ORARI-TEMUKA-OPIHI-PAREORA ZONE WATER MANAGEMENT COMMITTEE-

FOR THE MEETING OF 11 SEPTEMBER 2017

Report for Agenda Item No *

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OTOP Zone – Outcomes and Solutions Sought by Opuha Water Ltd

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1. PURPOSE OF REPORT

The OTOP Zone Committee (ZC) is now entering the 'solutions seeking' phase of the Healthy Catchments Project. Opuha Water Limited (OWL) has been invited to attend the ZC's 11 September 2017 meeting to discuss with its members OWL's views on potential outcomes and solutions for the OTOP Zone.

This Report provides a summary of the matters OWL intends to address at its presentation to the ZC on 11 September, including:

- background to the Opuha Scheme and an overview of the benefits of the Scheme within the OTOP Zone (Zone) through augmentation of surface water in the Opihi catchment;
- key issues and outcomes sought by OWL for the OTOP Zone, specifically with respect to water quantity and quality issues affecting the Scheme.

OWL wishes to engage with the OTOP Zone Committee through the sub-regional plan process to assist in the development of a planning framework with the best environmental outcomes, consistent with the expectations of the key stakeholders and communities within the Zone.

A critical issue for OWL, which underpins many of the matters addressed in this Report, is that the ZC's 'solution package', and the sub-regional planning framework that is ultimately developed for the Zone, ensures that affiliated water users and the environment retain the benefit of flows augmented by the Opuha Dam.

This paper does not detail OWL's involvement in the Adaptive Management Working Group (AMWG) and their role in developing a proposed adaptive management flow regime for the Opihi River. This is detailed in a separate agenda paper which will also be presented to the ZC on 11 September. It should be noted that OWL fully supports the AMWG's proposal and the implementation of a flow regime for affiliated water users that

provides better environmental, economic, cultural and recreational/amenity outcomes for the waterways of the Opihi catchment.

2. INTRODUCTION TO OPUHA WATER

2.1 The Opuha Dam

OWL owns and operates the Opuha Dam and Power Station as well as downstream irrigation distribution infrastructure. The Opuha Scheme plays a vital role in sustaining the in-river flows in the Opuha and Opihi Rivers while supplying reliable water to its irrigator shareholders and to the urban and industrial users of Timaru via the Timaru District Council's community water take. The Opuha Dam has been operating for over 18 years since being officially opened in November 1998.

The Opuha Scheme arose out of the realisation by many sectors of the community that the Opihi River had significant periods during which the natural hydrological storage within the catchment was unable to provide sufficient water for both instream and out of stream users. This, combined with climatic extremes, produced periods where the surface flow ceased in the lower reaches of the Opihi River above the Temuka confluence. At the time when the dam was being mooted, records had shown that the river had experienced severe drought conditions in every decade since the 1930's. The dam proposal was therefore not simply 'to return the river to its natural state'. The flow records at the time showed that the 'natural state' was not satisfactory and would not meet all demands. Rather the proposal was to substantially enhance river flows and to reduce the environmental risks far beyond that available under 'natural conditions'.

The Opuha Dam is located just downstream of the confluence of the North and South Opuha rivers. In addition to flows from those rivers, there are other natural inflows into lake including from Ribbonwood and Station streams. The catchment for the Lake extends along the Two Thumb Range – essentially from Mt Dobson through to north of Fox Peak. It is a lowlands hills, eastern facing catchment. The lake holds up to 72,000,000m^3 of water when full and extends over approximately 700ha.

The Opuha Dam has been immensely successful for the economic prosperity of the region and has enabled the development of a robust agricultural sector covering a wide range of land use activities. These include dairying, horticulture and arable cropping, sheep, beef and deer and specialist seed growing. These on-farm activities support significant downstream industries such as the vegetable processing facilities at Washdyke, dairy processing and represent a significant part of the region's export economy and earnings.

Lake Opuha provides excellent amenity and recreational benefits to both the local Fairlie community and further afield to the public of South and Mid Canterbury. The Lake is also an increasingly popular destination for the region's schools as part of their rowing and water based activities and programmes. The Lake and downstream river continues to be a popular recreational fishery and the elver bypass on the dam infrastructure enable elver to migrate into the lake where they can mature or head further upstream into the headwaters.

The Opuha Dam facility includes a 7MW hydro station at the base of the dam that generates electricity with all the water that is released from the lake storage. The power station operates every day but the amount of running is dependent on the amount of water that is required for the river downstream – water is never released from the dam solely for the purpose of generating. The power station provides a valuable contribution to the local electricity network and the revenue from the electricity sales accounts for approximately 40% of the OWL's income.

The amount of electricity generated annually is entirely dependent on the hydrology of the catchment (lake storage and downstream water demand). The output can vary considerably from year to year and for any particular month. On average, however, the power generated from the Opuha Dam is sufficient to supply over 3000 households.

2.2 The Opuha Scheme

Opuha Water Ltd is a cooperative company owned by its 245 irrigator shareholders with a Board comprising five farmer shareholder Directors and two independent Directors. It has a management and operation staff of ten, based at the office/depot near Pleasant Point.

There are 16,000 shares held by OWL's irrigator shareholders. Each 'share' represents an allocation of water that is considered adequate to irrigate one hectare of land for the irrigation season. The Opuha Scheme, therefore, enables the irrigation of a notional 16,000ha, with a maximum shared irrigation flow rate of 6.613 cumecs. The Opuha Scheme also supplies up to 425 L/s 'operational surplus' water to unshared irrigators when it is available – this water has been made available through efficiencies within the Scheme, such as the Gardners Pond infrastructure. In total, therefore, the Scheme can meet existing irrigation demand of 7.038 cumecs, which is consistent with the maximum irrigation demand anticipated at the time the original resource consent applications for the Opuha Dam were made. Collectively, affiliated water users pay over $3 million to OWL annually to maintain the dam facility and associated scheme irrigation infrastructure.

