of all the readings. Minimum flow recording was 427 l/s in 1992.

6. Ferniehurst

FLOW 565 l/s
42 l/s difference from downstream.

Comments, questions and discussion:

- River is low and often stays low until June if the autumn is dry.
- Farm has river on 3 sides.
- River was dammed by a big slip in the early 1900's (1907 / 1910?), but it slowly drained away.
- There are flounder in the river and these are seen all the way up the Spey.
- Have never seen small trout – but have seen large ones.
- Gorse and broom are all over the farm. It costs a fortune (time, energy and money) to control each.
- Tried to fence off the riverbanks tends to re-grow in natives / Hawthornes.
- Over time have noticed an increase in growth in the riverbed and an increase in gorse and broom.
- The banks were clean up until 20 years ago.
- Willows have grown up.
- River in flood between bridge and Rail Bridge – can wipe out the road.
- It is an unpredictable river.

3.3.1 Letter sent on 19 March 2006 to all Advisory Group members

Dear «Salutation»

Re: The Review of Environmental Minimum Flows for the Conway River Catchment.

On Wednesday the 15th of March the Technical Panel conducted site visits at the following locations:

Charwell River

- Stag and Spey Road Bridge

Conway River

- SH70 (Inland Kaikoura Rd) Bridge
- Mouth of the Conway River
- SH1 Bridge
- Ferniehurst

Members of the Advisory Group were present at different sites and overall we had an excellent turn out. On the evening of the 14th of March the members of the Technical Panel met with members of the Advisory Group at Stone Jug homestead. Please find enclosed the notes from this meeting as well as the notes from the site visits on the 15thof March.

The Advisory Group members will now form the core group with whom we will liaise during this next phase of preparing the Draft Report. Should you wish to be part of the Advisory Group please let us know as I can easily add you to the current list. Alternatively you may contact any of the existing members to keep in touch with the process.

People who have indicated they wish to be on the Advisory Group are:

Jeremy Johnston (Stone Jug)
Karl Perkins (Flax Hills)
Tim Wilding (Te Mania)
Richard Wilding (Ferniehurst)
David Wilding
Nick Anderson (Lagoon Flat)
Peter Hurst (Glen Colwyn)
Michael MacFarlane (Hawkswood)
Bruce & Heather MacFarlane (Ngaroma)
David & Sally Handyside (Medina)
Richard Watherston

How do I become involved?

The Advisory Group is open to anyone and there is no limit on numbers. The Group will work best if there is representation from across the range of interests in Conway Catchment so that everyone gets to hear about the different values and views.

The next meeting

If you see the need to have other meetings to discuss subjects related to the Review of the Environmental Flows for the Conway Catchment, please let me or one of the Advisory Group members know. Otherwise the next meeting will be used to present the Draft Report to the Advisory Group and to receive feed back.

If you would like to be involved in the Advisory Group, please contact me, on 03 363 9396, or email me at luisa.magalhaes@ecan.govt.nz.

3.4 4th Advisory Group Meeting Kaikoura, 31 January 2007

CONWAY ENVIRONMENTAL MINIMUM FLOWS MEETING

Memorial Hall, Kaikoura
7:30 pm, Wednesday 31 January 2007.

Present: Vaughan Lynn (Fish & Game), Conny Fitser, Stephen Wynne-Jones (Doc), Bruce McFarlane, Richard Wilding., Steve Cranwell (DoC), Richard Watherston, Tim Anderson, Tim Wilding.

ECan: Cr Little, John Talbot, Ray Maw, Jo Stapleton, Luisa Magalhães, Don Vattala, Tina von Pein.

Apologies: Cr Johnston, Grant Mills, Mike McFarlane, Peter Hurst, David Handyside, David Wilding.

****** Note – sentences in italics are the responses to questions.******

1. **Cr. Ross Little -** opened the meeting (7:15 pm) and welcomed everyone.
2. **Ray Maw (ECan) – Recap and outline of Agenda**
3. **Luisa Magalhaes (ECan)- Presentation of the Draft Staff Moderation Report**

Luisa explained how the catchment has been divided into four sections (see attached presentation), briefly described each section, its current environmental flow, the highest ranked values and the recommended environmental flow.

A. State Highway 70 Bridge
Recommended flow: 550 L/s
Stephen - The 7 day MALF has a very high margin of error. What about over- allocation?
Ray - We separate setting environmental flows and allocation regimes. At a first stage we discuss instream values and flow requirements then at a second stage we discuss allocation. If flow data is limited then we need to take a precautionary approach to allocation.

Vaughan - Was trout not ranked?
Luisa – This reach does not provide suitable habitat for trout because the river bed has a steep gradient, it is prone to flooding and has an unstable gravel bed.