The Opuha Dam releases water into the Opuha River which joins the Opihi River at Raincliff. There are three irrigation schemes that draw water from the Opuha and Opihi Rivers and there are also shareholder irrigators who operate directly off those two rivers as well as the Te Ana a Wai, the Upper Opihi and North and South Opuha Rivers above the dam. OWL holds consents for each of the schemes to divert water from the river and those irrigators that take directly from rivers or affiliated shallow groundwater wells have individual consents for their water takes.

Approximately 54% of the water supplied by OWL is utilised on dairy farms within the Scheme, 23% on drystock properties, and the remaining 23% spread across mixed cropping, vegetables, lifestyle blocks and some other small activities.

The Opuha Scheme and its constituent schemes are shown in Figure 1 below.

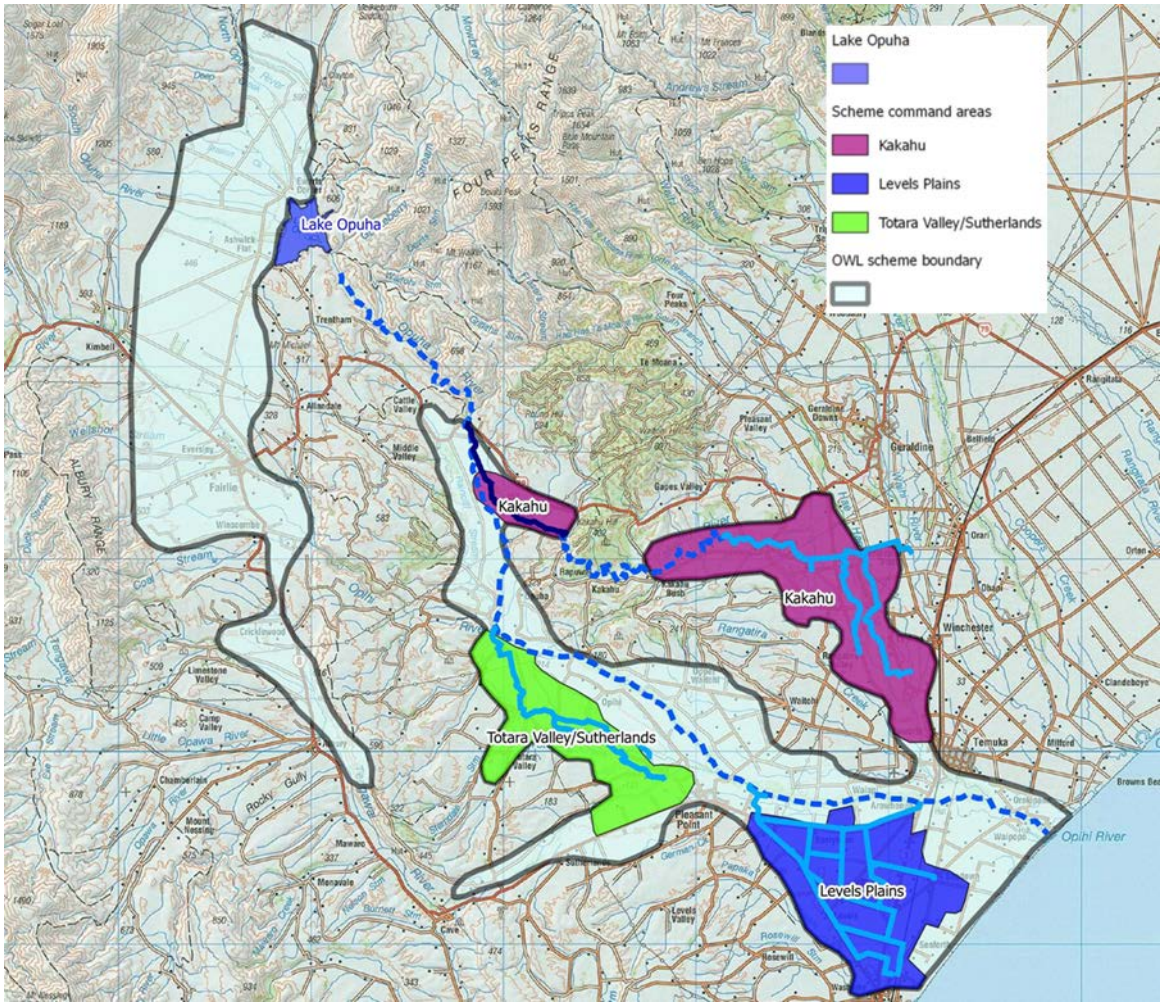

Figure 1 Opuha Scheme Map

In operating the Opuha Dam and associated infrastructure, OWL is committed to:

- Maintaining and improving, within our control, the health of the Opihi River;
- Enabling economic prosperity within the community;
- Ensuring affiliated water users and the environment retain the benefit of flows augmented by the Opuha Dam;
- Incorporating the knowledge and understanding of key stakeholders into river management; and
- Adopting a continuous cycle of improvement through research, trials and monitoring.

The Opuha Scheme has now been in operation for nearly 19 years. During this time, both OWL and other stakeholders have learnt a great deal about both the catchment and the operation of the dam and associated scheme infrastructure. In particular there is a far greater understanding of how the river system reacts in extreme (high flow and low flow) events, where the pressures and 'pinch points' lie, and how to make the best use of every drop of water in the catchment, whether it be for the environment or irrigators. It is fundamentally important that the OTOP sub-regional plan reflects these learnings, and that the solutions for the Opihi catchment are practical and workable.

3. KEY ISSUES/ITEMS OF DISCUSSION

3.1 Role of the Opuha Dam

OWL has status as a "Principal Water Supplier" under the Canterbury Land and Water Regional Plan (**CLWRP**) as amended by the Hearing Commissioners' recent decisions on Plan Change 5 (notified 24 June 2017).

Policy 4.51 of the CLWRP recognises the national benefits of principal water supplier schemes (including in relation to water supplied for irrigation and renewable energy generation) and that their associated water takes, use, damming, diverting and discharge form part of the existing environment. This policy direction is particularly relevant in terms of the approach adopted by the OTOP sub-regional plan for the future management of the water resources of the Zone, including the replacement of existing consents for the Opuha Scheme.

In accordance with Policy 4.51, OWL considers it is important that the OTOP sub-regional section of the CLWRP recognises the role of the Opuha Dam, particularly in augmenting surface water flows in the Opihi catchment, and the consequential benefits of augmentation to affiliated water users and the environment. The benefit of the Opuha Dam and Power Station in generating renewable energy should be recognised in the plan. It is also important that the plan fully recognises that Lake Opuha is an artificial reservoir with variable lake levels, and that while recreation on and around the Lake is encouraged, it is not the purpose of the Lake.

In recognition of the Opuha Scheme forming part of the existing environment, OWL considers it is appropriate that the sub-regional section enable those parties affiliated to the Scheme to continue to benefit from augmented flows.

Recommendation sought:

That the OTOP sub-regional plan:

- ***recognises the critical role that the Opuha Dam has in maintaining flow and connectivity, and providing reliable water for community supply and irrigation within the Opihi catchment; and***
- ***recognises the Opuha Dam's role in the generation of renewable energy; and***
- ***enables those parties affiliated to the Opuha Scheme to continue to benefit from their affiliation to the Scheme and augmentation by the Opuha Dam; and***
- ***recognises that Lake Opuha is an artificial reservoir, not a natural lake, and that while recreation is encouraged, it is an ancillary benefit, not the purpose of the Lake.***

3.2 Water Quantity

3.2.1 Tributary (above dam) shareholdings and 'offsets'

Approximately 3100ha of land is irrigated under the Opuha Scheme in the 'above dam' tributaries of the North and South Opuha, Te Ana a Wai, and Upper Opihi (above Raincliff). While not directly augmented by water released from the Opuha Dam, these takes are 'affiliated' to the Scheme because OWL is required to 'offset' their takes from the tributaries, through releases down the main stem.

It is OWL's understanding that the 'offset' was introduced during the original consenting process for these takes for the purpose of maintaining the Opihi rivermouth/lagoon health, however it also has the benefit of providing higher flows in the upper reaches between the dam and the tributary confluences. In recognition of the cumulative effects these tributary takes have on the main stem, it is OWL's view that it is appropriate and necessary for such takes to continue to be subject to the 'offset' and minimum flow conditions on the main stem.

"De-coupling" option

Since presenting to the ZC on 3 July, OWL has had the opportunity to consider an option that it understands Environment Canterbury (ECan) staff have briefly discussed with members of the ZC regarding the 'de-coupling' of the "above-dam" tributary shareholders from the Opuha Scheme.

This option would involve a significant change to the current regime whereby affiliated above-dam consents would be subject to minimum flows (and associated restrictions) on their respective tributaries only; the present requirement for those consents to comply with minimum flows on the mainstem of the Opihi River would no longer apply. Above-dam consent holders would no longer need to hold shares in the Opuha Scheme as it is assumed there would no longer be any obligation for OWL to release water to off-set the effect of their abstractions on the mainstem of the Opihi River.

OWL considers that the 'de-coupling' option has some significant shortcomings, which are addressed in the following paragraphs.

OWL considers that the "de-coupling" option fails to recognise the impact that abstraction from the above-dam tributaries has on flows in the mainstem of the Opihi River. It is noted that OWL would still need to release water from the Opuha Dam to off-set the effect of these abstractions on, and to meet minimum flow requirements for, the mainstem of the Opihi River, irrespective of whether the abstractors hold shares or not.

In OWL's view, the financial and reliability implications for the Opuha Scheme and OWL shareholders would be significant. For example, the "de-coupling" option assumes that the shares presently held by above-dam water users would be cancelled and subsequently reallocated to other users downstream. However, these shares may not be easily reallocated, in which case OWL could face up to $616,807 in reduced revenue from shares annually. With OWL being a cooperative company, this lost revenue

represents an additional cost that would need to be passed on to the other irrigating shareholders in the company.

If, despite OWL's concerns, all cancelled shares could be reallocated from 'above dam' to further downstream (e.g. to "new" stream depleting groundwater abstractors), as noted above, OWL would need to release water to supply the new affiliated water users and to continue to offset the effect of (now non-affiliated) above-dam users' abstractions. There are practical difficulties with this scenario, as OWL would effectively need to take water orders from abstractors that are no longer shareholders.

OWL is concerned that this scenario would destabilise the Opihi/Opuha hydrological model that is fundamental to the successful operation of the Opuha Scheme as more water would be taken from storage than at present, and reliability would be adversely affected for all existing shareholders. The effects on reliability would be even more pronounced if more large-scale storage was built on these tributaries – which in OWL's view will be an inevitable consequence of any increase to existing tributary minimum flows.

OWL also considers that the "de-coupling" option takes no account of the AMWG's Adaptive Management Flow Regime for the Opihi catchment, which assumes present affiliated above-dam consents continue to be "coupled" to the Opuha Scheme. If the above-dam consents were de-coupled, OWL would have no discretion to impose restrictions on the exercise of those consents in accordance with the AMWG's proposed regime. This would create an unusual situation when mainstem (below dam) irrigators are on restriction because the lake level or snow pack is such that a water shortage regime has been imposed, while above-dam users are unrestricted on their tributaries. Such an outcome could have a detrimental impact on the flows and ecological health of the mainstem downstream.

OWL understands that the main reasoning for ECan's suggestion that the "de-coupling" option be considered is to address a perception that the "above-dam" consents are 'double hit' by restriction i.e. restrictions placed on both the tributary and the mainstem at SYB. The AMWG regime, however, proposes an alternative restriction regime for affiliated above-dam consents recognising tributary minimum flows are more restrictive than the proposed regime for below dam irrigators. Under this regime, affiliated above-dam consents will not be subject to the Level 1 restriction regime if imposed; and if a Level 2 restriction regime is imposed, affiliated above-dam consents will be subject to the same restrictions as affiliated below dam consents, except when the level of Lake Opuha is rising in which case the affiliated above-dam consents will be subject to the Level 1 restriction regime. OWL believes that this aspect of the AMWG proposal addresses any perceived concerns regarding the minimum flow regime for the "above dam" consents.