Vaughan – NIWA have fished trout there.
Luisa – No, NIWA did not electrically fish trout at this site. NIWA found upland bullies, galaxias and torrent fish.

Stephen – There is no explanation for the criteria for rankings in the report.
Luisa – We have worked together with the Advisory Group since the beginning of the project, we have held a number of meetings and field trips and so the process is familiar to the Group.
Ray – The Technical Panel members were asked to rank their particular value as High, Medium and Low at each point and to recommend a flow that would protect that value.

Ray - Is everyone in the meeting in agreement with the flow proposed for SH70 Bridge?

B. Ferniehurst
No flow suggested
Vaughan –Why can't we have a minimum flow set at this site? The Technical Panel have made flow recommendations for Ferniehurst, so why no suggestion?
Luisa – Looking at catchment level and correlating the little flow information available it makes more sense to set an environmental flow at SH70 and another at SH1. There seems to be little value in setting an additional site. At present there is only one abstractor in this reach of the river (Glen Colwyn).
Ray - T*he Technical Panel went to Ferniehurst to have a look because it could offer a good site to install a flow recorder, but we still have not settled on a site.*

C. SH1 Bridge

Recommended flow: 1060 L/s

Steve Cranwell – I am quite happy with this flow but I am concerned again about MALF and standard of environment. With a margin of error of ±421 L/s, there is the possibility that the protection of instream values will be cut short.

Ray - W*e are not starting at MALF. This process is not based on MALF, but first and foremost on what technical panel say. There are problems with certainty of MALF but that should not influence this process.*

Richard Wilding – The old North Canterbury Catchment Board records have been looked at.

Vaughan – Can you send me the NIWA report with the IFIM model? *Luisa to send report*

Stephen – The report also says that SH1 Bridge is not an ideal gauging site.

Ray - SH1 is not ideal due to the braids shifting across the riverbed but it is the most suitable site in this reach and access is not a problem.

Ray - Is everyone in the meeting in agreement with the flow proposed for SH1 Bridge?

Luisa – Peter Hurst rang and told me that he is happy with the recommendation of 1060 L/s (year around) at SH1.

D. Conway River Mouth

Recommended 3 options:

Option A	**May to September: 1060 L/s** **October to April: 1060 L/s**
Option B	**May to September: 1060 L/s** **October to April: 0 L/s**
Option C	**May to September: 1060 L/s** **October to December: a residual flow greater than or equal to the rate of take** **January and February: 0 L/s** **March and April: a residual flow greater than or equal to the rate of take**

Steve - Why 0L/s?

Luisa – The gradient of the riverbed between SH1 and the mouth is very steep. ECan Hydrology concluded that, pumping simultaneously at maximum rate, the abstractions by the mouth do not have the ability to influence the flow at the mouth due to the gradient. Because we do not understand the flows relationships well, staff proposes 3 options.

Steve – There are a lot of wildlife values associated in the mouth e.g. river dependent bird species. Zero flow is significant, especially in altering the flow regime to dry during October to April. There is also the migration of whitebait species and eels.

Luisa – Staff talked to Andrew Crosland regarding native birds. The birds' preferred place/habitat is upstream of SH1 but there are birds nesting at the mouth. The mouth only open roughly 25% of time.

Stephen – What about flow sharing? The alternative is to set environmental flow higher and monitor the values.

Ray - NIWA investigated the concept of flow sharing as an option. In their opinion, it is better to set environmental flow rather than rely on flow sharing.

Tim Wilding – I am comfortable with option C. Let Mother Nature take charge. We need to balance up the interests of the environment and the needs for farming. Much thought, effort and money has gone into these farms and they are important for people's livelihoods.

Vaughan - How much flow at SH1 is needed to keep the mouth open?
Luisa - We do not know.

Vaughan - We support option A. We cannot support option B or option C at this stage.

Steve - We support option A too.

R. Wilding - Option A is not right because flows at SH1 Bridge make no difference to the river mouth. I cannot see what difference option A can make. I am ok with Option C

Tim Wilding – What does option C entail regarding the residual flow?
Luisa – Between October and December and again in March and April, when irrigating you must leave a flow past the intake point, greater than or equal to the rate of take.

Ray – What do you think about option C?
Tim Wilding – I am ok with option C. I see no problem with having to leave water past the intake points.

Vaughan – We need a cap on it.
Luisa – Staff also proposes to cap abstractions at the mouth but allocation will be discussed at the next meeting.