Finally, as noted later in this report, OWL seeks that provision be made in the OTOP sub-regional plan for irrigation schemes/principal water suppliers to hold scheme-wide nutrient discharge consents. The "de-coupling" option would preclude OWL from having any influence over these water users in terms of their on-farm activities through Farm Environment Plans required under an Opuha Scheme-wide nutrient discharge consent,

as the above-dam water users would be operating under individual land use (to farm) consents.

Recommendations sought:

- ***That the OTOP sub-regional plan recognises the existing hydrological model for the Opuha Scheme; and specifically***
- ***That the OTOP sub-regional plan continues to recognise and provide for the offset of the takes from the 'above dam' tributaries (North Opuha, South Opuha, Upper Opihi, Te Ana a Wai) by the release of water down the main stem from the Opuha Dam; and***

3.2.2 Tributary minimum flows

Approximately 20% of the shared water utilised by Opuha shareholders is abstracted from the above dam tributaries of the Opihi catchment. OWL understands that existing minimum flows on these tributaries are being reviewed by Environment Canterbury (ECan) alongside the OTOP ZC as part of the Healthy Catchments Project.

OWL has been provided with a copy of the ECan memo 'Opihi River Catchment – Ecological Flow Review' (dated 13 July 2017) (ECan Memo). That Memo records ECan's preliminary ecological flow recommendations, which have been based on a desktop study of available data and the proposed "interim limits" contained in the *Proposed* National Environmental Standard for Ecological Flows and Water Levels (Proposed NES).

However, these recommendations do not take into account the wider Opihi catchment hydrology and in particular the 'offset' provided to the mainstem flows for the tributary abstractions previously discussed. The ecological flow recommendations also fail to acknowledge the benefit to the main stem of these offsets, which provide higher flows in the upper reaches between the Dam and the tributary confluences. OWL considers it is appropriate that these 'offsets' (and their associated benefits) be taken into account as part of the review of existing tributary minimum flows,

The ECan Memo states that each of the tributary rivers supports diverse fish species and generally have a macro-invertebrate community that indicates good to excellent water quality/habitat, with the exception of the low QCMI scores in the 2014/15 season. However, there is little recognition that this was a particularly dry summer with no rainfall, very limited irrigation due to restrictions, and the rivers suffered due to these extreme dry conditions independent of irrigation.

OWL appreciates that the review of minimum flows currently underway as part of the Healthy Catchments Project is necessary for the development of a robust sub-regional planning framework for the OTOP Zone. However, it is concerned that the methodology adopted by ECan in formulating its present recommendations (as recorded in the ECan Memo) does not reflect the current status of the Proposed NES or the approach it contemplates for determining ecological flows in regional plans.

In this regard, OWL notes that:

- The Proposed NES is a proposed national standard that was released in the form of a discussion document for public consultation in 2008. It has not progressed beyond a "proposal", and as such, should be treated as no more than a guideline.
- The Proposed NES states that the proposed "interim limits" (for minimum flow and allocation) apply to water bodies for which there are no environmental flows or water levels specified in a proposed or operative water plan. The stated intention is that the limits will apply until an alternative is established through regional plan provisions.
- The Proposed NES identifies methodologies for determining ecological flows and water levels where such flows/levels are under review in a regional plan or are being added to a regional plan. These methodologies are based on case by case technical assessments.

OWL is particularly concerned that the methodology adopted by ECan, which applies the proposed "interim limits", does not enable a case by case assessment of the individual tributaries, and precludes the following relevant matters from being taken into account:

- existing minimum flows regimes, which have been set through robust resource consent processes, following expert analysis and stakeholder consultation.
- local or regional circumstances, including matters such as:
    - the aquatic values of each affected tributary and their significance;
    - the connectivity of different waterbodies, which is hugely important in a catchment like the Opihi (as has already been discussed regarding the 'offsets').
    - the characteristics of modified, augmented systems such is the Opihi catchment.

OWL has engaged a freshwater ecologist, Mr Greg Ryder, to assist in the review of, and provide advice in relation to, information concerning the minimum flow review currently underway. Mr Ryder has reviewed the ECan Memo and his expert opinion is that the present ecological flow recommendations lack justification based on the information presented. Mr Ryder has also expressed concern to OWL that there is presently limited available data regarding the fish communities in the Opihi catchment and their significance, and that such data is essential to the formulation of targeted recommended flow regimes. In Mr Ryder's view, it is arguable whether changes in existing minimum flows are necessary if fish populations are currently in a good state with respect to abundance and health.

OWL understands that ECan has recently tendered for instream habitat assessment work to be undertaken over the upcoming summer, and assumes that the information gaps identified by Mr Ryder will be addressed as part of that work.

OWL considers that it would be appropriate for the outcome of the habitat assessment work to be made available to interested parties (including OWL) and an opportunity provided for an informal expert caucusing process on ecological flow recommendations prior to the ZC's intended consultation with the wider community on any ecological flow

proposals. In OWL's view, such collaboration at this point in the sub-regional plan development process would lead to cost and time efficiencies for all parties, and is likely to result in more robust outcomes for the OTOP Zone.

Finally, OWL notes that the economic and social costs of any recommended ecological flow regime is a matter that the ZC and ECan are obliged to consider (under section 32 RMA) when formulating any recommendations for the future OTOP sub-regional plan. In this regard, the ZC has already heard from the Te Ngawai Water Users Group and the 'Above Dam' Irrigators Group, and will be hearing from the South Opuha Irrigators on 11 September. These irrigators are greatly concerned that the ZC's decisions on ecological flows will impact on their well-being and livelihoods and may be made without genuine consultation and in the absence of robust economic and social analysis of the implications of any changes. Of particular concern to these groups is that they have no alternative sources of water supply to turn to – there is no deep groundwater and no 'new water' proposals in these catchment areas. Any increase in existing minimum flows will therefore directly impact their reliability and their ability to farm.

OWL therefore respectfully requests that a robust and meaningful consultation process be adopted so that these, and other consent holders who will be directly affected by any recommended changes to existing minimum flow regimes, have the opportunity to provide feedback and engage with the ZC on these issues.

Recommendations sought:

- ***That the review of minimum flows and allocation for the 'above dam' tributaries recognises the offset in the main stem and the benefit it provides to the upper reaches of the river as well as the lagoon/rivermouth.***
- ***That there be genuine consultation with potentially affected consent holders on the ZC's recommendations for tributary minimum flows, informed by robust economic and social analysis of the implications of any changes.***
- ***That the outcome of the tendered ecological work (including the raw data) be made available to interested parties as soon as it is completed.***
- ***That in the interests of collaboration and minimising costs to all parties later in the planning process, there be an opportunity for expert caucusing following the completion and analysis of the tendered ecological work by the interested parties.***
- ***That provision be made for the experts to report back to the ZC on the outcome of that caucusing prior to the ZC's intended consultation with affected consent holders.***

3.2.3 Main Stem/ Scheme Allocation

The Opihi River Regional Plan (**ORRP**) prescribes four consent classes in the Opihi Catchment based on the date of grant and affiliation status to the Opuha Scheme, as follows:

- AA – consents granted prior to 1994 and affiliated;
- AN – consents granted prior to 1994 and non-affiliated;
- BA – consents granted after 1994 and affiliated; and
- BN – consents granted after 1994 and non-affiliated.

To be 'affiliated', a consent holder must have purchased sufficient OWL shares or have a relevant agreement with OWL to entitle them to abstract water released from Lake Opuha when OWL is complying with the conditions of its discharge permits.

OWL understands that the present ORRP approach to consenting water takes and water allocation does not fit comfortably with the planning framework of the CLWRP and the requirements of the National Policy Statement for Freshwater Management 2014 (NPSFM) for allocation limits on surface water and groundwater resources. It also accepts that a simplified allocation framework for the Opihi catchment is desirable.

OWL has had preliminary discussions with ECan staff regarding potential options for a new sub-regional allocation framework. At this stage, OWL sees merit in a framework that provides an allocation limit for the Opuha Scheme capped at the shared maximum irrigation flow rate of existing AA and BA consents (i.e. surface water and stream depleting groundwater takes), with separate 'A' and 'B' permit allocation limits capped at existing allocations under AN and BN consents respectively (or an alternative approach for non-affiliated consents). This approach would ensure that affiliated water uses continue to benefit from augmented flows. It will also ensure that the benefit of any gains (e.g. efficiencies) are retained within the scheme and could be used for improve the reliability of existing affiliated takes.

An Opuha Scheme allocation limit essentially allocates OWL with a 'bucket' of water. OWL believes, however, the 'bucket' of stored water may get bigger and as a consequence, further water could be made available for allocation. As a hypothetical example, if the Opuha Dam was to be raised by a metre, there could be further water stored to allocate to 1) improve reliability of existing irrigators; 2) environmental flows; and/or 3) new irrigation. While there are no proposals on the table at present, OWL considers it is important that the OTOP sub-regional planning framework does not foreclose the opportunity for consents to be granted in the future in such circumstances.

As previously outlined, the sum of all shares held by affiliated water users equate to a maximum irrigation flow of 6.6 cumecs, and 'operational surplus' water is provided at a maximum of 425 L/s. For completeness, OWL notes, that the sum of consented takes by affiliated water users may exceed this due to individual consent holders having alternative consented take locations. While these consents enable water to be moved around (subject to consent conditions), the overall take is still constrained by the individual shareholding with OWL.

Recommendations sought:

That the OTOP sub-regional plan's water allocation framework:

- ***provides an allocation limit for the Opuha Scheme that reflects the maximum irrigation flow rate of 7.038 cumecs; and***
- ***recognises that the Opuha Scheme shall retain the benefit of any in-Scheme efficiency gains; and***
- ***provides a consenting framework that does not foreclose opportunities to take beyond the Opuha Scheme allocation limit in appropriate circumstances; and***
- ***recognises that while 'on paper' the consented allocation of AA and BA consent holders may exceed 7.038 cumecs, at any given time, the maximum irrigation flow rate will be no greater than 7.038 cumecs.***

3.2.4 Tributary allocation

OWL understands that in addition to minimum flows, allocations within the tributary waterways will be reviewed as part of the Healthy Catchments Project.

OWL also understands that this workstream is yet to commence due to the delay in attaining robust resource consent inventory numbers. It is therefore unclear what approach ECan plans to take with the tributary allocations, and in particular, whether the Proposed NES's "interim limits" for allocation will be adopted.

It is noted that in terms of allocation, the Proposed NES states:

- For rivers and streams with mean flows less than or equal to 5 cumecs:

  *… an allocation limit of, whichever is the **greater** of:*
  - *30% of MALF as calculated by the regional council*
  - *The **total allocation** from the catchment on the date that the national environmental standard comes into force less any resource consents surrendered, lapsed, cancelled or not replaced.*

- For rivers and streams with mean flows greater than 5 cumecs:

  *…an allocation limit of, whichever is the **greater** of:*
  - *50% of MALF as calculated by the regional council*
  - *the **total allocation** from the catchment on the date that the national environmental standard comes into force less any resource consents surrendered, lapsed, cancelled or not replaced.*

As already discussed, it is OWL's view that the Proposed NES should be treated as a guideline only. However, if it is to be used for the purpose of setting allocation limits as part of the Healthy Catchments Project, OWL strongly believes that the proposed "interim

limits" should be applied as intended; i.e. it would be inappropriate to 'pick and choose' which parts of the "interim limits" to adopt or not. Doing so may have severe consequences for some tributary water users, for example those in the South Opuha catchment, where the current surface water allocation would reduce by half if the recommended allocation limit was based on 30% MALF. OWL understands ECan has undertaken an assessment that indicates as a catchment the Opihi (excluding Temuka) is not overallocated. For the purpose of setting allocation limits, OWL considers it would be appropriate for the Opihi Catchment to be viewed as a whole system, connected via the Opuha Scheme, and for the "offsets" provided by the Opuha Dam to be recognised.