E. Charwell at Flax Hills
Recommended flow: 350 L/s
Vaughan - Why were trout ignored?
Luisa - Trout values were not ignored. The river bed is steep with unstable gravel bed prone to shifting. The habitat is suitable for torrent fish and other native species. Staff is of the opinion that trout is spawning in the Spey Stream and for this reason the Spey is part of the hydrological study currently under way.

Vaughan - Do you have a correlation of this site and SH1 Bridge?
Luisa - No we do not have a correlation yet. We will have that as the hydrological study progresses.

Richard Watherston - Birthday Creek and Blackburn (both feeding into the Spey) never alter through droughts, they are spring fed.

Tina - Next meeting we will come back and talk about flow and allocation.
Richard Watherston – Steve can you show us on a map where is all the DoC land within this catchment?
Steve (DoC) to organise such map for next meeting.

Vaughan - Any gauging runs programmed for this irrigation season?
Luisa - Yes, there are four gauging runs for this irrigation season. It takes two days to visit all the sites.

Vaughan - Will irrigation be on when doing the gaugings?
Luisa – It could be but the hydrology team will figure it out.

4. Ray Maw (ECan)- Water Allocation options
Ray outlined the background for allocation under the Natural Resources Regional Plan (NRRP) (see attached presentation).

Ray - We need a catchment wide solution and the Advisory Group can make proposals for allocation regimes.

Vaughan – The benefits to the environment of having the allocation capped is that the river should not be allowed to run at low flow for long periods of time. Aren't many catchments already over allocated?
Ray – The Conway River does not have this particular issue as there aren't many abstractors.

Ray – Allocation regimes are not going to remain in place forever, they will be reviewed and adjusted to maintain a variable flow regime for the river. The answer may be to leave a gap between the A block with a higher reliability of supply and the B block.

Ray – Does anyone have any major obstacles about capping the A block at the current abstractions? If not, then staff could put a regime in place around a particular date.

Steve – You separate Environmental flows from an allocation regime? What is the purpose of the environmental flow?
Ray – The environmental flow (minimum flow) is set to ensure that abstraction ceases at that point in order to protect the values in Objective QWN1 of the NRRP. The environmental flow becomes the absolute bottom line for abstractions. The more water that is allocated the less reliable the supply will be.

Steve – Can an allocation regime allocate all the water right down to the environmental flow?
Ray - Yes it could happen but it is undesirable.

Vaughan – We wouldn't be opposed to cap at current levels.

Cr Little – (Asking DoC representatives) In general terms, do you accept some usage of river water for out of stream needs?
Stephen – Yes we do but it is not in anyone's interest to over allocate water. We also need to have more monitoring. We would urge setting environmental flows with precaution.

Stephen – We would like to address our concerns about this Draft report in writing.
Stephen to comment in writing about the draft report and to send it to ECan before the next meeting.

Ray - If anyone wants to write in or talk to us, please feel free to.

Cr. Little Council wants to look at all views.

Vaughan - If anyone could come to agreement would this process be fast tracked to becoming operative?
J. Talbot - If everyone agrees, and we receive no submissions then the plan becomes operative straight away.

Richard Watherston – What about the wattles in the lower part of the river? Who would eradicate them?
Cr. Little - Could the Coastal Conway Group discuss this issue? The group has worked on the problem with wild pigs already.

There was some discussion about possible dates for the next Advisory Group meeting but no date was set.

5. **Cr Little thanked everyone and closed the meeting at 8.50 pm.**

3.5 5th Advisory Group Meeting - Kaikoura, 23 April 2007

CONWAY ENVIRONMENTAL MINIMUM FLOWS MEETING

Memorial Hall, Kaikoura
7:30 pm, Monday 23 April 2007.

Present: Vaughan Lynn (Fish & Game), Richard Wilding, Paul McGahan (DoC), Karl Perkins, Chris Wilding, John Meuli.

ECan: Cr Little, Ray Maw, Luisa Magalhães.

Apologies: Tim Wilding, David Wilding, Peter Hurst, Mike McFarlane, Jan Clayton-Greene, Lionel Solly.

Introduction

Cr Ross Little opened the meeting and welcomed attendees.

2nd Draft Staff Moderation Report

Luisa Magalhaes outlined the environmental flow regimes recommendations for the Charwell River at the Stag and Spey Bridge, the Conway River at SH70, the Conway River at SH1 and the Conway River at the mouth. The following questions and comments arose from the discussion.

Charwell River

- Why is there a need for a gap between the A and B blocks?
  ECan staff explained the need to ensure that abstractions do not cause prolonged periods of low flows, common referred to as 'flat-lining', and for the need to retain the benefits associated with fluctuating levels arising from floods or freshes.

  Fish and Game support the use of a gap because it embraces a flow sharing approach to the use of water.