Recommendations sought:

That the OTOP sub-regional plan's water allocation framework:

- ***Views the Opihi catchment (excluding Temuka) as a whole catchment when setting the allocation limits; and***
- ***Sets the Opihi catchment's allocation limits based on the existing total allocation from the catchment.***

3.2.5 Future management of Opuha Scheme consented allocation

OWL holds consents for three irrigation schemes to divert and take water from the Opuha and Opihi Rivers. These consents specify the rate of take, when the water can be taken and what the water can be used for, among other things. Within these sub-schemes, water is allocated according to shared entitlement rather than any individual's water consent (with the exception of some affiliated Kakahu water users who take augmented water from the Kakahu River).

There are also affiliated water users who operate directly off the Opuha and Opihi Rivers as well as the Te Ana a Wai, the Upper Opihi (above the confluence) and the rivers and streams above the dam. These affiliated irrigators take directly from rivers or stream depleting wells, and therefore have individual consents for their water takes.

The water short 2014/15 and 2015/16 irrigation seasons, in particular, demonstrated the value that would have been gained by being able to operate in line with the 'water user group' concept, where restrictions could be managed scheme wide, for example, rather than on an individual basis and water allocations based on shareholding could be rationed and reallocated based on short term availability and demand to make best use of the limited water.

OWL considers that there would be merit in the sub-regional plan providing mechanisms to enable the global management of affiliated consents, e.g. through the application of the 'water users group' concept (as per region-wide CLWRP Policies 4.67 and 4.72) on a Scheme-wide basis and the amalgamation of consents held by OWL and individual affiliated consents into one scheme 'global consent'.

The concept of a scheme global water consent is complex and has significant implications for OWL and affiliated water users. While the move towards this global management approach may be some time away, OWL wishes to ensure the ability to operate under such a framework is not foreclosed in the future.

OWL notes that the amalgamation of existing consents into a new 'global consent' would initially involve the transfer of individual affiliated consents to OWL. As a consequence, the ZC's 'solutions package' (and any subsequent sub-regional transfer provisions developed) would need to ensure that such transfers could be facilitated in a similar way to the transfer of a consent to a new owner of a site, where there is no change to the location of the take. This scenario is not presently contemplated by the region-wide CLWRP transfer provisions.

Recommendation sought:

That the OTOP sub-regional plan enables:

- ***the application of the water users group concept under region-wide CLWRP policies 4.67 and 4.72 to the Opuha Scheme; and***
- ***the transfer of individual affiliated consents to Opuha Water Ltd (as a Principal Water Supplier), and the future operation and management of the Opuha Scheme's allocation under a global consenting framework.***

3.2.6 BN takes

Unlike AN consented takes, BN takes, which are essentially high flow takes, are presently uncapped and in recent years ECan has granted consent for a number of BN takes which enable flood flow harvesting.

OWL is particularly concerned with the impact BN consents granted in the catchments above Lake Opuha (the North and South Opuha) will have on the reliability of all affiliated water users. The volume of water that is 'harvested' under high flow (BN consent) conditions represents a direct reduction in the water that flows into the lake and therefore reduces the storage water available for subsequent augmentation of the downstream catchment for environmental flows, community supply and affiliated water takes downstream. This has a direct detrimental impact on water availability for all the affiliated 'below dam' water users and also has an indirect impact on the 'above dam' users by reducing OWL's ability to maintain Saleyards Bridge flow. It also reduces the water available for hydro generation at Opuha Dam.

Recommendation sought:

- ***That the OTOP sub-regional plan caps the BN allocation in the North and South Opuha at existing consented allocation to prevent more 'flood harvesting' water being allocated in these catchments.***

3.2.7 Reasonable use

Schedule 10 of the LWRP provides a methodology to determine the seasonal annual volume of an irrigation water consent based on meeting demand conditions that occur in nine out of ten years. While this may be appropriate for a run of river or groundwater scenario, it does not 'fit' well with an Irrigation Scheme or Principal Water Supplier whose scheme is based on water storage and augmentation of river flows where those augmented pay for and expect high (>90%) reliability water. In this regard, OWL notes that reasonable use determines a volume sufficient to meet demand 9/10 years, but those augmenting would expect higher.

Recommendation sought:

- ***That the OTOP sub-regional plan provides an alternative approach to calculating annual consent volumes which reflects the OWL shareholding rather than the current Schedule 10 requirements.***

3.2.8 Stream Depleting Takes

OWL understands and accepts Environment Canterbury's wishes to make changes to the method of calculating the rate of stream depletion in the Opihi catchment from a 30 day pumping test (as currently provided for in the ORRP) to a 150 day test (as in LWRP, Schedule 9) as it is elsewhere in Canterbury. Essentially this change would mean that groundwater consent holders not currently tied to minimum flows on these waterways may be deemed to be stream depleting and a minimum flow condition would be included in their consent.

OWL is concerned that there is the perception that these adversely affected consent holders may be able to buy shares in OWL and be supplied water from the Opuha Dam. OWL wish to make it clear that it has no additional shares or water to allocate. OWL currently releases water from Lake Opuha for affiliated AA and BA water users, and some 'unshared' irrigators who use 'operational surplus' water gained through efficiencies. Any increase in shareholding of OWL would negatively impact the reliability of existing affiliated water users, and as a farmer owned co-operative company, this is highly unlikely to gain support.

Recommendation sought:

- ***That the OTOP sub-regional plan ensures that OWL affiliated water users are not adversely impacted by any recommended changes to the present ORRP stream depletion assessment methodology.***

3.2.9 On-farm storage

The Opuha Scheme is founded on a large scale storage reservoir. OWL recognises that smaller scale on-farm and in-scheme storage facilities also have a role to play in improving water use and distribution efficiency within the scheme and wider Opihi catchment.

On-farm storage provides irrigators with more discretion and flexibility in the timing and rate of irrigation applied, and provides operational flexibility to be able to deal with planned or unplanned stoppages. During restriction periods in particular, on-farm storage is able to offer some buffering to the water restrictions for the irrigator.

Operationally across the Opuha Scheme, on-farm storage facilitates a steady draw-off of water which is far more efficient to provide through the Opuha Scheme infrastructure. It also enables a higher 'lake to land' transfer by reducing the losses associated with start-up, shut down and ramping of irrigation takes from the scheme.

As such OWL considers it appropriate that the OTOP sub-regional plan is enabling of on-farm and in-scheme water storage.

Recommendation sought:

- ***That the OTOP sub-regional plan recognises the efficiencies in water use and distribution that can be achieved through on-farm and in-scheme water storage, and is enabling of such storage in the Opihi catchment.***

3.2.10 Changes in consented 'use'

While not a matter specific to OWL, OWL understands that the LWRP's approach to coupling 'take and use' has precluded proposals in other sub-regions to change consented 'use' of water (e.g. from stockwater supply to irrigation) where there is no material change to the consented 'take'.

OWL considers it is important for the sub-regional plan to provide a consenting pathway for changes to consented 'use', to enable more innovation and efficiency with respect to the use of water in the Zone.

Recommendation sought:

- ***That the OTOP sub-regional plan provides a consenting pathway for changes to consented 'use' of water.***

3.3 Water Quality

3.3.1 Nutrient management provisions

The LWRP includes region-wide provisions to enable Principal Water Suppliers and Irrigation Schemes to manage nutrient losses within their command area by holding a discharge consent. The use of land for farming activities where water is supplied by such schemes is a Permitted Activity as long as the scheme holds a resource consent for the discharge of nutrients that specifies the maximum amount of nitrogen that may be leached (annual N load).

For a variety of reasons, including not wanting to cut across the OTOP sub-regional plan process, OWL has not, to date, applied for a scheme nutrient discharge consent. It is important to the scheme, however, that this provision remains to provide OWL this option into the future.

Recommendation sought:

- ***That the OTOP sub-regional plan enables Irrigation Schemes or Principal Water Suppliers to apply for a consent that authorises the discharge of nutrients from their respective schemes***

OWL understands that various technical work streams are currently being undertaken to assist the ZC formulate its recommendations for the future management of land use and nutrient discharges within the Zone. OWL would welcome the opportunity to provide feedback on options and/or be involved in future discussions on nutrient limits / reduction regimes and how such regimes might work for different constraints or limits of sub-catchments within the Opuha Scheme boundaries.

3.3.3 Water Quality Limits – Lake Opuha

The Trophic Level Index (TLI) is an indicator of lake water quality developed for NZ lakes. The TLI for Lake Opuha is derived from three water quality parameters: total nitrogen (TN), total phosphorus (TP), and chlorophyll a. Higher values indicate greater nutrient enrichment, more algal biomass and lower water clarity

The region-wide freshwater outcomes for Canterbury lakes set out in Table1b of the CLWRP specifies a TLI of 3 for 'Artificial – On-river' lakes. Lake Opuha falls within this categorisation. However monitoring of Lake Opuha by both Environment Canterbury and OWL indicates the TLI largely sits between 3 and 4. OWL monitoring of TLI since 2005 gives an average TLI of 3.6 (see Appendix 1).

ECan's current state report '*Orari, Temuka, Opihi and Pareora Zone: state and trends in water quality and aquatic ecology*'[1] suggests that this average is "somewhat surprising given the reasonably low nutrient status of the two main inflowing tributaries", and suggests that this TLI is a reflection of the artificial management of the lake. In particular, the variable lake levels prevent the establishment of macrophytes and therefore the degree of nutrient uptake by these aquatic plants. In-lake nutrient cycling also has an influence on the TLI.

Lake Opuha is first and foremost a storage reservoir and as such the lake levels vary as a function of inflows and outflows. The large operating range means that there is very little opportunity for the macrophyte community to establish. As such OWL believes that the LWRP region-wide water quality outcomes are unsuited to Lake Opuha and a site-specific approach is justified for the OTOP sub-regional plan. This includes provision for the TLI to exceed the freshwater outcome sought in the plan if this is deemed to be

[1] Hayward, S., Clarke, G., Dynes, K., Bamden, A., Arthur, J., and Barbour, S. (2016) Orari, Temuka, Opihi and Pareora Zone: state and trends in water quality and aquatic ecology. Environment Canterbury Technical Report No. R16/63

outside of OWL's control. For example, the recent (August) TLI of the lake has been reported as being 4.5 (eutrophic). This is not due to the operation of the dam but rather due to the extreme high inflows during July.

Recommendation sought:

- ***That the freshwater outcome of TLI 4 for Lake Opuha be included in the OTOP sub-regional plan to recognise that the lake is first and foremost a storage reservoir with variable lake levels and a large operating range, and to reflect the monitoring data over the last 12 years.***
- ***That site specific ecological health indicators be developed for Lake Opuha.***

CONCLUSION

OWL wishes to thank the Zone Committee for the opportunity to engage with its members through the Sub-Regional Plan process, and to assist in the development of a solutions package and subsequent sub-regional plan with the best environmental outcomes, consistent with the expectations of the key stakeholders and communities within the Zone.

OWL considers that the recommendations it has sought from the Zone Committee will provide appropriate recognition of the Opuha Dam and the Opuha Scheme, and the benefits of augmentation in the Opihi catchment for environmental flows, community supply and affiliated water takes.