- Why is the size of the gap for the Charwell River inconsistent with the Conway River at SH70?
  ECan staff explained that the size of the gap is determined by the size of the A allocation block which are different for the two sections.

- The Charwell Water Users Group consider that the gap for the Charwell is too big and suggest that a gap of 100 L/s would be more appropriate.

- Fish and Game support the staff recommendation of a gap equal to190 L/s.

See also under General below.

Conway River at SH70

- It was pointed out that the recommendation of the flow at which abstractions from the B allocation block will cease (third bullet point on page 26) should be 670 L/s not 610 L/s. Staff will make that change.

- Staff gave an explanation of the types of resource consents that have existed for this reach and the new ones are currently being sought.

Conway River at SH1

- No further comments

Conway River at the mouth

- What is the reason for allowing an allocation for a community water supply in the A block?
  Staff explained that it would be prudent at this time to make provision for a community water supply for the Claverley Settlement. It was pointed out that such a supply is different from the rights of an individual to take water for their reasonable domestic and stockwater needs. It was also stated that it is possible for consent to be granted to use the water for other abstractive uses until such time as it is required for community water supply purposes.

5. General

The Charwell Water Users Group (CWUG) sought clarification of the following matters.

- Why has the minimum flow site for the Charwell been changed from the gorge site back to the Stag and Spey Bridge?

  Staff explained that recent hydrological investigations show that there is a difference in the flows between the two sites and until the relationship is better understood, the site should remain at the Stag and Spey Bridge.

  CWUG do not agree with this and would prefer the site to be at the gorge because it is below all the takes and it is a better, more stable site for gauging.

- Why have the paragraphs on page 21 been added to/changed from 1st Draft, specifically?
  (a) the commentary regarding the range of flows;
  (b) the comments regarding the minimum flow recommendations do not match the technical panel notes, especially Duncan and Partridge.

  CWUG suggest that paragraph 3 be replaced by these accurate quotes as tabled
  "Neither the Technical Panellist nor any ECan staff present reported any fish, aquatic life, plants or birds under stress at the 240l/s recorded on the 15 March 2006.
  Duncan stated the stream site was quite vigorous with ruffles (riffles) and runs along steep slope with good velocity in the river, some bedrock out crops with pools up to 1 metre deep.
  Partridge stated that none of the distinctive edge species was well above the water level and none are in the zone of the gravel species where dryland plants

like scabweed are present. He also noted that none of the native species are of special note.
YP (Yvonne Pfluger) said the flow seems low but appropriate for the size of the river. She concluded the min flow could be a little lower since differences in terms of landscape values to flow would not be significant.
Taylor noted that the flow was too low at present for native fish especially torrent fish but ok for other species. He also stated that none of these fish are rare either regionally or nationally.
Duncan concluded that the Charwell River was a nondescript stream without any particular outstanding values in a very modified environment based toward exotic vegetation."

Staff agreed to check the use of comments provided by the technical panel.

- The words "all panellists noted" in 1st paragraph 3.1.1 on page 18 is not correct.

  Staff have checked the technical panel notes and found the following statements regarding the Charwell River at Stag and Spey Road Bridge:
  - *T. Partridge wrote "with the present flow of 240 L/s, most (edge species) are clear of the stream flow (...)This indicates a narrow range of normal flows and a current flow that is lower than normal … "*
  - *Y. Pfluger wrote "Flow seems low ..."*
  - *M Taylor wrote "Flow too low at present..."*
  - *M Duncan wrote "... but flows a bit slow and low for good torrent fish habitat" and*
  - *Runanga wrote "…natural flow characteristics and natural features identified as below average"*

  (see appendix 5.2 Technical Panel Notes on pages 44 to 51 of the staff moderation report)

- CWUG disagree with the local knowledge provided in 3.1.2 on page 19

  The section on local knowledge, provided at the time of the site visits by Karl Perkins, a member of the CWUG, has been withdrawn from the section dealing with the Charwell River.

- Why has the information requested under the Local Government Official Information and Meetings Act not been provided?

  Staff indicated that the matter was in the hands of the Director responsible (John Talbot).

- Can the money in the review budget be accessed by CWUG to assist them in producing their report?

  Staff explained that there is no monetary provision for researching alternative flow recommendations. There is provision for assisting with the compilation of a separate report and staff will consider if it possible to make a contribution along those lines.

- Fish and Game enquired as to what the CWUG where specifically questioning?

CWUG responding by stating that they considered that the technical panel viewed the river when it was very low, their expectations are too high, and if the MALF error band of +/- 250 L/s was provided to them their recommendations would have been lower.

Cr Ross Little thanked those attending for their contributions and closed the meeting at 9.40pm.