Appendix 1: TLI of Lake Opuha over monitoring period 2005-2017

Lake Opuha - Trophic Lake Index (TLI)

	Chloro mg/m³	TN g/m³	TP g/m³	TLc	TN mg/m³	TLn	TP mg/m³	TLp	TLI	TLI Grade
9/08/2005	2.1	0.28	0.007	3.038	280	3.756	7	2.686	3.160	MESO
16/11/2005	25	0.32	0.019	5.771	320	3.931	19	3.952	4.551	EUTRO
22/02/2006	3.8	0.26	0.009	3.693	260	3.659	9	3.004	3.452	MESO
15/05/2006	1.6	0.31	0.013	2.738	310	3.889	13	3.471	3.366	MESO
14/08/2006	2.7	0.99	0.009	3.316	990	5.407	9	3.004	3.909	MESO
6/11/2006	3.2	0.76	0.01	3.503	760	5.061	10	3.138	3.901	MESO
8/02/2007	2.1	0.51	0.008	3.038	510	4.540	8	2.855	3.478	MESO
17/05/2007	0.95	0.42	0.013	2.163	420	4.286	13	3.471	3.307	MESO
21/08/2007	0.78	0.47	0.007	1.946	470	4.433	7	2.686	3.022	MESO
12/11/2007	1.3	0.3	0.008	2.509	300	3.846	8	2.855	3.070	MESO
20/02/2008	1.5	0.46	0.019	2.667	460	4.405	19	3.952	3.675	MESO
15/05/2008	3.7	0.28	0.014	3.663	280	3.756	14	3.565	3.661	MESO
13/08/2008	2.8	0.83	0.017	3.356	830	5.176	17	3.811	4.114	EUTRO
6/11/2008	3.6	0.64	0.1	3.633	640	4.837	100	6.058	4.843	EUTRO
10/02/2009	2.2	0.34	0.017	3.090	340	4.010	17	3.811	3.637	MESO
11/05/2009	3.9	0.34	0.009	3.721	340	4.010	9	3.004	3.578	MESO
10/08/2009	2.8	0.9	0.022	3.356	900	5.282	22	4.138	4.259	EUTRO
10/11/2009	3.5	0.47	0.009	3.602	470	4.433	9	3.004	3.680	MESO
4/02/2010	3.2	0.25	0.007	3.503	250	3.608	7	2.686	3.266	MESO
13/05/2010	2.8	0.45	0.021	3.356	450	4.376	21	4.079	3.937	MESO
18/08/2010	11	1.1	0.024	4.865	1100	5.545	24	4.248	4.886	EUTRO
4/11/2010	3.2	0.54	0.01	3.503	540	4.615	10	3.138	3.752	MESO
24/01/2011	3.1	0.32	0.014	3.468	320	3.931	14	3.565	3.654	MESO
7/09/2011	4.1	0.47	0.011	3.776	470	4.433	11	3.259	3.823	MESO
12/12/2011	2.5	0.35	0.01	3.231	350	4.048	10	3.138	3.472	MESO
6/03/2012	3.3	0.23	0.012	3.537	230	3.499	12	3.369	3.468	MESO
25/05/2012	0.88	0.25	0.008	2.079	250	3.608	8	2.855	2.847	OLIGO
7/08/2012	3	0.03	0.008	3.432	30	0.836	8	2.855	2.374	OLIGO
18/12/2012	3	0.47	0.012	3.432	470	4.433	12	3.369	3.745	MESO
7/02/2013	3	0.26	0.009	3.432	260	3.659	9	3.004	3.365	MESO
8/05/2013	3	0.41	0.019	3.432	410	4.254	19	3.952	3.879	MESO
25/09/2013	3	0.73	0.009	3.432	730	5.009	9	3.004	3.815	MESO
3/12/2013	2.5	0.33	0.007	3.231	330	3.971	7	2.686	3.296	MESO
27/02/2014	4.9	0.15	0.011	3.973	150	2.940	11	3.259	3.391	MESO
14/05/2014	0.8	0.26	0.013	1.974	260	3.659	13	3.471	3.035	MESO
20/10/2014	4.9	0.5	0.01	3.973	500	4.514	10	3.138	3.875	MESO
11/11/2014	5	0.53	0.015	3.995	530	4.590	15	3.652	4.079	EUTRO
3/02/2015	6.5	0.24	0.015	4.285	240	3.554	15	3.652	3.830	MESO
9/07/2015	2.6	0.65	0.008	3.274	650	4.857	8	2.855	3.662	MESO
17/08/2015	1.9	0.9	0.011	2.928	900	5.282	11	3.259	3.823	MESO
10/11/2015	9.4	0.61	0.009	4.692	610	4.774	9	3.004	4.157	EUTRO
1/02/2016	12.4	0.27	0.008	4.997	270	3.708	8	2.855	3.854	MESO
26/05/2016	1.8	0.39	0.01	2.868	390	4.189	10	3.138	3.398	MESO
9/08/2016	1	0.57	0.015	2.220	570	4.685	15	3.652	3.519	MESO
3/11/2016	1.2	0.49	0.007	2.421	490	4.487	7	2.686	3.198	MESO
14/02/2017	2.9	0.4	0.01	3.394	400	4.222	10	3.138	3.585	MESO
9/05/2017	6.2	0.48	0.01	4.233	480	4.461	10	3.138	3.944	MESO
	average	average	average							
	2.620	0.466	0.010	3.282	466	4.422	10	3.188	3.631	MESO

See TLI Category (Grade) description on following page.

TLI Category	TLI	Description
Microtrophic	<2	Lakes are very clean and often have snow or glacial sources (eg Lake Pukaki in Canterbury)
Oligotrophic	2-3	Lakes are clear and blue, with low concentrations of nutrients and algae (eg Lake Rotoma in Bay of Plenty)
Mesotrophic	3-4	Lakes have moderate concentrations of nutrients and algae (eg Lake Rerewhakaaitu in Bay of Plenty)
Eutrophic	4-5	lakes are murky, with high concentrations of nutrients and algae (eg Lake Rotoroa in Northland)
Supertrophic or Hypertrophic	>5	Lakes have extremely high concentrations of phosphorus and nitrogen, and are overly fertile; they are rarely suitable for recreation and lack habitats for desirable aquatic species (eg Lake Forsyth in Canterbury).